



Lao People's Democratic Republic
Peace Independence Democracy Unity Prosperity

Environmental Impact Assessment Guidelines



October 2012



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Prosperity**

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Prepared by: Environmental
Management Support
Programme (EMSP)

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This EIA report writing guideline is building on an earlier draft which was developed by the UNDP-UNEP Poverty-Environment Initiative (PEI) of the Lao PDR. PEI continues to complement this work by EMSP by supporting the dissemination and capacity building of DESIA staff of MONRE, EIA consultancy companies and project developers.

List of Acronyms

ADB	Asian Development Bank
ALARP	As Low as Reasonably Practicable
AS	Australian Standard
AS/NZS	Australian Standard/New Zealand Standard
CA	Concession Agreement
CGM	Complaints and Grievances Mechanism
CIA	Cumulative Impact Assessment
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
ECC	Environmental Compliance Certificate
EIA	Environmental Impact Assessment
EMDP	Environmental Minorities Development Plan
EMMP	Environmental Management and Monitoring Plan
EMS	Environmental Management System
EMSP	Environmental Management Support Program
ESD	Environmental and Social Department
ESMMP	Environmental & Social Management and Monitoring Plan
ESMU	Environmental and Social Management Unit
EU	European Union
GIS	Geographic Information System
GOL	Government of the Lao PDR
HIA	Health Impact Assessment
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome
IEE	Initial Environmental Examination
IFC	International Finance Corporation
ISO	International Standard Organization
L_{Aeq}	Equivalent Continuous Sound Level A-weighted
MOU	Memorandum of Understanding
NGO	Non Government Organization
NTFP	Non Timber Forest Product
PCDP	Public Consultation and Disclosure Plan
PM	Prime Minister
PMO	Prime Minister's Office
PWREOs	Provincial Water Resources and Environment Offices
OHSAS	Occupational Health and Safety Standard
RAP	Resettlement Action Plan
RU	Resettlement Unit
SDP	Social Development Plan
SI	Système International d'unités (International Standard System of Units)
SIA	Social Impact Assessment
SMMP	Social Management and Monitoring Plan
STDs	Sexually Transmitted Diseases
TOR	Terms of Reference
UNDP	United Nations Development Programme
USEPA	United States Environmental Protection Agency
UXO	Unexploded ordnance
VEC	Valued Ecosystem Component
WB	World Bank
WHO	World Health Organization
MONRE	Water Resources and Environmental Administration

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Preface

These EIA Guidelines have been developed by the Ministry of Natural Resources and Environment (MONRE) of the Lao PDR in consultation with line ministry agencies, provincial governments, project developers and EIA consultants, and with technical assistance from a team of experts from the international consulting company Grontmij and the Finnish Environment Institute (SYKE).

Development of the EIA Guidelines was co-funded by the Ministry for Foreign Affairs of Finland through the Environmental Management Support Programme, and by the UNDP through the Poverty and Environment Initiative.

The purpose of these guidelines is to guide and assist project developers and their consultants in conducting and reporting the results of environmental impact assessment studies of projects in the Lao PDR. The goal is to ensure that the EIA reports include adequate project descriptions, impact assessments and mitigation measures that are prepared using sound, professional, and scientific tools and methods. The guidelines focus on providing guidance on preparing easily understandable EIA reports.

These guidelines have been prepared based on many years of practical experience in preparing and reviewing EIAs in the Lao PDR, as well as in other developing and industrialized countries. The EIA Guidelines are in line with the Lao PDR *Decree of Environmental Impact Assessment* (no. 112/PM, 16 February 2010) for category 2 projects (i.e., those identified as having significant potential impacts [Article 2]); with recent guidelines issued under the Decree; and with other legislation and guidelines in the Lao PDR. The EIA Guidelines will be useful to the EIA consultant during preparation of the EIA report, and will facilitate the review and approval process by the government authorities.

The EIA Guidelines will be revised after a trial period of two years to incorporate new developments in the EIA field, changes in environmental legislation, and comments from EIA practitioners and government authorities.

MONRE strongly emphasizes the need for project developers and consultants to follow these EIA Guidelines in preparing EIA reports.

Definitions

Adaptation – adjustment of natural or human systems to a new or changing environment. Adaptation to climate change refers to adjustments of natural or human systems in response to actual or expected climatic stimuli or their effects, either to moderate harm or to take advantage of beneficial opportunities. Various types of adaptation can be identified, including anticipatory and reactive adaptation, private and public adaptation, and autonomous and planned adaptation.

Adverse impact – any adverse environmental, social, socio-economic, health, occupational safety or health effect suffered or borne by any entity, natural person, or natural resource, including, but not limited to, the environment, flora and fauna. Such impacts may be attributed in any degree or extent to, or arise in any manner from any action or omission on the part of the project developer, or from the project or any activities related thereto.

Applicable Laws – all existing and future laws, regulations, treaties and other international obligations of the Lao PDR applicable to the project developer's activities or to the project.

Baseline – baseline conditions are the conditions of an area potentially affected by a proposed project that exist prior to initiation of the project. Existing baselines are established prior to pre-construction, construction and operation of proposed projects in order to evaluate effects on the environment.

Best Practices mean practices to which the project developer will commit, which are not yet required by applicable laws, but are nonetheless are recognized by a consensus of relevant stakeholders, including government, industry, labor, financial institutions and academia as being practices which have been adopted by leading, reputable companies of international standing and which, when carried out by the project developer, can be expected to further to reduce the adverse impacts arising from the project and activities related thereto.

Biodiversity refers to the variety of life on earth: the number of plants, animals and other organisms that exist on our planet and the variety within these species and the ecosystems they inhabit.

Biophysical – that part of the environment that does not originate with human activities (e.g., biological, physical and chemical processes); pertaining to the natural environment.

Climate Change – a change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere, and which is, in addition to natural climate variability, observed over comparable time periods.

Compensation – monetary payment or replacement in kind for losses resulting from a development project; the re-creation of lost or damaged habitat.

Competent Authority is any person or organization that has the legally delegated or invested authority, capacity, or power to perform a designated function.

Complex Project refers to an investment project that has substantial impacts on the environment and society, including impacts beyond the borders of the jurisdiction under

consideration, or a cumulative impact on other investment projects, or in which complex technology is applied.

Construction Phase refers to a specific period, stipulated in a contract and beginning on the date stated in the notice to proceed, during which the contractor must complete construction, subject to the conditions of the contract.

Cumulative Impact – is defined as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions.”

Direct Impact (primary impact) (first order impact) is an impact that follows as a direct consequence of a project activity.

Ecosystem is a community of interdependent plants, animals and other living organisms, including humans, together with the environment that supports them and with which they interact.

Effects/Impacts (synonymous) – are reactions to changes in the environment as a result of project actions. Effects, whether direct, indirect or cumulative, can be ecological, such as effects on components of natural resources, on the structure and/or functioning of affected ecosystems, or on aesthetic, historic, cultural, economic, or social features.

Emission Limit Values or ELV is a figure specifying the concentration or load of a pollutant allowed to be emitted or discharged to the environment from a specific installation in a given period of time or per unit of production.

Environment is the complex web of interrelationships between living and non-living components which sustain all life on earth, including the social/health aspects of human group existence. It also includes the physical, biological, social, spiritual and cultural components which are interrelated and affect the growth and development of living organisms.

Environmental Compliance Certificate or ECC is a legal document through which MONRE approves an environmental examination or environmental impact assessment report, or an environmental and social management and monitoring plan (ESMMP).

Environmental and Social Management and Monitoring Plan or ESMMP means a plan formulated in an environmental impact assessment report that defines the main environmental and social activities, and measures to prevent, reduce or mitigate environmental and social impacts. ESMMPs also include definitions of organizational structures and responsibilities, schedules and sufficient budgets for implementation of environmental and social management and monitoring activities during the construction, operation and termination phases of a project.

Environmental Impact Assessment or EIA means studying, surveying, researching, analyzing and estimating possible positive and negative impacts generated by a project on the environment and society, including short and long term impacts on health. Projects subject to EIA are designated in Category 2, Article 2 of the Lao PDR *Decree of Environmental Impact Assessment* (no. 112/PM, 16 February 2010). In addition, EIAs include appropriate alternatives, environmental management and monitoring plans (EMMPs), and social management and monitoring plans (SMMPs) to prevent or mitigate possible impacts that are likely to occur during all phases of an investment project.

Environmental Quality Standard or EQS is a measure of the state of a specific environmental medium with regard to a specific pollutant that represents the upper limit of acceptability designed to protect human health or the ecosystem.

Greenhouse Gases are defined to be carbon dioxide (CO₂), carbon monoxide (CO), nitrous oxide (N₂O), oxides of nitrogen (NO_x), methane (CH₄), and non-methane volatile organic compounds (NMVOCs). The Kyoto Protocol also addresses hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆).

Indirect Impacts (secondary impacts) (higher order impacts) are environmental effects that are at least one step removed from a project activity in terms of cause-effect linkages. Also included are impacts caused by an action that occur later in time or farther removed in distance, but that are still reasonably foreseeable (e.g., development in undisturbed areas as a result of access road building).

Initial Environmental Examination or IEE means studying, surveying, researching and analyzing data to estimate initial environmental and social impacts, including impacts on health, that may arise from investment projects listed in Category 1 of Article 2 of the Lao PDR *Decree of Environmental Impact Assessment* (no. 112/PM, 16 February 2010). IEE also includes identifying measures to prevent and mitigate possible environmental and social impacts.

Involvement – means the process of consulting and disseminating information on an investment project to gather comments from people or groups who are likely to be affected by, gain benefits from, or have an interest in the project. The comments are to be used as references in preparing and deliberating on an initial environmental examination (IEE), environmental impact assessment (EIA) report, or environmental and social management and monitoring plan (ESMMP). Involvement can take the form of meetings with stakeholders at all levels, or with those who are likely to be affected by the investment project during all phases of the project.

Hazard – a source of potential harm, or a situation with a potential for causing harm, in terms of human injury; damage to health, property, the environment, and other things of value; or some combination of these.

Mitigation – an activity intended to reduce the severity of, avoid or control environmental or social impacts of a project through design alternatives, scheduling or other means.

Project Affected People – means a natural person, legal entity, or organization that is directly or indirectly affected, or likely to be affected, by the investment project. The people may be affected by legal expropriation of land or real estate, changes of land category, and impacts on the ecological and environmental systems in the their settlement areas.

Project Developer or Developer means any person, legal entity or organization, from the public or private sector, that is licensed to undertake the study, survey, design, pre-construction, construction, operation and decommissioning, closure and post-closure of an investment project.

Project Screening means study and analysis of data contained in a proposed investment project to determine whether the project requires initial environmental examination (IEE), or environmental impact assessment (EIA).

Residual Impact – predicted adverse impacts that remain after mitigating measures have been applied.

Risk means the likelihood that harm will actually be done by the hazard occurring while the work is being carried out, or by the way something is used. $\text{Risk} = \text{Hazard} \times \text{Exposure}$

Risk Assessment – the scientific method of confronting and expressing uncertainty in predicting the future (ADB, 1997).

Scoping means the process of determining the scope of the environmental impact assessment (EIA), i.e., the data that need to be collected and analyzed to assess the impacts of the investment project on the environment. The primary objective of the scoping process is to produce a terms of reference (TOR) for preparation of an environmental impact assessment report.

Stakeholders are defined as persons, groups or communities external to the core operations of a project who may be affected by the project or have an interest in it. This may include individuals, businesses, communities, or local government (IFC, 2012).

Terms of Reference is a description of all work to be performed when carrying out an environmental impact assessment (EIA).

Valued Ecosystem Component (VEC) – any part of the environment that is considered important by the proponent, public, scientists or government involved in the assessment process. Importance may be determined on the basis of cultural values or scientific concern.

Vulnerability – the degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity, and its adaptive capacity.

Vulnerable groups – individuals or groups within the project's area of influence who are particularly vulnerable or disadvantaged, and who could experience adverse impacts from the proposed project more severely than others (IFC Guidance Note 1, GN 48, January 2012). Vulnerable groups can include ethnic minorities, migrants, disabled people, the homeless, lone parents, isolated elderly people and children.

1. Introduction

1.1 Characteristics of an EIA

EIA is a legal requirement for all projects that may have a significant adverse impact on the environment and/or society. EIA is therefore a regulatory tool to identify and minimize adverse environmental and social impacts, and to ensure that proper management and mitigation measures are implemented.

An EIA should consider the environmental issues in all project phases, including planning, pre-feasibility, feasibility, design and procurement, pre-construction, construction, operation, decommissioning, closure, and post-closure. The EIA helps the project developer to prepare a project in consideration of its consequences on the environment without threatening its technical and economic feasibility.

An EIA should consider all biological, physical, social, economic, health cultural and visual components of the environment that could be affected by a project. It offers the possibility of analyzing and defining the relations and interactions between the factors having an influence on the ecosystems, resources and quality of life of the population and communities.

The objectives of EIA are to identify the environmental and social components that will be impacted, as well as the risks and opportunities for the environment and the communities affected that may arise because of the project. The significance of the impacts will help to define the main factors to be considered in deciding whether a project should proceed.

The EIA should consider the views, concerns and perceptions of stakeholders, communities and individuals that could be affected by the project. The EIA should include the results of public consultations and negotiations with the affected populations on the environmental and social issues. Public concerns should also be taken into account in assessing impacts, designing mitigation measures and selecting monitoring parameters.

1.2 Lao PDR Environmental Requirements

The *Decree on Environmental Impact Assessment* (no. 112/PM, 16 February 2010) describes environmental impact assessment (EIA) as, the means of “studying, surveying, researching-analyzing and estimating of possible positive and negative impacts on the environment and society, including short and long term impacts on health created by the investment projects as well as offering appropriate alternatives, environmental management and monitoring plan (EMMP), and social management and monitoring plan (SMMP) to prevent and mitigate possible impacts which are likely to happen during construction and operation of the investment projects.” Projects subject to EIA are classified in Category 2, Article 2 of the Decree (Appendix 1).

The EIA should be prepared according to a scientific method, and should satisfy government requirements for project analysis, public consultation, and the decision-

making process. The EIA provides the reader with an understanding of the project and how it will be implemented. More specifically, the EIA:

- presents the characteristics of a project and its justification;
- describes the environmental and social baseline data of the study areas, as well as the changes that will occur during and after project implementation;
- demonstrates how the project can be integrated into its environment by presenting various project alternatives and the defining measures intended to minimize negative environmental, social and health impacts, and to maximize benefits to the communities affected;
- proposes environmental, social and health management and monitoring plans to ensure that the requests from the government and commitments made by the project developer are implemented.

1.3 Objectives of the EIA Guidelines

The objectives of the EIA Guidelines are to provide a common framework for EIA reporting, to present project developers and their environmental consultants with clear guidance on the structure, content and scope of EIA reports, and to ensure that EIA reporting is consistent with legal requirements, good practices and professional standards.

Furthermore, by following these guidelines, the quality of EIA reports will be improved, which will also facilitate a smooth and timely review by the agencies concerned.

1.4 Scope of the EIA Guidelines

The EIA Guidelines are applicable for all Category 2 projects as defined in the *Decree on Environmental Impact Assessment* (no. 112/PM, 16 February 2010).

These EIA Guidelines address how EIA reports should be structured, what the reports should encompass, how data and information should be presented, and the level of detail and comprehensiveness required or recommended in EIA reports. Thus, the EIA Guidelines are predominantly about reporting, and less about how EIA studies must or should be carried out.

An EIA report should cover and assess all environmental, social, economic, health, cultural and visual impacts of the project during the pre-construction, construction, operation and decommissioning, closure and post-closure phases. Resettlement issues should be detailed in a separate report but summarized in the EIA report. EIA reports include preparation of the Environmental and Social Management and Monitoring Plan for the project.

The EIA Guidelines are divided into four main sections:

Section 1: EIA Process

Section 2: Scoping Report and Terms of Reference for the EIA

Section 3: EIA Report

Section 4: Environmental and Social Management and Monitoring Plan

2. EIA PROCESS

2.1 Introduction

The EIA Process in the Lao PDR is determined by the *Decree on Environmental Impact Assessment* (no. 112/PM, 16 February 2010). Investment projects are divided into two categories, initial environmental examination (IEE) or environmental impact assessment (EIA), according to the scale of the project. The EIA Guidelines cover large-scale investment projects that are complex or create significant environmental and social impacts, for which environmental impact assessment is required. The list of projects subject to EIA (Category 2) is presented in Appendix 1.

This section of the EIA Guidelines introduces the EIA process with reference to the normal project planning cycle. In addition, this section presents the duties and responsibilities of the project developer and government agencies for preparation, review and approval of the EIA.

2.2 EIA Process and the Project Planning Cycle

The normal project planning cycle generally includes the following phases:

- Pre-Feasibility;
- Feasibility;
- Design and Procurement;
- Pre-Construction;
- Construction or Survey-Exploration;
- Operation; and,
- Decommissioning, Closure and Post-closure.

During each of these phases, the developer should undertake investigation and consultation activities to minimize the environmental and social impacts of a project. It is recognized that integrating environmental and social aspects in project cycle as early as possible will significantly reduce project impacts and mitigation costs.

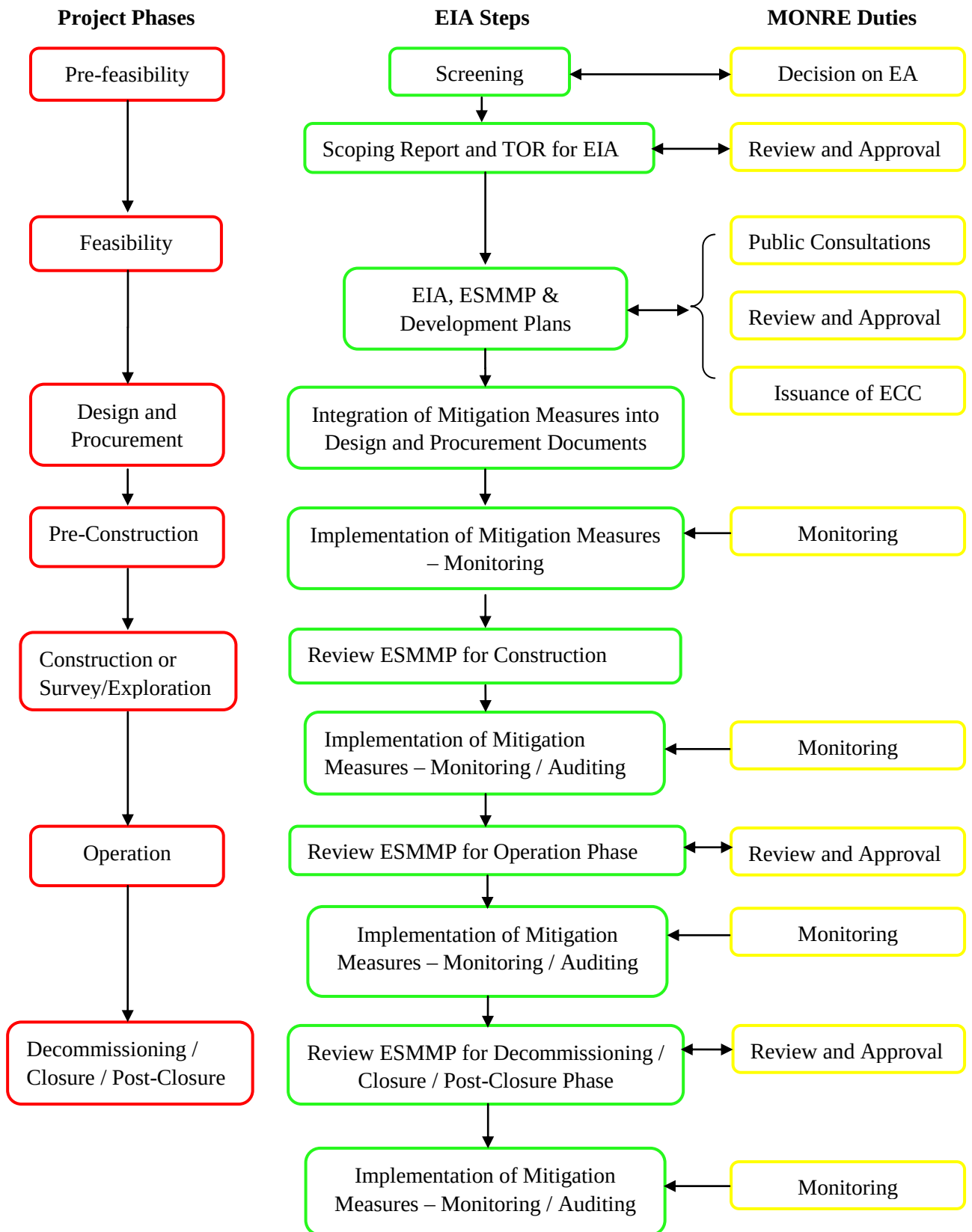
Figure 2.1 presents the project planning cycle in relation to the EIA steps that need to be completed by the project developer and in relation to the duties of MONRE for reviewing, monitoring and approving the documents and activities carried out by the project developer.

The main responsibilities of the project developer are to:

- send an investment application form to MONRE to enable MONRE to determine the scale of the project;
- prepare a Scoping Report and TOR for the EIA;
- prepare the EIA Report, Environmental and Social Management and Monitoring Plan (ESMMP), and development plans;
- conduct public consultation meetings during preparation of the EIA;
- incorporate mitigation measures in the design and procurement documents;

- improve the ESMMP frequently, and implement the mitigation measures during the pre-construction, construction, operation and decommissioning, closure and post-closure phases;
- carry out monitoring and auditing activities as stipulated in the ESMMP.

Figure 2.1: Project Planning Cycle and Environmental/Social Activities



2.3 EIA Process and the EIA Guidelines

The EIA Process requires completion of a Screening and Scoping Report and TOR for EIA activities prior to preparation of the EIA Report.

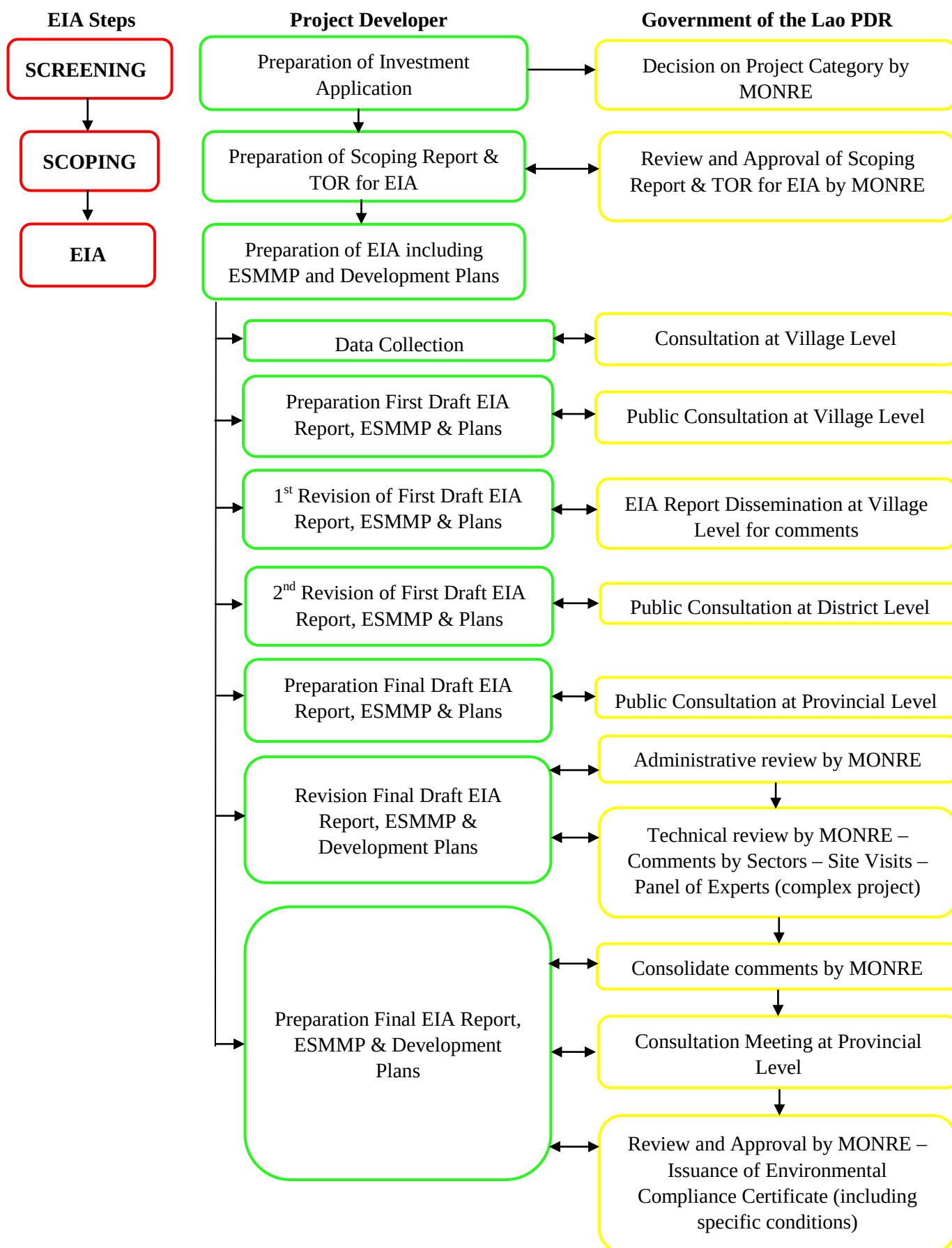
For the project screening, the project developer shall submit an investment application to MONRE (Decree 112/PM, Article 6). The project developer shall utilize the list of projects subject to EIA, in addition to considering the significance of the potential impacts of the project. MONRE will make a decision based on the information provided by the project developer as to whether the proposed project will have to undertake an IEE or an EIA.

During the project scoping, the project developer will prepare a Scoping Report and detailed terms of reference for preparation of the EIA as required in Decree 112/PM (Article 11). Section 3 of the EIA Guidelines provides guidance on how to prepare the Scoping Report and the TOR. MONRE will revise, comment on and approve the Scoping Report and TOR before the project developer begins preparing the EIA.

Preparation of the EIA Report, ESMMP and development plans will require consultations with the local authorities and affected people. The Public Involvement Guidelines describe this consultation process. Figure 2.2 indicates the most important steps to undertake during preparation of the EIA, especially with regard to public consultation. MONRE will conduct an administrative and technical review of the EIA Report, ESMMP and development plans. The project developer will be required to revise the EIA Report, ESMMP and development plans to comply with the consolidated comments provided by MONRE and those of the Panel of Experts.

Once MONRE is satisfied with the EIA Report, the ESMMP and the development plans, the Environmental Compliance Certificate will be issued, including specific conditions if required.

Figure 2.2: Responsibilities during preparation of EIA Report for project of Category 2



3. SCOPING & TERMS OF REFERENCE FOR EIA

3.1 Overview

Scoping is the first phase in carrying out EIA studies. The project developer is responsible for preparing the Scoping Report and Terms of Reference (TOR) for preparing the EIA study. When completed, these documents shall be sent to MONRE for comments and approval (Decree on EIA, Article 11).

During scoping, the likely key environmental impacts and risks of the project, including impacts on social conditions, health, livelihood, etc., are identified in a preliminary manner. In this way, the scoping phase establishes the framework of activities and impacts that require further investigation during the EIA study.

One of the main reasons for scoping is to limit further investigation to those issues that are most important for decision-making and efficient, sustainable project execution.

Scoping is therefore a fundamental phase in the EIA process, which:

- defines the study area, area of influence, time boundaries, project phases, and potential stakeholders;
- starts the process of understanding the applicable regulations and standards, and their context for project design and completion of the EIA;
- makes a provisional identification of impacts, which provides focus on the environmental and social issues that need to be addressed in subsequent EIA studies;
- provides an indication of what baseline data and information are required, and how to obtain it (although there is no need to actually collect any data at this stage);
- provides an opportunity for consultants, relevant authorities, project developers, interested and affected parties to express their views and concerns regarding the proposal before an EIA proceeds;
- enables an efficient assessment process that saves time, resources, costs and delays;
- identifies potentially-affected communities and other stakeholders with an interest in the project.

The Scoping Report should include the following main sections. A proposed table of contents for the Scoping Report is presented in Appendix 2.

- Executive Summary
- Context of the Project
- Overview of the Policy, Legal and Institutional Framework
- Project Description and Alternatives
- Description of the Environment
- Key Potential Environmental Impacts and Mitigation Measures
- Public Consultation and Disclosure
- Conclusions and Recommendations

3.2 Executive Summary

The executive summary should summarize the significant findings and recommendations of the Scoping Report and the TOR for preparing the EIA. The executive summary should present all necessary information to provide a clear picture of the project, its environment, the key potential impacts and associated mitigation measures, as well as the significant issues included in the TOR for the EIA study. The executive summary shall be written in Lao and in English.

3.3 Context of the Project

The context of the project provides the background to the EIA and the overall context of the project, including the main findings of previous technical, economic, environmental or social studies.

This section of the Scoping Report should be divided into the following sub-sections:

- Presentation of the Project
- Related Projects and Developments
- Presentation of the project developer and the EIA Consultant

3.3.1 Presentation of the Project

The project developer should present the status of the project (planning, pre-feasibility and feasibility phases); a brief description of the intended project; the main phases of the project (design, pre-construction, construction activities, operation, decommissioning, closure and post-closure); a brief history of the project; expected investment and revenues (taxes, royalties, etc.); the current status of the existing infrastructure related to the project; and the need for the project, including a brief justification and the project objectives.

3.3.2 Related Projects and Developments

Other projects or developments related to construction or operation of the proposed project should be presented. For example, for a pulp and paper mill project, related projects or developments may include operations on forest lands, such as plantation, maintenance, harvesting, and transportation. For a hydroelectric project, examples may include improvement of the energy distribution grid, or plans for a future mining project that would be located within the impoundment area of the proposed dam.

3.3.3 Presentation of the project developer and the EIA Consultant

In this section, the project developer will introduce its company's experience and activities in the Lao PDR and overseas; its volume and capacity of production; its environmental experience; and how the company has addressed socioeconomic conditions in its activities and projects, among other aspects.

The project developer shall provide the following contact details:

- name of the company;
- main postal address, telephone, fax and e-mail details for the company;
- name of the main contact person, including his or her direct postal address, telephone, fax and e-mail details.

The EIA Consultant should present the team of experts participating in preparation of the Scoping Report, including both permanent and contract staff, and associated organizations.

3.4 Overview of the Policy, Legal and Institutional Framework

The current Lao PDR environmental and social policy, legal and institutional framework applicable to the project should be briefly summarized. This section of the report should also indicate and briefly summarize applicable international or regional conventions and treaties signed or ratified by the Lao PDR. The project developer should present its corporate environmental and social policies, if such policies exist. If the project is supported by funding from international financial agencies, their policies, guidelines and standards should be identified and listed.

If applicable, the status of concession agreements or MOUs between the project developer and the Government of the Lao PDR should be presented.

The “Overview of the Policy, Legal and Institutional Framework” section should include the following sub-sections:

- Corporate Environmental and Social Policies;
- Lao PDR Policy and Legal Framework;
- International Conventions and Treaties;
- Lao PDR Government Institutional Framework; and,
- International Policies, Guidelines and Standards (if applicable)

3.5 Project Description and Alternatives

The project description is a crucial part of the scoping report. Scoping is often done at a stage in project development where certain fundamental decisions such as choice of technology or location are still under consideration. Therefore, the scoping study should assess relevant and realistic alternatives to ensure that appropriate decisions are made.

The “Project Description and Alternatives” section should include the following sub-sections:

- Project description (and, if relevant, project alternatives for each project phase);
 - Pre-Construction
 - Construction
 - Operation
 - Decommissioning, closure and post-closure
- Comparison and Selection of Project Alternatives

3.5.1 Presentation of the Project and Description of Alternatives

The project description should provide enough details to allow preliminary assessment of the project alternatives and potentially significant negative impacts. Any uncertainties should be highlighted in the project description.

The structure and content of a project description will vary from project type to project type. However, in general, the structure and content of the project description should follow the guidelines presented in Table 3.1.

Table 3.1 Generic Structure and Content of a Project Description

Brief Presentation		Guidance Notes
1. Sector and Subsector		e.g., energy production, hydroelectric power
2. Size		Size may be expressed in terms of area, length (for a road or other linear project), production capacity, category/type, number of employees, or project investment.
3. Location		Provide an overview map, typically at a scale of 1:300,000 for linear projects and 1:20,000 for single-point projects. The map should include main natural features, like water bodies, forest, etc., existing infrastructure (roads, bridges, etc.) and human settlements in the vicinity of the project. In the case of an urban development, sensitive areas (schools, markets, monuments or cultural sites, commercial areas, etc.) should be clearly indicated.
4. Project Components		Main production facilities Internal infrastructure Ancillary infrastructure and facilities
5. Overall Time Schedule		Present a diagram with the planned timing of: - Studies (including the EIA study); - Permitting/licensing; - Concession agreements; - Detailed design, contracting; - Pre-construction activities; - Construction activities; - Operations; - Decommissioning, closure and post-closure
6. Project Organization		Organization chart, management, roles and responsibilities, etc
Pre-Construction and Construction Phases		
7. Activity Schedules		Diagram with the main components and their respective main construction activities and related mitigation measures
8. Location of Project Components		Site map (1:50,000 for linear projects and 1:10,000 for single-point projects), with location of project components such as roads, camps, mines, processing plant, storage areas, tailing dams, reservoirs, power

	house, transmission lines, bridges, etc.
9. Project Characteristics	Description of the main characteristics of: - Materials (amounts, types, sources) - Equipment, machinery - Conceptual design drawings List the alternatives considered and assessed. Only consider realistic and reasonably feasible alternatives.
10. Labor	Expected workforce, and, if possible, a brief description of the workforce by job type; Expected origin of the workforce
Operational Phase	
11. Overview of Operations	Brief description of project components including production processes and technologies, facilities and infrastructure Visual presentation of the completed project (e.g., a freehand drawing, layout) Presentation of production data: - Input materials (amounts/year, types, qualities and characteristics, sources) - Water and energy consumption and sources - Outputs: Products (amounts, characteristics) by-products, waste and other emissions)
12. Operations Schedule	Time diagram presenting the main components and the main operations/processes and their respective mitigation measures
13. Site Layout Maps	Site layout maps (1:20,000 or larger scale) showing the location of the main operational components
14. Components	Description of each component: - Facilities, technology, processes with simplified flow diagram - Location and visual presentation - Conceptual design drawings - Flow diagram: Materials, water, energy, waste and other emissions - Materials handling, storage - Waste and wastewater management - Transportation (mode, timing, loads, routes)

15. Labor	Expected workforce (if possible workforce per job type) Expected origin of workforce
Decommissioning, Closure and Post-Closure Phase	
16. Overview	Closure Plan Requirements (Strategy, Policy, Main Objectives, time schedule, budgets, etc.)

As shown in Table 3.1, the project description should include a listing and short presentation of the alternatives considered. Detailed analyses of the alternatives are best presented in a separate subsection.

The scoping report should describe each alternative in reasonable detail to enable all major potential environmental, economic, social, health, cultural and visual impacts to be identified/predicted and evaluated.

In describing the reasonable alternatives, the use of maps, plans, drawings and figures is required to provide effective visual presentations of the alternatives.

3.5.2 Comparison and Selection of Project Alternatives

Alternatives are essentially different ways in which the project developer can feasibly meet the project's objectives, for example by carrying out a different type of activity, by choosing an alternative location, or by adopting a different technology or design for the project. At the more detailed level, alternatives merge into mitigating measures, where specific changes are made to the project design or to methods of construction or operation to avoid, reduce or remedy environmental effects. Therefore, the alternatives considered and presented in the report should only include significant, realistic and reasonably feasible alternatives to the developer's preferred location, design or choice of technology. It follows that such alternatives are also seen from the perspective of the project developer.

The "no project" alternative must always be considered as the baseline against which the environmental impacts of the project should be considered.

The process of identifying alternatives and selecting the optimal alternative should include an assessment of:

- the capacity to satisfy the demand (i.e., objectives, problems and needs);
- legal and technical feasibility (e.g., land tenure, zoning, topography, civil engineering works, and availability of human resources);
- the economic benefit of the project;
- the ability to limit the significance of negative impacts and to maximize positive impacts on the natural and human environment, including impacts on local employment.

As much as possible, the comparison between the proposed alternatives should be based on quantitative data.

One common method is to apply weights and ranks to the various impacts, and then to aggregate the results by assigning numerical values to the expected impacts on each valued environmental or social component. Then, each alternative is compared based on a single overall measure of impacts. The greater the aggregate value for an alternative, the more serious the environmental or social impact. Numeric weights can be assigned by using the informed opinions of stakeholders.

3.6 Description of the Environment

To understand how the project may affect the environment, and in particular, how significant such impacts could be, it is necessary to describe the physical, biological, social, economic, cultural and visual characteristics of the environment. This can be done using secondary information available from government offices (national, provincial, district and village) and from NGOs involved in the project area. Use of recent satellite imagery is required in all cases. With this information, it is possible to make a preliminary identification of sensitive environmental, social, cultural and visual features within the study area. Direct information on these sensitive areas, as well as the social context of the study area, will be collected by carrying out field visits.

The “Description of the Environment” section of a Scoping Report should include the following sub-sections:

- Setting the Study Limits
- Physical Components
- Biological Components
- Socio-Economic Components
- Cultural Components
- Visual Components

3.6.1 Setting the Study Limits

The Scoping Report should define the boundaries of the study areas and justify the chosen limits. The area or areas identified (i.e., there may be more than one study area) will include all anticipated direct and indirect impacts, as well as all project-related activities such as access roads.

The study area should be presented on a map at a scale of 1:300,000 for linear projects and 1:20,000 for single-point projects (or larger scale when possible). The information illustrated on the map should include the project location; administrative boundaries; infrastructure and main resources of the area (roads, watercourses, industrial parks, residential areas, etc.); existing and future residential, industrial, tourism, and cultural developments; sensitive areas and valued ecosystem components (VECs) of the environment identified during the scoping process.

3.6.2 Physical Components

The physical components of the study area should be described briefly according to their importance for identification of project impacts. Physical components may include a brief description of the climate, topography, geology, geomorphology, soil, seismology, surface hydrology, surface water quality, etc., of the study area. For example, for a project that will discharge contaminated water into a river, more detailed data on water flow and water quality will be needed.

Specific reference should be made to physical components involved in the potential natural hazards of the area, including potential hazards that may arise due to climate change.

3.6.3 Biological Components

The biological components should be described briefly according to their importance in identifying project impacts.

Environmentally sensitive areas should be described in the text and presented on maps to facilitate interpretation of the data, and to highlight areas that should be protected by the project.

3.6.4 Socio-Economic Components

The socio-economic components of the project study area are very important to consider, especially when resettlement is required. The following information is readily available and accessible at the village or district level: population data; health conditions; the main economic activities of the affected people; education levels; and the presence of vulnerable groups.

Information on socio-economic components that should be presented in the scoping report includes:

Demographic information:

- Name of district(s) and villages affected;
- Population (including gender and age distribution, if possible);
- Ethnicity and languages;
- Main economic activities and means of livelihood of men and women;
- Education level and access to educational services;
- Main sources of water and energy;
- Other development projects in the area (hydroelectric power, plantations, road construction, mining or industrial activities).

Community Health:

- Prevalence and rates of infectious diseases (e.g., malaria, dengue fever, tuberculosis, HIV/STDs, etc.) and chronic diseases (e.g., arthritis, cardiovascular diseases, diabetes, nutritional disorders, etc.);
- Trends in existing health problems;
- Access to health services;
- Availability of clean water and sanitation.

Infrastructure (presented on a map):

- Roads, airports, bridges, ports, transmission lines, irrigation systems, etc. in the study area;
- Schools, temples, markets, hospitals or clinics.

Data such as average income, cost of living, life expectancy and birth rate, average number of persons per household, and presence of vulnerable groups should also be included if available. In the case of resettlement, information on both the villages to be relocated and the host communities where the residents will be resettled should be included.

Significant events in the community in the last 15 years, like natural disasters, previous resettlements, and conflicts should be mentioned, as well as whether the area is affected by UXO. The socio-economic components should include reference to areas or people who may be vulnerable to the natural hazards of the study area.

Visits in the villages will also help to identify the main socio-economic issues facing the affected people, and to verify the information provided by secondary sources. These data will be summarized in this section of the Scoping Report.

3.6.5 Cultural Components

Cultural components in the study area that may be affected by the project should be presented briefly in this section of the Scoping Report. Examples of cultural components include religions and beliefs, local values and costumes, sites of traditional or historical value, use of natural resources, traditional livelihood, main institutions and organizations.

3.6.6 Visual Components

Features of visual value within the study area should be identified. Features may include landscape, nature, monuments, natural or cultural features, tourist attractions, etc. that will be affected or visually disrupted by the project. Such features should be listed, described briefly, and illustrated by photography and/or presented on a map.

3.7 Preliminary Environmental Impact Assessment and Mitigation Measures

This section should include a preliminary identification and assessment of key impacts and potential risks of and to the project for all project phases (i.e., pre-construction, construction, operation and decommissioning, closure and post-closure). The significance of the potential impacts must be determined using appropriate methodology and criteria.

The generic structure of this section is as follows:

- Methodology;
- Identification of potential environmental and social impacts;
- Potential impacts, mitigation measures and residual impacts

3.7.1 Methodology and Approach

In this section, the methodology and approach used for preliminary identification of the social and environmental impacts, and for assessment of their importance for the scoping report, must be briefly described. There is no mandatory methodology for impact assessment, but it is recommended that a well-recognized, proven methodology that is appropriate for the complexity of the project and for the sensitivity of environmental setting (including social, health, cultural, and visual components) be used. The impact assessment methodology used for the scoping can be different and simpler than the impact assessment methodology used for the subsequent EIA studies.

Scoping is a quick and simple form of EIA in which key potential impacts and risks are identified and assessed on a preliminary basis. The following two elements need to be considered:

- **A basic understanding of the project** and related activities: these include the main characteristics of the project during all project phases, and the environmental impacts that these could generate. Examples of project characteristics, activities and associated impacts that may be expected for construction of a transmission line project are presented in **Erreur ! Source du renvoi introuvable..**

- An **initial understanding of the value of the environment** in which the project will be located: these include the physical, natural and socio-economic characteristics of the area likely to be affected by the project and its activities, and an idea of their value or importance (e.g., whether the area is home to an endemic bird species found nowhere else, whether the area is characterized by farmland or primary forest, etc.).

Based on these two elements, likely impacts and issues of potential importance can be identified. Note that the emphasis above is on a “brief” understanding of the project and an “initial” understanding of the environment.

Box 3.1 Examples of Project Activities and Potential Environmental Impacts of a Transmission Line Project

Examples of project activities during construction that could affect the environment may include:

- Land / vegetation clearing;
- Disposal of spoil and vegetation;
- Erection of structures;
- Movement of construction vehicles;
- Employment of construction workers;
- Establishment of construction work camps;
- Provision of sanitation facilities for construction workers.

Environmental impacts associated with these activities may include:

- Loss of species and biodiversity;
- Dust generation;
- Soil erosion;
- Changes to local groundwater and surface water regimes;
- Visual changes to the landscape;
- Noise;
- Air pollution.

Socio-economic impacts associated with these activities may include:

- Resettlement;
- Demographic changes (temporal migration of workers and eventually their followers);
- Increased levels of infectious and waterborne diseases;
- Increased levels of respiratory problems;
- Traffic accidents;
- Disruption of traditional livelihoods;
- Restricted access to natural resources traditionally used for food and fuel.

One technique that can be used to determine the issues and scope for an EIA is to complete a Preliminary Impact Identification and Assessment Matrix as described in Box 3.2 and illustrated in Appendix 3.

Box 3.2 Developing a Preliminary Impact Identification and Assessment Matrix for Scoping

1. List the project components or activities that could affect the environment down the left hand column of a blank matrix. These characteristics could be broken down into phases (e.g., movement of residents / farmers, clearing of land, disposal of spoil, erection of structures, etc.) or into types (e.g., emissions to air, discharges to water bodies, generation of wastes, etc.).
2. List the environmental components in the area likely to be affected by the project along the top row of the matrix, including physical, biological and human environmental characteristics (e.g., water quality, noise, air quality, aesthetics, cultural property, traditional livelihood, public health, etc.).
3. Taking into account an understanding of the importance of the environmental and social characteristics, for each square marked, determine approximately whether the impact will be positive or negative, and, if negative, whether the impacts are expected to be of high, medium or low significance.

A methodology for determining the significance of the impacts is proposed in Section 4.6 of these guidelines.

3.7.2 Identification of Potential Environmental Impacts

The project developer will identify and summarize the major potential sources (i.e., project activities) of impacts to the physical, biological, health, social, economic, cultural, and visual components of the environment for the following project phases:

- Pre-Construction
- Construction
- Operation
- Decommissioning, closure and post-closure

Identification of potential impacts related to natural hazards and climate change should also be considered at this stage of the Scoping Report.

3.7.3 Key Potential Environmental Impacts, Mitigation Measures and Residual Impacts

In this section, the project developer must identify the major potential impacts of the proposed project alternatives, and must summarize the assessment, proposed mitigation measures, and residual impacts by project and by activity.

Potential impacts, and exposure of the environment and society to natural hazards and potential impacts that could increase the vulnerability of the socio-economic components to disasters and/or natural hazards should be described.

This section of the Scoping Report should be divided into the following subsections:

- Pre-Construction
- Construction
- Operation
- Decommissioning, closure and post-closure

The methodology used by the project developer to determine the significance of the impact should be systematically used for identification and description of each major project impact. The preliminary impact matrix used for scoping (if applicable), results of map overlays, etc., should be presented in the chapter or in an appendix to the Scoping Report.

3.8 Public Consultation and Disclosure

Involving the public in preparation of the EIA is fundamental to increasing the understanding and acceptance of the project, to understanding how the project may affect their living conditions, as well as to identifying impacts and issues that are not immediately obvious to the EIA preparation team. The earlier in the project preparation process the public can be involved, the more likely it is that a trusting relationship can be built and useful recommendations made.

In the Lao PDR, the project developer shall undertake a process of consultation during the EIA study involving the affected communities and the project stakeholders. This consultation shall be conducted in coordination with local authorities on a continuous basis starting as early in the EIA process as possible.

The following sub-sections should be included in the “Public Consultation and Disclosure” section:

- Methodology and Approach
- Summary of Consultation Activities Undertaken
 - Overview of consultation activities
 - Summary of the opinions of the people or communities consulted
- Results of Consultations During Project Scoping
 - Issues identified by stakeholders and groups affected by the project
 - How these issues were taken into account
- Recommendations for Consultations to be Undertaken During the EIA Studies

3.8.1 Methodology and Approach

The methodology and approach used to identify stakeholders and conduct public consultation should be described in this section of the Scoping Report. The methodology and approach used for public consultation will vary according to the project developer and the scale of the project. In general, the following consultation activities should be undertaken to understand and take the opinions of the affected people into account in the project design and implementation:

- Identification of Stakeholders and Groups affected by the project;
- Conducting Public Consultation;
- Disclosure.

3.8.1.1 *Identification of Stakeholders and Groups Affected by the Project*

This section should include a preliminary identification and listing of stakeholders and groups affected by the project. Stakeholders are defined as individuals, groups or communities external to the core operations of a project who may be affected by the project or have an interest in it. This may include individuals, businesses, communities, or local governments (IFC, 2012).

The three main groups of organizations and individuals whom it may be appropriate to consult during scoping are:

- government authorities;
- other interested organizations;
- the general public.

Types of organizations to be included in these three groups are listed in Box 3.3.

Box 3.3 Checklist of Groups and Individuals to be Consulted During Scoping
1. Government Authorities • National, provincial, district and local authorities; • Authorities responsible for pollution control, including water, waste, soil, noise and air pollution; • Authorities responsible for protection of nature, cultural heritage and the landscape; • Health and safety authorities; • Land use control, spatial planning and zoning authorities; • Authorities in neighboring countries where trans-boundary impacts may be an issue. 2. Other Interested Parties • Local, national and international environmental, social and development interest groups¹; • Government departments responsible for agriculture, energy, forestry, fisheries, etc., whose interests may be affected; • International agencies whose interests may be affected, e.g., Mekong River Commission; • Local employers' and business associations, such as chambers of commerce, trade associations, etc.; • Mass organizations such as Lao Women's Union, Lao Youth Union, Lao Front for Reconstruction, etc. • Employees' organizations such as trade unions; • Groups representing users of the environment, e.g., farmers, fishermen, women using NTFs for their own consumption and trade, tourism operators; Research institutes, universities and other centers of expertise 3. The General Public • Landowners and residents; • Ethnic groups in the affected area • Elected representatives and community figures such as religious leaders or teachers; • Local community groups, residents' associations, etc.; • General members of the local and broader public.

3.8.1.2 Conducting Public Consultations

Public consultation is an important responsibility of the proponent, and is recognized as a crucial step toward building understanding and acceptance of the project by the

¹ For organizations in the Lao PDR, consult the following website: www.directoryofngos.org

² Guidelines for the executive summary are taken from Lao PDR Department of Electricity, Ministry of Industry and Handicrafts (2001), "Environmental Management Standard, Environmental Impact Assessment for Electricity Projects," DOE (2001) no.

stakeholders. Public consultation provides the proponent with feedback and information about “valued environmental components” of the communities affected by the project. According to the *Decree on Environmental Impact Assessment* (112/PM, Article 12), public consultations shall be conducted at different times during preparation of the EIA.

At the scoping stage, information meetings shall be organized by the project developer and the district authorities to inform villagers about the project development plan and possible environmental and social impacts, as well as to collect opinions of the people affected by the investment project. Information from the Scoping Report should serve as a basis in preparing for these meetings. The population from villages directly or indirectly affected by the project should be consulted.

A summary of the public consultation meetings shall be included in the Scoping Report. All summary reports shall be signed by the chairperson and some of the participants. According to the *EIA Decree* (112/PM, article 12(4)(h)), the minutes of each meeting shall also be signed by the project developer and the consultant who prepares the report. The name of the participants and information about how the meetings were organized shall be provided in the Scoping Report. A summary of the results of each public consultation shall be presented, including the opinions of the participants, comments from stakeholders, and responses from the project developer.

3.8.1.3 *Disclosure*

The Decree on EIA (112/PM) requires that the proponent make suitable information available to stakeholders in a language and format that is understandable to them to facilitate meaningful consultation with groups affected by the project, civil society organizations, and NGOs active in the project area. The project developer shall provide stakeholders sufficient time to review and understand the project and its issues to enable them to participate effectively during consultation.

For the public consultation meetings, the project information provided to the people affected by the projects and the stakeholders should include the Scoping Report and the presentation materials. This information shall be provided in Lao and in English.

3.8.2 *Summary of Consultation Activities Undertaken*

3.8.2.1 *Overview of Consultation Activities*

Public consultation and disclosure should start at the planning phase and continue throughout preparation of the Scoping Report. If consultation activities have been undertaken before preparing the Scoping Report, these activities should be described in this section of the report.

The project developer should present the methodology and approach used during the planning phase. The consultation process should be described in terms of activities, schedule, participants, and results.

3.8.2.2 *Summary of the Opinions of the People Consulted*

The list of the individuals consulted during the planning activities should be summarized in this section of the Scoping Report. The full list of participants including details such as the organization they represent (if any), telephone numbers or other contact information should be included in appendix to the Scoping Report.

3.8.3 Results of Consultations during Project Scoping

3.8.3.1 Issues Identified by Stakeholders and Groups Affected by the Project

Environmental, socio-economic or cultural issues identified by stakeholders during the scoping phase should be presented in terms of opinions raised during discussions, meetings and workshops. It is appropriate to present participants' opinions in a table showing the name of each participant and the corresponding response from the project developer in terms of solutions or action proposed. If participants are reluctant to register their names, the list may indicate only their sex and age.

The minutes of meetings and workshops, including the opinions raised by the population and the responses from the project developer and other stakeholders, should be presented in an appendix of the Scoping Report, along with the signature of the chairperson and some of the participants.

3.8.3.2 How Issues Were Taken Into Account

The project developer should explain how the issues raised by the stakeholders during the scoping phase have been incorporated in the project. In some cases (e.g., resettlement and compensation), government authorities may be responsible for issuing the responses.

3.8.4 Recommendations for Consultations to be Undertaken During the EIA

The consultation process is an ongoing activity that will take place throughout the project implementation cycle. The Scoping Report should define the future consultation process in terms of:

- objectives of consultations during preparation of the EIA Report;
- the participants to be involved in future consultations;
- information disclosure.

3.9 Conclusions and Recommendations

The project developer should present the conclusions and recommendations, which will serve as the basis for preparing the TOR for the EIA Study.

The following sub-sections should be included in the “Conclusions and Recommendations” section:

- Main issues to be examined in more detailed studies;
- Project alternatives that should be taken into account in these studies;
- Spatial and temporal scale over which impacts should be assessed;
- Stakeholders that should be consulted; and
- Important data gaps or restrictions.

3.10 Terms of Reference for the EIA Study

The Terms of Reference are a primary outcome of the Scoping Report. They will serve as the basis for determining of the scope of the EIA Report and the ESMMP. The TOR should be as detailed as possible to minimize gaps in preparing the EIA, and to ensure that the project developer allocates enough time to prepare the EIA.

All baseline studies (e.g., biodiversity research, socio-economic survey, health survey) and/or impact assessment studies (e.g., water quality modeling, air quality modeling, hazard, exposure and vulnerability assessments) should be described in the TOR.

The structure of the detailed TOR is presented in Appendix 4. This structure should be adapted to the scoping results for each project, but in general, most of these items (sections, subsections, components, etc.) should be included in the EIA Report.

Resettlement and compensation issues, as well as preparation of the development plans, are not fully covered in the TOR, since these matters may be addressed in specific studies carried out in parallel with preparation of the Scoping Report.

3.11 Reporting

The Scoping Report will:

- form the basis for an agreement with MONRE on the scope of the EIA;
- allow stakeholders to see how their views will be taken into account during preparation of the EIA;
- provide the basis for the information to be supplied to the responsible authorities;
- provide input to the EIA report; and,
- present the TOR for the EIA study, and give advice on a suitable budget and time schedule for this and any other required studies.

The Scoping Report should present visual material such as photos, maps, and figures to facilitate understanding of the information presented in the report. It is usually requested to present the project location on topographic maps and the environmentally sensitive areas on thematic maps at a scale of 1:300,000 for a linear project (Example in Appendix 5) or 1:20,000 for a single-point project (or at a larger scale where possible).

3.12 Approval

Once the Scoping Report and TOR are completed, the project developer shall send the documents to MONRE for review and approval. MONRE will complete the review within 15 public workdays and inform the project developer of any comments. The project developer shall obtain MONRE's approval of the scoping/TOR before commencing the actual EIA studies.

It is advisable that the Scoping Report/TOR for the EIA be made available to people affected by the project, to local residents and to local NGOs. For complex projects, MONRE may undertake public consultations to ensure that the stakeholder opinions have been fully considered.

Although scoping can be considered as a discrete phase of the EIA process that ends with issuance of the TOR for the EIA, the activity of scoping should continue throughout the EIA so that the scope of work can be amended in the light of new issues and new information. The scope of the EIA should be flexible enough to allow new issues that emerge during the course of the environmental studies, as a result of design changes, or through consultations to be incorporated. It is important to remember that the *Decree on EIA* allows competent authorities to request additional information at a later phase in the EIA process, even if this information was not requested when they issued a formal Scoping Approval. For this reason, continuous review of the scope of the EIA is important to avoid delays caused by such requests.

4. ENVIRONMENTAL IMPACT ASSESSMENT REPORT

4.1 Overview

Preparation of the EIA Report constitutes the second step required for completion of the environmental impact assessment (Decree 112/PM), the first step being preparation of the Scoping Report and the TOR for the EIA (Chapter 3).

The impact assessment phase is quite similar to the scoping phase in terms of approach, although a greater level of detail is required.

Preparation of a social assessment report is required in cases where resettlement and compensation are important issues (*Regulation on Resettlement and Compensation*, a regulation for implementing Decree 192/PM on *Compensation of People Affected by Development Project* no. 1432/STEA, Article 9). It is also requested that social, economic, cultural and health components be included in the EIA Report (Decree 112/PM, Article 3, EIA definition) in order to have a full assessment of all project impacts.

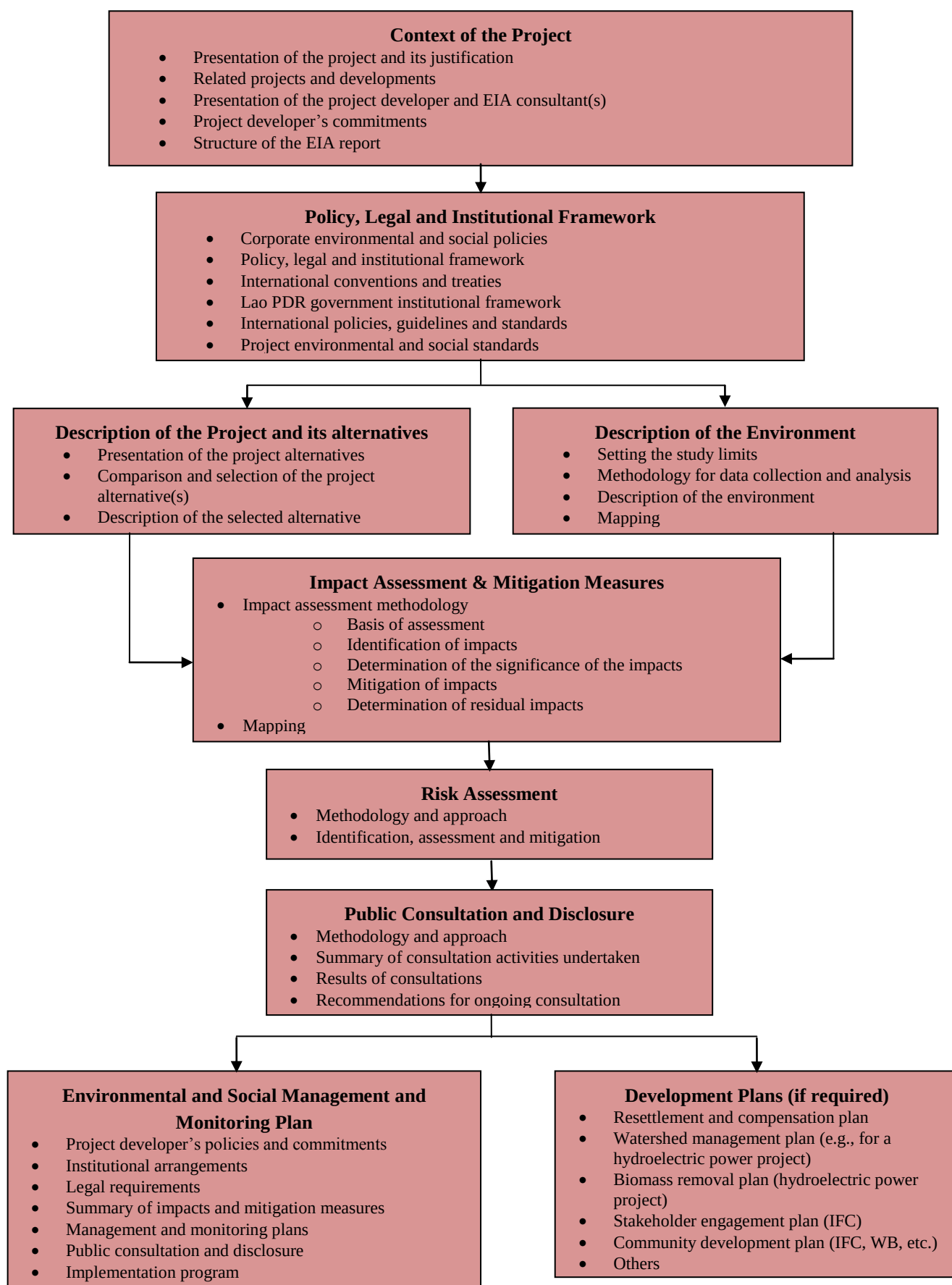
The EIA Report may be presented in a series of volumes and specialist reports according to the complexity of the project. Specific environmental and social studies (e.g., fisheries, resettlement, etc.) may be presented in separate reports, but should be summarized and their results included in the EIA Report.

The EIA Report should include the main sections presented in Figure 4.1 and summarized as follows:

- Executive Summary
- Context of the Project
- Policy, Legal and Institutional Framework
- Project Description and Alternatives
- Description of the Environment (including social aspects)
- Impact Assessment and Mitigation Measures
- Cumulative Impact Assessment
- Risk Assessment
- Public Consultation and Disclosure
- Development Plans

An Environmental and Social Management and Monitoring Report (ESMMP) shall be prepared for each EIA Report. The ESMMP should be presented in a separate volume attached as an appendix to the EIA Report (see Appendix 6, Table of Contents of EIA Report, Volume 2).

Figure 4.1: General Structure for Preparation of an Environmental Impact Assessment



4.2 Executive Summary²

EIA report shall include an executive summary, which accurately and concisely summarizes the significant findings and recommendations of the main reports and appendices. The executive summary should be able to be read and understood as a standalone document, with all information necessary to provide a clear understanding of the project, its environment, potential impacts and associated mitigation and management measures. The Executive Summary shall be written in Lao and in English.

The Executive Summary should include as a minimum the following information:

- an introduction, which will present the purpose and extent of the EIA report, and any pertinent background information such as details on the project's history, the project developers and consultants;
- a summary of the project's EIA history, including any previous studies such as scoping and TOR, etc.;
- a summary of activities undertaken during the EIA;
- the main project alternatives studied and the results of the comparative analysis, including a description of and the justification for selection of the recommended alternative;
- a description of the environment to be affected by the project. This will include details on the environmental study areas, baseline information on the physical, biological, economic, social and cultural components;
- each significant environmental and social impact of the recommended alternative, including sufficient detail on the importance, scope, and approach to management of the impacts, monitoring requirements, and institutional arrangements. This description shall consider all project phases, including design, pre-construction, construction, operation and decommissioning, closure and post-closure;
- the public involvement process undertaken, including a summary of public events, the results of these events, the main comments received, and how they were addressed in the EIA reports. This section should also include any additional public involvement activities that are required to be conducted;
- a summary of the Environmental and Social Management and Monitoring Plans (ESMMP), including the budget for implementing the mitigation and compensation measures, the human resources assigned by the project developer to implement the ESMMP, and internal and external monitoring requirements;
- a summary of any Development Plans required for the project;
- the economic assessment (cost/benefit analysis) of the environmental and social impacts and their management;
- the recommendations of the EIA;
- maps, tables, photographs and figures to provide effective visual presentation of the project, and the type and significance of the impacts.

4.3 Context of the Project

The introduction of the EIA Report provides the background to the EIA and the overall context of the project, including the main findings of the previous technical, economic, environmental and social studies.

The "Context of the Project" section should be divided into the following sub-sections:

² Guidelines for the executive summary are taken from Lao PDR Department of Electricity, Ministry of Industry and Handicrafts (2001), "Environmental Management Standard, Environmental Impact Assessment for Electricity Projects," DOE (2001) no. 585/MIH.

- Presentation of the Project
- Related Projects and Developments
- Presentation of the Project Developer and EIA Consultant(s)
- Project Developer's Endorsement of the EIA Report
- Structure of the EIA Report

4.3.1 Presentation of the Project

The project developer shall present the project, including the status of the project (planning, pre-feasibility, feasibility, design phases); the main elements of the project (location, capacity, type of project, length, voltage, time schedule, budget, etc.); a brief history of the project; the current status of the existing infrastructure related to the project; and the need for the project, including a detailed justification and project objectives.

The justification and need for the project should be as detailed as possible, including economical, technical, environmental, social and cultural components. The benefits to the country, the province, the district and the affected population should be well demonstrated, rather than based on general statements. Quantification of the benefits will be very useful in establishing the justification for the project.

The project developer shall summarize the main findings identified in the Scoping Report and EIA Report preparation, especially the major physical, biological, economic, social, cultural and visual issues, and the main concerns of the affected population and communities.

Any other relevant background information, such as previous technical, economic, environmental, social and cultural studies, should be presented.

A map showing the project location and the sensitive environmental and technical project components should be included with this presentation (see example in Appendix 5).

Box 4.1 presents a summary of the information that is needed to explain the project context and its justification.

Box 4.1 Information Needed to Explain the Project Context
• Current status, including a brief project history, the current status of the existing infrastructure, available energy supply (quantity and source), etc.; • The scope of the project and its main components; • The need for the project (i.e., detailed justification); • Constraints due to legally established protected areas; • Technical and economic requirements to construct and operate the project (e.g., size of the project and schedule for completion, based on existing plans and programs); • Alignment with GOL Policies, socioeconomic development plans (national, provincial and district) and sector development plans; • Opinions of project-affected people and local communities.

4.3.2 Related Projects and Developments

Projects or developments related to the construction and operation of the project should be presented. For example, for a transmission line project, the related projects or developments may include the construction of a hydroelectric or thermal power plants,

distribution of electricity in the country, establishment of industrial parks or economic zones, or improvement of the energy grid. Projects that may conflict or be incompatible with the proposed project should also be presented (e.g., a mining project planned within the impoundment area of a proposed hydroelectric power plant).

4.3.3 Presentation of the Project Developer and EIA Consultant(s)

The contact details for the project developer are requested, including the name of the company; the main postal address, telephone, fax, e-mail, and website details for the company; the name of the main contact person and direct postal address, telephone, fax, and e-mail details.

Recent experience of the project developer (company) with similar projects in the Lao PDR and/or other countries should be presented with appropriate references. If the project is proposed by a consortium, the experience of the consortium as well as the relevant experience of each partner should be presented.

The experience of the environmental consultant and its partners that will carry out the EIA Study should be summarized. The team leader and experts should be introduced, including their specific expertise and input to the EIA study. In addition, the name and accreditation of the laboratory that will perform the chemical or biological sampling and analysis should be provided.

4.3.4 Project Developer's Endorsement of the EIA Report(s)

The project developer is fully responsible for the accuracy, completeness and soundness of the data, information, assessments, mitigation measures and budget allocations presented in the EIA Report(s). The project developers shall clearly state and document their full endorsement of the EIA Report(s), and their full commitment to implementing all measures, including the provision of necessary funds and human resources. Appendix 7 presents the Endorsement Letter that shall be filled out and attached to the EIA Report(s).

4.3.5 Structure of the EIA Report

The developer should present the structure and content of the EIA report to help the reader locate information within the document.

4.4 Policy, Legal and Institutional Framework

This section should provide an overview of current environmental and social policies, and the legal and institutional framework under which the project is regulated, including international or regional conventions and treaties signed or ratified by the Lao PDR that are applicable to the project and the EIA study.

In addition to Lao PDR legislation, standards, directives and guidelines, this section should clarify whether the project and the EIA adhere to the environmental and social policies, standards, directives or guidelines of the project donors or other institutions.

The following sub-sections should be included in the "Policy, Legal and Institutional Framework" section of an EIA Report:

- Corporate Environmental and Social Policies
- Policy and Legal Framework
- International Conventions and Treaties
- Lao PDR Government Institutional Framework
- International Policies, Guidelines and Standards (if applicable)
- Project-Specific Environmental and Social Standards

4.4.1 Corporate Environmental and Social Policies

The project developer's corporate commitments in terms of environment, social conditions, employment opportunities and health and safety policies should be summarized. These should include corporate commitments to international standards such as ISO 14001 (environmental management systems), OHSAS 18001 (Occupational health and safety management systems), AS 8003 (corporate social responsibility) or industry-specific environmental, social, security and safety codes of practice.

The current environmental, social, health, and cultural plans, strategies and systems in force within the developer's organization, including EMS manuals, procedures, forms and registers should be briefly described. Recent projects underway or completed under the developer's environmental and social management system and procedures should be presented.

Since the developer may retain a contractor and subcontractors to carry out portions of the construction or operation work, the developer shall indicate how it will ensure that its corporate environmental and social policies will be implemented.

The internationally recognized environmental and social "best practices" or "codes of practice" that will be implemented by the project developer during the construction and operation periods will be introduced.

4.4.2 Policy and Legal Framework

The project developer shall describe the policies, laws and regulations of the Lao PDR that are applicable to the project or the EIA study. This presentation shall highlight which particular provisions should be taken into account in planning and implementing the project.

4.4.3 International Conventions, Treaties and Agreements

The Lao PDR is a signatory to several international conventions, treaties and agreements. Those that are potentially relevant to the project should be presented, and the main elements that should be considered during project preparation and implementation should be summarized.

An **indicative** list of conventions, treaties and agreements signed or ratified by the Lao PDR as of May 2011 is presented below:

- International Plant Protection Convention (1955);
- ASEAN Agreement on the Conservation of Nature and Natural Resources (1985);
- Convention on the Protection of the Ozone Layer (1985);
- Convention Concerning the Protection of World Cultural Heritage and Natural Heritage (1987);
- The Montreal Protocol on Substances that Deplete the Ozone Layer (1987);
- UN Framework Convention on Climate Change (1992);
- International Convention to Combat Desertification (1994);
- Mekong River Commission Agreement on the Cooperation for the Sustainable Development of the Basin (1995);
- Convention on Biological Diversity (1996);
- Kyoto Protocol (2003);
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (2004).

4.4.4 Lao PDR Government Institutional Framework

The jurisdictions involved in the project, and the cooperation mechanisms that will be put in place to ensure the success of the EIA and implementation of its results should be presented. The project developer should use an organizational chart to facilitate understanding of the Lao PDR government institutional organizations involved in the project.

The responsibilities of each organization during the preparation, review, approval and implementation of the EIA Report will be summarized.

This description shall ensure that the project developer understands the requirements of the Lao PDR institutions, and that these requirements are considered in preparing and implementing the EIA.

4.4.5 International Policies, Guidelines and Standards (if applicable)

Projects funded by international organizations or funding agencies (e.g., World Bank Safeguard Policies, ADB Safeguard Policies, etc.) may request adherence to their own environmental and social safeguard policies, guidelines or standards. If the project is funded by an international organization, the project developer shall summarize its environmental and social policies, guidelines and standards.

Financial institutions may request that the project developer follow the Equator Principles and IFC Performance Standards during project design and implementation. The project developer shall then present the Equator Principles and the IFC Performance Standards that will be used.

If the project developer refers to policies, laws, decrees, regulations, standards from other countries, these documents shall be summarized and, if not available on the internet, the developer should provide a copy of these documents (in English) with the EIA report to ensure that the reviewing agencies can consider this information.

4.4.6 Project Environmental and Social Guidelines and Standards

As a rule, the project should always adhere to the Lao National Environment Standards. However, there may be cases where a project developer is required to follow more stringent or additional standards for business reasons, due to membership in an organization, or due to contract provisions. In any case, the project developer shall specify all of the applicable standards. It should however be noted that the final decision regarding which standards are applicable lies with the competent authority of the GOL.

It is suggested that the Lao National Standards that may apply to the project be presented in a table. If needed, columns may be added to the table to show standards from other countries or international agencies (e.g., WHO, IFC, EU, USEPA). The project developer shall then identify which standards will be selected for each parameter. If the selected parameter is not the more stringent one, an explanation should be provided for this selection.

The project developer shall indicate which environmental, economic, social and health guidelines will apply to the project. For example, in the case of resettlement issues, the project developer may indicate that the IFC guidelines will be followed, rather than the Lao PDR guidelines.

4.5 Description of the Project and Alternatives

The project description is a crucial step in preparing an EIA report. Without detailed information on the project description, it becomes impossible to assess the environmental, economic, social, health, cultural and visual impacts of the project accurately, or to propose specific mitigation measures. Technical information about the project will be provided by the engineering team of the project developer.

The project description presented in the Scoping Report should be improved at this stage, since additional technical information and/or new project alternatives are available.

The following sub-sections should be included in the “Description of the Project and Alternatives” section of an EIA Report:

- Presentation of the Project and Description of Alternatives
- Comparison and Selection of Alternatives
- Description of the Selected Alternative
 - Technical description of the selected alternative
 - Detailed Design
 - Pre-Construction
 - Construction
 - Operation
 - Decommissioning, closure and post-closure

4.5.1 Presentation of the Project and Description of Alternatives

A general presentation of the project should be included in this section of the EIA Report. This presentation shall include the objectives of the project, proposed technical components by phase (i.e., pre-construction, construction, operation and decommissioning, closure and post-closure), implementation schedule, investment cost, and other details.

The EIA Report shall include the description of realistic alternatives for achieving the basic development objectives of the project. Alternatives that have already been analyzed and rejected during the scoping phase should be presented.

The EIA Report shall describe each alternative in reasonable detail to enable all potential environmental, economic, social, health, cultural and visual impacts to be identified or predicted and evaluated. At least two alternatives plus the option of not proceeding with the project should be described. This should include alternatives to the project, for example, alternate transmission line routes, alternate sources of energy, alternate project locations, different project sizes, etc. All alternatives should be considered to the same degree.

Use of maps, plans, drawings and figures to provide effective visual presentations of the alternatives is required in describing the reasonable alternatives.

4.5.2 Comparison and Selection of the Alternative

Based on a comparative analysis of three or more of the most pertinent alternatives, the developer must select a preferred alternative, and highlight the critical environmental, social, economic, and technical aspects of the chosen alternative. If there is only one alternative at this phase, the study shall explain the reasons for choosing this alternative and indicate why the other alternatives have not been retained for further comparison. As a minimum, the “no project” alternative shall be included in the comparative analysis.

The process to select alternatives or to select an optimal alternative shall use a comprehensive comparison method and shall satisfy at least the following criteria:

- the capacity to satisfy the demand (i.e., objectives, problems and needs);
- legal and technical feasibility (e.g., land tenure, zoning, topography, civil engineering works, and availability of human resources);
- the economic benefit of the project;
- the ability to limit the significance of negative impacts and to maximize positive impacts on the natural and human environment;
- the ability to minimize the number of people affected, and the number to be resettled;
- creation of local employment and training opportunities.

Comparison of the project alternatives should be based on environmental, social, technical and economic factors. As much as possible, the comparison between the proposed alternatives should be based on quantitative data. The final selected alternative shall be the focus of the EIA, and shall be described in detail in the following subsection.

In some cases, analysis of the alternatives may involve comparing impacts that are not easily quantifiable (i.e., that are not measured using the same criteria), and that vary in time and space. In the analysis of alternatives, biophysical and socio-economic effects are represented numerically or visually (e.g., dots or histograms that vary in size according to magnitude).

One common method is to apply weights and ranks to the various impacts, and then to aggregate the results by assigning numerical values to the expected impacts on each valued environmental or social component. Then, each alternative is compared based on a single overall measure of impacts. The greater the aggregate value for an alternative, the more serious the environmental or social impact. Numeric weights can be assigned by using the informed opinions of stakeholders.

4.5.3 Description of the Selected Alternative

4.5.3.1 *Technical Description of the Selected Alternative*

The selected alternative(s) should be characterized, including describing the activities, infrastructure, construction work, and equipment required for all project phases, as well as temporary and permanent infrastructure and related installations. A cost estimate and a time schedule for the different phases of the selected alternative should be determined.

The description of the selected project alternative for the pre-construction, construction, operation and decommissioning, closure and post-closure phases should follow the generic structure and content of a project description presented in Table 4.1.

Table 4.1 Generic Structure and Content of a Project Description

Brief Presentation	Guidance Notes
1. Sector and Subsector	e.g., energy production, hydroelectric power
2. Size	Size can be expressed in terms of area (or length, for a road or other linear project), capacity (output or production), category/type, economic value and number of employees
3. Location	Overview map, typically at a scale of 1:20,000 (linear project) and 1:5,000 (single-point project). The map should include main natural features, such as water bodies, forest, existing infrastructure (roads, bridges, etc.) and human activities in the vicinity of

	the project. Human sensitive areas (schools, markets, sites or monuments of cultural importance, commercial areas, etc.) should be clearly indicated.
4. Project Components	Main production facilities Internal infrastructure Ancillary infrastructure and facilities
5. Overall Time Schedule	Present a diagram with the planned timing of: - Studies (including the EIA study) - Permitting/licensing - Concession agreements - Detailed design, contracting - Pre-construction activities - Construction activities - Operation (lifespan) - Decommissioning, closure and post-closure
6. Project Organization	Organization chart, management, roles and responsibilities, etc.
Pre-construction Phase (if required)	
7. Overview	Objectives, main activities, magnitude of the pre-construction activities, duration, etc
8. Pre-Construction Activity Schedules	Diagram pre-construction activities, including proposed measures to protect the environment (e.g., sedimentation basin at the site drainage outflow to reduce effect on water quality)
9. Location of Project Components	Site map (1:20,000 for linear projects and 1:5,000 for single-point projects) with location of project components such as temporary roads, workers camps, storage areas, clearing areas, temporary bridges, etc
10. Pre-Construction Project Characteristics	Detailed technical specifications for the pre-construction activities; Topographical survey (e.g., identification of center line, vegetation clearing activities) and/or geotechnical survey (location, period of the year, duration, size); Access negotiations; Site preparation and pre-construction activities (deforestation, vegetation clearing, clearing of line debris, dynamiting, borrow material excavation, river crossings, removal of arable soil, use of heavy

	machinery, removal of old infrastructure, etc.); Temporary infrastructure and related activities (access roads, bridges, heavy equipment storage areas, fuels deposits, material storage and handling areas, labor camps, sanitary facilities, project offices, etc.); Solid and liquid wastes (volume produced, storage and disposal areas); Excavation and filling (volume, source, transport, storage and deposition); Material and equipment used characteristic (e.g., trucks, graders, etc.)
11. Labour	Expected workforce, if possible short description of workforce per job type); Working hours; Expected origin of workforce
Construction Phase	
12. Overview	Objectives, main activities, scale of the pre-construction activities, duration
13. Construction Activity Schedules	Construction schedule and duration (start and end dates and general sequence)
14. Location of Project Components	Site map at an appropriate scale, illustrating linear projects (1:20,000) or single-point projects (1:5,000), as well as the planned components. Recent air photos (satellite images) of the project area are recommended. Indicate the locations of project components such as roads, camps, mines, processing plant, storage areas, tailing dams, reservoir, power house, transmission lines, bridges, etc.
15. Construction Project Characteristics	Detailed technical specifications for the construction activities (e.g., for a transmission line project (type of line, pylon structures, voltage capacity, servitude or ROW width) and for a substation (land occupation, project area, voltage, equipment, technical process, type of connection to the electrical network, etc.) ; Site preparation and construction activities (e.g., deforestation, vegetation clearing, clearing of line debris, dynamiting, borrow material excavation, river crossings, removal of arable soil, use of heavy machinery, removal of old infrastructure, etc.); Excavation and filling (volume, source, transport, storage and deposition); Number and type of construction equipment present on the construction site (noise level by mechanical

	equipment, duration of the construction activities with using mechanical equipment, etc.); (substation) Temporary infrastructure and related activities (access roads, bridges, heavy equipment storage areas, fuels deposits, material storage and handling areas, sanitary facilities, project offices, etc.); Permanent and temporary construction camps (location, regulations, best practices, sanitary facilities, shower, food, potable water, solid waste facilities, etc.); Solid and liquid wastes (volume produced and storage and disposal areas); Storm water treatment systems, such as retention ponds or infiltration basins; (substation); Rehabilitation work; Others
16. Labour	Health and safety measures for permanent and temporary employees (health check, first aid kits, clinic, safety devices, etc.); Expected workforce, if possible short description of workforce per job type); Working hours; Expected origin of workforce
17. Business opportunities	Prioritize the use of local contractor; Business development strategy; Development of partnerships with local businesses; Communication on the requirements of the project regarding business opportunities
Operational Phase	
18. Overview of operations	Project operation activities shall cover the whole project activities including, transportation, reception and storage, production process, management of the waste including storage, transport and elimination of the wastes and any other residues; Brief description of project components including production processes and technologies, facilities and infrastructure; Visual presentation of the completed project (e.g., a freehand drawing, layout); Presentation of production data: - Input materials (amounts/year, types, qualities and characteristics, sources);

	- Water and energy consumption and sources; - Outputs: Products (amounts, characteristics) by-products, waste and other emissions)
19. Operations schedule	Time diagram presenting the main components and the main operations/processes and their respective mitigation measures
20. Site layout maps	Site layout maps (1:2,500 or better scale) showing the location of the main operational components
21. Description of operation activities	Material and equipment used characteristic (e.g., transformer, noise level, oil types, containment for oil spillage, transport of equipment, etc.); Indicate, describe and quantify all activities producing contaminant in the environment (including air emissions, noise, water discharge, etc.) and the means and mechanisms proposed to reduce the pollution from these sources; Present simplified production process including drawing, sketch, etc. with the identification of inputs, outputs, management procedures and location of point source emissions and pollution (e.g., gases, liquids, solids, noise); Determine and characterize the liquid, solid and gaseous discharge from the production process; Demonstrate the capacity of the project to respect the standards for each source of pollution; Indicate how the project will optimize the management of the waste using the conservation principle for the resources (water, energy, raw materials, etc.); Flow diagram: materials, water, energy, waste and other emissions; Hazardous products (name and quantity, storage facility, etc.); Quantity of hazardous wastes; Materials handling, storage; Waste and wastewater management; Transport (means, timing, loads, routes); Others.
22. Labour	Expected workforce (if possible workforce per job type); Working hours; Expected origin of workforce

	Employment program Job Opportunities (recruitment policies, skilled and unskilled jobs, labor intensive work, duration, etc.)
23. Business opportunities	Used of local contractors; Business development training; Development of partnerships with local businesses; Communication on the requirements of the project developer in terms of business opportunities
Decommissioning, Closure and Post-Closure Phase	
24. Overview	Closure Plan Requirements (Strategy, Policy, Objectives, performance objectives and indicators, budgets (binding estimate for closure costs), etc)
25. Decommissioning Closure/Post-closure Schedule /	Time diagram presenting the main activities of the decommissioning, closure and post-closure
26. Decommissioning Closure/Post-closure Plans /	Prepare a conceptual rehabilitation, decommissioning, closure and post-closure plan covering all project components
27. Description of Decommissioning Closure/Post-closure activities /	Presentation of the decommissioning, closure and post-closure activities for each project component. Presentation of the cost for implementing the decommissioning, closure and post-closure activities and funding sources
28. Labour	Expected reduction of workers; Social development plan; Time period for lay out

Visual aids such as maps, cross-sections, 3D views, freehand drawings, technical design drawings, and diagrams are very useful and helpful for providing the reader with a good understanding of the project.

4.5.3.2 Detailed Design

Usually, an EIA study is carried out during the feasibility study phase of project planning, i.e., before the detailed design phase. On one hand, this means that the results of the EIA can be fully integrated into the detailed design and construction contract specifications. On the other hand, it also means that changes made during the detailed design may have significantly different impacts than those foreseen in the EIA. Such changes may require supplementary or even revised EIA studies. There are no fixed thresholds for when additional EIA studies may be required. The best way to avoid this situation is for the project developer to maintain an open dialogue with the competent authorities throughout the EIA studies, to report all uncertainties, and to make clear where decisions have yet to

be finalized. The developer may then come to an understanding with the authorities on how to deal with such cases.

For example, in large projects, it is not uncommon for the exact design and location of certain facilities to be decided quite late in the detailed design phase. If these facilities have well known, predictable and manageable impacts, then the usual way of managing such situations is to define the design and location criteria in the EIA Report, then include the selected design and location in the subsequent updated Construction Phase ESMMP and/or Operational Phase ESMMP for approval. However, in other cases, the design and location may be crucial to the significance of impacts and their mitigation. If not clarified and defined in advance, failure to base the EIA studies on the final design and location may render the studies incomplete.

4.6 Description of the Environment

The description of the baseline conditions of the existing environment shall detail information on the physical, biological, economic, social, cultural and visual components. This description shall also include details of the interrelationships between the components and the importance of such relationships.

The results of the Scoping Report shall be used to identify the level of detail required for the description of the environment. It is important to describe only the physical, biological, economic, social, cultural and visual components that are needed for the assessment in this section. Descriptions that provide general information at the scale of the country as a whole should be limited, given that the EIA should focus on the project and its surrounding area.

The following sub-sections should be included in the “Description of the Environment” section of an EIA Report:

- Setting the Study Limits
- Description of the Environment
 - Physical Components
 - Biological Components
 - Socio-Economic Components
 - Cultural Components
 - Visual Components
- Mapping

4.6.1 Setting the Study Limits

The EIA shall define the boundaries of the study areas and justify the chosen limits. The study areas should already have been defined in the Scoping Report, but may be adjusted due to changes in the project during the feasibility study and/or EIA study. The area or areas identified (i.e., there may be more than one study area) will include all anticipated direct and indirect impacts, as well as all project-related activities such as access roads.

For example, for a transmission line project, an area 2 km wide surrounding the selected route is analyzed in order to identify the environmental, social, cultural and visual impacts of the line (Appendix 8). The width of 2 km is dictated by visual impacts. The level of detail requested is at a scale of 1:20,000, or larger if a valued ecosystem component is present. If the transmission line crosses an urban or residential area, the level of detail will be studied and presented at a scale of 1:10,000 or larger.

For a substation, the study area will be defined as a circle of 2 km radius around the substation. The level of detail requested is at a scale of 1:10,000, or larger if a sensitive environmental or social component is present.

For an industrial project, the limits of the study area may depend on the impacts of air emissions, water contamination and noise. The study area will be presented at different scales according to the information illustrated. For example, for air emissions, the study area may cover an area of 5 or 10 km around the site, so it will be better to present the air pollution contours at a scale of 1:50,000 or 1:100,000. However, for valued ecosystem components near the factory, the level of detail requested will be at a scale of 1:10,000 or larger.

4.6.2 Methodology for Data Collection and Analysis

Baseline environmental and social data will be collected in a systematic and logical way, using nationally or internationally recognized methodology for each specific physical, biological, economic, social, cultural and visual component. Sampling and analysis shall be conducted using calibrated and certified equipment, and certified laboratories. The procedures used by the consultant to ensure adequate quality control shall be detailed.

The sources of secondary data for each physical, biological, socio-economic, cultural and visual sub-component must be clearly identified. The value of this information shall be assessed considering the methodology used to collect and analyze these data, as well as the date of the sampling or data collection.

The EIA Report shall clearly indicate which information is primary or secondary data.

For health impact assessment, the project developer should use the methodology proposed in the *Practical Guideline on Health Impact Assessment in the Lao PDR (draft)* prepared by the Ministry of Health.

Recent high-resolution satellite imagery should be used for description and presentation of the physical, biological, economic, social, cultural and visual components of all projects. This information will improve the accuracy of the data provided in the EIA Report (i.e., land use, vegetation cover, etc.), and will facilitate the assessment of the project impacts.

4.6.3 Description of Environment

The EIA shall describe the state of the environment in the study area before the start of construction activities. The current condition of sensitive physical, biological, economic, social, cultural and visual components that could be affected by the project should be described. These descriptions should focus on and be supported by quantitative and qualitative data that are relevant to the project.

The project developer shall carry out field surveys to collect relevant data using state-of-the-art methodologies. In addition, the developer should use secondary data from government offices, NGOs, regional organizations (MRC, ADB, etc.) to complete the baseline data. The sources of the secondary data should be clearly identified.

The information collected should be summarized on maps to facilitate understanding of the environmental and social context, and the analysis of environmental and social impacts. The scale of the maps at this phase should be at 1:20,000 in rural areas and 1:5,000 (or more detailed) in urban areas (see example in Appendix 8).

4.6.3.1 Physical Components

The physical components selected for study and the level of detail at which they are described should correspond to their importance or value in the study area(s). The Scoping Report and the TOR will provide a basis for selection of the physical components to be studied and the level of information requested about these components. During preparation of the EIA study, it is possible that previously unforeseen impacts that may be identified that may require additional surveys.

The physical components typically described in an EIA Report are:

- Climate (existing data cumulated on a period of several years)
 - Rainfall (dry and rainy season),
 - Humidity
 - Evaporation
 - Temperature and
 - Wind;
 - Climate change
- Topography;
- Geology (including risk of earthquakes);
- Geomorphology;
- Soil: Nature of the soil and arable land surface, potentially contaminated sites, lithology, slopes, areas sensitive to erosion and land movements / landslides;
- Sediments:
 - Metals
 - Sedimentation process (i.e., erosion and accumulation areas).
- Surface water hydrology
 - Bathymetry and hydrodynamic conditions (i.e., water flow at the surface and at the bottom);
 - Runoff, flood flows, low flows, evaporation
 - Flooding areas;
- Surface water: Aquatic and semi-aquatic environments, wetlands, and flood-prone protection areas for each location where a water crossing or encroachment is proposed:
 - Physical, chemical, and bacteriological quality of the surface water;
 - Total suspended solids, pH, conductivity, alkalinity, sulfate, metals, nitrogen compounds
 - Nature of the substratum of the watercourse bed;
 - Use of the watercourse;
- Groundwater
 - Location of groundwater sources (wells, springs, etc.)
 - Quality (pH, conductivity, alkalinity, sulfate, metals, nitrogen compounds)
 - Flows, volume
- Ambient air quality. For example, in residential areas, emissions and their concentrations due to road traffic and other sources of air pollution (particulate matter PM₁₀);
- Ambient noise
 - Noise level (L_{Aeq} 1 hour, L_{Aeq} 24 hours, L_{90} , L_{50} , L_{10})
 - Location of sampling points in sensitive areas (hospital, school, residential areas, recreation areas, etc.)
 - Isophone contour map illustrating the following three period L_{Aeq} day (7h – 19h), evening (19h – 22h), night (22h – 7h)
 - All detailed information providing the context of the measurement results.

The description of the physical components should include the potential natural hazards of the area, including potential hazards due to climate change.

4.6.3.2 Biological Components

The biological components selected for study and the level of detail at which they are described should correspond to their importance or value in the study area(s). The Scoping Report and the TOR will provide a basis for selection of the physical components to be studied and the level of information requested about these components. During preparation of the EIA study, it is possible that previously unforeseen impacts that may be identified

that may require additional surveys. To the extent possible, the description of the natural (physical and biological) environmental components should present the functional relationships and interactions between these components. This will enable particularly sensitive or important ecosystems to be identified. For example, the presence and abundance of animal species and relevant aspects of their life cycle (e.g., migration, reproduction, and food supply habits) should be highlighted. The inventories should reflect the social, cultural, and economic values assigned to the described component.

In some cases, the components may require preparation of technical reports by a biological expert. For example, an ornithologist may be required to provide information on bird migration and risks associated with a transmission line. These technical reports may be attached as appendices to the main EIA report, and summarized in the EIA report.

The biological components typically described in an EIA report are:

- Wetlands
 - Characteristics
 - Existing and future use
 - Presence of fragile or exceptional wetland
- Flora species and their habitats
 - Abundance
 - Distribution
 - Diversity
 - Rare, endangered, or vulnerable species
 - Riparian vegetation
 - Species of social, economic, cultural, or scientific interest (i.e. NTFP, etc.)
- Fauna species and their habitats (Mammalians, Reptiles, Amphibians, Birds)
 - Abundance
 - Distribution
 - Diversity
 - Migration
 - Rare, endangered, or vulnerable species
 - Species of social, economic, cultural, or scientific interest (i.e. NTFP, etc.)

4.6.3.3 Socio-Economic Components

The socio-economic components selected for study and the level of detail at which they are described should correspond to their importance or value in the study area(s). The Scoping Report and the TOR will provide a basis for selection of the physical components to be studied and the level of information requested about these components. During preparation of the EIA study, it is possible that previously unforeseen impacts that may be identified that may require additional surveys.

If resettlement and compensation constitute a major socio-economic impact of the project, the results of the Resettlement Action Plan should be summarized and included in the EIA Report.

The typical socio-economic components described in an EIA Report are:

- Social and health profiles of the communities (mapping the location the potentially affected population)
 - Social profile, including key demographic indicators of the potentially affected villages, compared with the district and national indicators:
 - Total number of people and families who will be required to leave the villages and district;
 - Total number of people living in the villages and district;
 - Population density;
 - Ethnic distribution of people living in the community/villages;

- Age distribution of people living in the community by ethnicity;
 - Sex distribution of people living in the community by ethnicity;
 - Dependency ratios (ratio of non-working children and elderly population to adult population capable of earning income) by ethnicity;
 - Type of domestic and family units (e.g., single family households versus multiple family unit compounds, or both; single parent versus married couple “nuclear family” households) by ethnicity;
 - Demographic problems, such as high immigration or emigration rates;
 - Significant changes in any of the above during the past 50 years;
 - Political and social organizations;
 - Education:
 - formal educational structure, and alternatives or complementary educational systems (e.g., religious education);
 - median adult educational achievement level, and the adult literacy level of the population;
 - access to education services, and barriers to educational achievement;
 - Housing conditions;
 - Gender issues;
 - Vulnerable groups.
- Health profile of communities in the study area. Health indicators should be compared with district and national values.
 - Mortality and morbidity;
 - Incidence of infectious diseases such as malaria, dengue fever and other waterborne diseases, tuberculosis (TB), HIV/AIDS, and STDs;
 - Incidence of chronic diseases, including cardiovascular diseases, cancer, and respiratory diseases such as asthma and bronchitis;
 - Diet and nutrition;
 - Mental health and wellbeing, mentioning rates of substance abuse, suicide, criminality;
 - Health-seeking behavior, including traditional medicine, birth practices, etc.
 - Health programs in the area, NGO interventions, etc.
 - Availability of health services, including transport, network and access to medicines;
 - Access to drinking water, sanitation and waste management.
- Local, district and provincial economy
 - employment sectors and unemployment levels;
 - traditional production systems, including gender roles;
 - use of the forest and other natural resources;
 - household income;
 - cost of living;
 - land ownership;
 - local business.
- Existing and planned use of the territory according to national, provincial, and district development plans, and to the laws, decrees and policies in force. Describe and illustrate on a map where relevant:
 - Existing housing concentrations, urban or residential areas, residential development projects;
 - Industrial and commercial areas and future developments;
 - Agricultural areas, agricultural activities, irrigation and drainage;

- Forest areas;
 - Protected forest;
 - Conservation forest;
 - Productive forest.
 - Areas with recreational, educational, historical, or aesthetic value;
 - Public infrastructure and access to public services
 - Roads;
 - Navigation and ports;
 - Airports;
 - Transmission lines;
 - Electricity;
 - Potable water distribution systems;
 - Sewers;
 - Pipelines;
 - Hospitals;
 - Kindergartens;
 - Schools;
 - Temples;
 - Cemeteries.
 - Water sources, including private and public wells, and other installations for collecting water;
 - Protected areas around the water-collecting installations;
 - Energy sources.
- UXO;
 - Concerns and opinions of the local communities, especially the affected population.

The socio-economic components should include reference to populations who may be vulnerable to natural hazards in the study area.

4.6.3.4 Cultural Components

Cultural components should be described in a way that enhances understanding of local communities, their use of various environmental components, and their views on the project. As for the other components, the relevant cultural components should already have been identified in the Scoping Report and TOR.

The cultural components typically described in an EIA report are:

- Cultural heritage
 - Archaeological sites;
 - Potential archaeological areas;
 - Cultural, traditional and/or tourism sites;
 - Other elements of heritage interest, whether protected by law or not.
- Ethnic Groups
 - Location;
 - History;
 - Cultural norms and social forms;
 - Traditional way of life.

4.6.3.5 Visual Components

Visual components should be described, especially in sensitive areas like urban centers, tourism sites, protected areas, etc. The EIA Report should include photographs of visual components that will be affected. Visual analyses should be performed by experts using appropriate methodology.

The visual components typically described in an EIA Report are:

- Local topography;
- Karst relief;
- Woodland extent and type;
- Other vegetation types;
- Built forms (architecture);
- Settlement patterns;
- Land use;
- Details of local materials, styles, etc.;
- Prominent watercourses;
- Cultural and religious identity;
- Visual features; and
- Landmarks.

4.6.4 Mapping

Mapping should be presented at two different levels of detail. Initially, thematic maps at a scale of 1:300,000 showing the major environmental and social components at the district or provincial level should be presented to illustrate the location of these components within and surrounding the project study area. The thematic map should locate the most sensitive components of the project (residential areas, historical places, paths of particular landscape value, viewing points, roads, bird migratory corridors, land use, forest conservation areas, natural hazards, etc.).

The physical, biological, socio-economic, cultural and visual components should be mapped at a scale of 1:20,000 for linear projects. For major developments such as hydroelectric or mine projects, these components should be mapped at a scale of 1:20,000 to 1:10,000, according to the significance of the environmental and social potential issues identified. The study area for an industrial project should be mapped at a scale of 1:10,000. The physical, biological, socio-economic, cultural and visual components will be identified with an appropriate legend that shows all spatial information presented in the EIA report (name of villages, watercourses, roads, etc.).

Examples for preparation of thematic maps (project presentation) and descriptions of the environment (environmental and social baseline data) are presented in Appendices 7 and 8, respectively.

4.7 Impact Assessment and Mitigation Measures

The project developer shall identify the impacts of the project for each project phase (i.e., pre-construction, construction, operation and decommissioning, closure and post-closure), and assess the significance of impacts using appropriate methodology and criteria.

The following sub-sections should be included in the “Impact Assessment and Mitigation Measures” section of an EIA Report:

- Impact Assessment Methodology
- Identification of impacts
 - Pre-Construction

- Construction
- Operation
- Decommissioning
- Impacts, mitigation measures and residual impacts
 - Pre-Construction
 - Construction
 - Operation
 - Decommissioning, closure and post-closure

4.7.1 Impact Assessment Methodology and Approach

The EIA Report shall describe the approach and methodology applied for identification and assessment of impacts. The methods and techniques used for the identification and determination of the significance of the impacts should be as objective, concrete, and reproducible as possible. Once the methodology is defined, the project developer shall use it systematically for each identified impact.

For health impact assessment, the project developer shall follow the methodology presented in the *Practical Guideline on Health Impact Assessment in the Lao PDR (draft)* prepared by the Ministry of Health.

A trans-boundary impact assessment should be conducted if the project may cause impacts in neighboring countries.

4.7.1.1 Scope of Assessment

This section should present the context of the assessment. It is important to describe any agreement that can affect the scope of the assessment. For example, some impacts may not be included in the assessment since these activities were completed by the Lao PDR Government before the start of the project (e.g., if resettlement and compensation have been completed before the project start).

4.7.1.2 Identification of Impacts

Generally accepted impact identification tools are presented in Appendix 3. Use of control tools (checklists, matrixes, and/or other available instruments) to identify impacts on the environmental components is highly recommended. These control tools should be presented in the EIA Report to facilitate the review, and to ensure that all impacts have been considered carefully.

The source of the impacts should be clearly identified, as well as the environmental, socio-economic, cultural or visual components affected.

4.7.1.3 Determination of Impact Significance

The methodology for the assessment should consider project-related impacts that are positive, negative, direct, indirect, and, if applicable, impacts that are cumulative, synergistic, reversible, and irreversible. Impact significance should be clearly presented. The significance of an impact depends on a number of factors such as:

- The intrinsic value of the affected ecosystem component(s) (i.e., sensitivity, uniqueness, rareness, and reversibility);
- The social, cultural, economic, and aesthetic values attributed to the component(s) by the population. The more the population values a component in an ecosystem, the more likely the impact on this component will be considered significant;

- The level of concern of the population regarding health and safety issues, or regarding protection of their archaeological sites;
- Whether the affected environmental component(s) have already undergone modifications.

The impact intensity is determined by the degree of disturbance and the environmental value of the component under consideration. The degree of disturbance assesses the magnitude of the modifications to the structural and functional characteristics of the affected components. The environmental value reflects the importance of the intrinsic and social values of the components affected by the project. Impact determination should also consider the spatial extent of the impact (distance or relative area impacted, proportion of the component affected) and the temporal duration of the impact on the project-affected component. The criteria and procedures to establish impact significance are presented in Appendix 9.

In terms of presentation, it is highly recommended to describe each specific impact by presenting the following elements in succession:

- the assessment
- proposed mitigation measures
- residual impact
- additional mitigation or compensation measures, if required to minimize the residual impact.

Dividing the project impacts and the description of the mitigation measures into separate chapters of the assessment is not recommended.

The assessment of each project impact should be performed systematically. The presentation of the impacts should clearly indicate the source of impact (how), the duration (when), the reason this impact occurs (why), and the intensity and the significance of the impact.

Modeling

Modeling may be required to determine the significance of the project impacts for various kinds of projects (industry, mining, hydroelectric power, substation, etc.), and to ensure the efficiency of the mitigation measures. Modeling may also be used to assess natural hazards and climate change impacts. Modeling should be performed using international models and standards, and should be based on quantitative data.

In most cases, modeling can be performed for hydrology, water quality, noise, air quality and impacts on climate, biology and ecology.

Results from spatial models (e.g., noise contours) should be presented on a map at an appropriate scale. For example, noise contours along a road should be presented at a scale of 1:5,000 (or larger) to enable the components affected by the project to be identified and located (e.g., number of houses, schools, hospitals, etc.).

Results from dynamic models, for example, models that produce water quality time series data, should be presented as curves or bar charts. The temporal resolution shall match the time scale inherent in the system being modeled (e.g., a river catchment model with a 1-day time step should not be used to simulate 100-year scenarios).

Results from models that are both dynamic and spatial can be presented as animated contours. Both temporal and spatial scales used by the models shall match the scales of the system being modeled.

4.7.1.4 Mitigation of Impacts

The purpose of impact mitigation is to reduce the negative effects of the predicted adverse impacts on the environment. Detailed objectives of mitigation measures are described in Box 4.2.

Box 4.2: Objectives of Mitigation Actions Intended to Reduce Adverse Impacts

Mitigation measures are intended to eliminate, offset, or reduce adverse environmental impacts, and could have a range of objectives, such as:

- *Avoidance:* Avoiding projects or activities that could result in adverse impacts; avoiding certain types of resources or areas considered to be environmentally sensitive. This approach is most effective when applied in the earliest phases of project planning.
- *Prevention:* Measures intended to prevent the occurrence of negative environmental impacts.
- *Preservation:* Preventing any future actions that might adversely affect an environmental resource. This is typically achieved by extending legal protection to selected resources beyond the immediate needs of the project.
- *Minimization:* Limiting or reducing the degree, extent, magnitude or duration of adverse impacts. This can be achieved by scaling down, relocating, or redesigning elements of a project.
- *Rehabilitation:* Repairing or enhancing affected resources, such as natural habitats or water sources, particularly when previous development has resulted in significant resource degradation.
- *Restoration:* Restoring affected resources to an earlier, and possibly more stable and productive state, typically to “pristine” condition.
- *Compensation:* Creation, enhancement, or protection of the same type of resource at another suitable and acceptable location to compensate for lost resources. It should be noted that compensation may be a suitable mitigation measure for certain impacts of certain projects, but it is often not a long-term solution.

Source: EMP Guidelines, South Africa, June 2005

For each project phase, the EIA Report shall specify the actions, infrastructure, design modifications, additions, or any other actions required to reduce the intensity of the impact. Mitigation measures can also be used to improve the benefit of positive impacts. Detailed, site-specific mitigation measures shall be defined for each impact identified.

Mitigation measures shall be as detailed as possible. Vague or uncertain commitments (e.g., where possible, if necessary, if required, etc.) are generally unacceptable. Impacts and mitigation measures that can be located by geographic coordinates should be presented on a map. The cost of implementing the mitigation measures should be estimated and presented in the EIA Report. Indicators that evaluate the efficiency of the mitigation measures should also be provided.

Incorporate Mitigation Measures into the Design and Procurement Documents

For the results of the EIA to be effectively incorporated into the project design, the environment team shall coordinate with the technical / engineering team during the preliminary and detailed design process. Important mitigation measures should be incorporated into the project technical specifications and/or the Bill of Quantities. Non-technical measures (e.g., compensation and resettlement) should be dealt with at the appropriate level and with the appropriate responsible institutions. Responsibility for

implementing each mitigation measure should always be clearly defined and accepted by the responsible agency.

For mitigation measures that are to be incorporated into the design, drawings / maps should be prepared to locate the impacts and define exactly what needs to be done in the design.

4.7.1.5 Determination of Residual Impacts

Where mitigation measures are unable to eliminate or reduce the impacts to an acceptable level (residual impacts), the EIA Report should determine how these impacts will be addressed. For example, “in kind” compensation is sometimes done by replanting trees in other areas to compensate for deforestation in the project area.

4.7.1.6 Mapping

Impacts that can be located on a map should be presented on an impact identification and assessment map at a scale of 1:20,000 for linear projects or 1:5,000 for single-point projects (e.g., factory, mine, etc.).

4.7.2 Identification of Impacts

The project developer shall identify all potential sources of impacts to the physical, biological, health, social, economic, cultural and visual components of the environment for the following project phases:

- Pre-Construction;
- Construction;
- Operation;
- Decommissioning.

For each subsection below, the project activities should be summarized in a matrix or table to enable identification of project impacts. The matrix or table (see example at Appendix 3) will show the relationship between the main sources of impacts and the potentially affected physical, biological, social, economic, cultural and visual components of the environment.

4.7.2.1 Pre-Construction

During the pre-construction phase, the main sources of impact generated by the project will depend of the type of activities carried out. For example, pre-construction activities may include:

- Topographic survey;
- Site leveling;
- Resettlement;
- Construction of resettlement sites;
- Construction of access road;
- Exploration (drilling, access road, construction of platform, accommodation camps, airport, etc.);
- Presence of workforces;
- UXO detection and clearance, etc.

4.7.2.2 Construction

Impact sources during the construction phase depend on the type of construction activities undertaken, the construction methods and construction equipment used, the plant equipment fabricated onsite, chemicals or materials used, source and amount of utility usage, duration of site work, etc. Construction impacts may be generated at the main construction site as well as in other areas that need to be considered.

Project construction activities and sources of impact may include:

- Building access roads;
- Opening and operation of borrow pits, quarry sites, etc.;
- Site clearing;
- Topsoil removal;
- Earthwork and excavation, including using dynamite and drilling;
- Installation of structures;
- Pipeline installation;
- Cleaning and hydraulic testing;
- Transportation of materials;
- Power generation;
- Painting activities;
- Welding and cutting activities;
- Presence of workforce;
- Air emissions;
- Noise;
- Wastewater discharges;
- Solid wastes;
- Hazardous wastes;
- Accidents;
- Workers' accommodation;
- In-migration
- Employment
- Local business development; etc.

4.7.2.3 Operation

The project activities or sources of impact during the operational phase will vary greatly from one project to another. For an industrial project, these may include air emissions, noise, liquid effluents, solid wastes, hazardous wastes, etc. generated from the process units. These project activities or sources of impacts may include:

- Operation (fluctuation of water levels in the reservoir for a hydroelectric power plant, increase in road traffic for a new road, etc.);
- Maintenance activities (vegetation clearing for a transmission line or for a road, etc.);
- Transportation;
- Air emissions;
- Noise;
- Water supply;
- Wastewater discharges;
- Solid wastes;
- Hazardous wastes;

- Workers' accommodation;
- Employment;
- Accidents;
- Site restoration; etc.

4.7.2.4 Decommissioning, closure and post-closure

The sources of impact during the decommissioning, closure and post-closure phase are often difficult to determine since the project life could last for 50 or 75 years. However, it is important to undertake the exercise of identifying the post-closure impacts to ensure that the major consequences can be planned for and incorporated in the feasibility and design phases. These sources of impacts may include:

- Demolition of buildings and infrastructure (pipelines, access roads, water supply sources, etc.);
- Removal and disposal of residues, including hazardous wastes;
- Site decontamination;
- Site rehabilitation;
- Maintenance of structures (tailings, etc.);
- Wastewater discharges;
- Transportation;
- Solid wastes;
- Hazardous wastes;
- Accidents.

4.7.3 Impacts, Mitigation Measures and Residual Impacts

4.7.3.1 Overview of the Impacts

The description of each project phase should start with an overview of the identified impacts, their causes, significance, mitigation and residual impacts. This overview may be thematic (air, water, waste etc.) and/or site specific.

4.7.3.2 Description of the Impacts, Mitigation Measures and Residual Impacts

The description of the impacts will present the assessment of the impacts, the proposed mitigation measures, and the residual impacts by project phase (pre-construction, construction, operation, decommissioning, closure and post-closure).

The primary impacts, mitigation measures and residual impacts may be described and assessed thematically, or by site. While there are no clear or stringent rules for selection of themes, the following themes are commonly used:

- **Physical Impacts:**
 - Surface Water Quality;
 - Groundwater Quality;
 - Surface Hydrology;
 - Erosion and Sediment;
 - Air Quality;
 - Noise;
 - Vibration;
 - Climate;
 - Others
- **Biological Impacts:**

- Forest;
 - Flora;
 - Fauna (e.g., facilitation of wildlife trade);
 - Biodiversity;
 - Terrestrial Ecosystems;
 - Aquatic Ecosystems;
 - Riparian Ecosystems;
 - Others
- **Socioeconomic Impacts:**
 - Economic development;
 - Employment;
 - Education and training;
 - Resettlement, land acquisition and compensation;
 - Public health and nutrition (e.g., infectious diseases, chronic diseases, nutritional disorders, physical injuries, mental health and wellbeing);
 - Occupational health and safety;
 - Demographic changes (e.g., in-migration, emigration);
 - Gender;
 - Ethnic groups;
 - Vulnerable groups;
 - Land use change;
 - Traditional livelihoods and production systems;
 - Access to natural resources: (e.g., NTFP, water, fisheries, wood for fuel, etc.);
 - Local business and existing productive activities (e.g., fisheries, agriculture, forestry, industry, mineral resources, tourism, etc.);
 - Communication and transportation, including navigation;
 - Vulnerability to natural hazards and climate change;
 - UXO;
 - Others
 - **Cultural Impacts**
 - Cultural Heritage;
 - Archaeology;
 - Traditional Values and Lifestyle;
 - Others
 - **Visual Impacts**
 - Aesthetics;
 - Landscape (e.g., karst);
 - Cultural, traditional or tourism site;
 - Others

Large or Complex Projects

If the project is large in area and includes many sites affecting different ecosystems (e.g., for projects such as a mine, hydropower, transportation projects, etc.), it is advised that the impacts be reported both thematically and site-specifically.

An example of the structure of this section of the EIA report for such site-specific large projects is presented in Box 4.3. The same format should be used for all project phases.

Box 4.3 Example of Site Specific Presentation of Impacts, Mitigation Measures and Residual Impacts for a Bauxite Mine and Refinery Project

1. Bauxite mine	2. Refinery
1.1 Pre-construction phase	2.1 Pre-construction phase
1.1.1 Physical impacts	2.1.1 Physical impacts
1.1.1.1 Erosion	2.1.1.1 Noise
• Project activities • Potential impacts • Mitigation measures • Residual impacts	• Project activities • Potential impacts • Mitigation measures • Residual impacts
1.1.1.2 Others	2.1.1.2 Others
1.1.1 Biological impacts	2.1.2 Biological impacts
1.1.1.1 Fauna	2.1.2.1 Fauna
• Project activities • Potential impacts • Mitigation measures • Residual impacts	• Project activities • Potential impacts • Mitigation measures • Residual impacts
1.1.2 Socioeconomic impacts	2.1.3 Socioeconomic impacts
1.1.3 Cultural impacts	2.1.4 Cultural impacts
1.1.4 Visual impacts	2.1.5 Visual impacts
1.2 Construction phase	2.2 Construction phase
1.3 Operation phase	2.3 Operation phase
1.4 Decommissioning, closure and post-closure phase	2.4 Decommissioning, closure and post-closure phase

Description of the Impacts, Mitigation Measures and Residual Impacts

Each impact will be described in detail, with the description of the project activities that are the source of impact; the reasons why the impact occurs; its intensity, duration, extent and significance. The mitigation measures for each impact will determine exactly which actions need to be taken and will be budgeted. The responsible authority for implementation of the mitigation measures will be identified. The result of the proposed implementation measures should be determined, and the residual impacts assessed.

The description of the each impact should include the following sub-sections:

- Project Activities;
- Potential Impacts;
- Mitigation Measures;
- Residual Impacts;
- Responsibility for Implementation;
- Responsibility for Monitoring

The methodology used by the project developer to determine the significance of the impact should be applied systematically for each project impact.

4.8 Risk Assessment

4.8.1 Overview

The project developer is requested to conduct a qualitative hazard and risk assessment to identify and assess the key risks of each major component of the project and associated facilities, during the construction, operation, and decommissioning, closure and post-closure phases. Hazards and risks to people (including both project-related personnel and the general public) and to the environment should be assessed.

Hazard and risk identification and reduction workshops should be held during the detailed design and initial site mobilization phases. These workshops allow the assessment to be refined, and further controls to be incorporated in the final project design as necessary.

The following sub-sections should be included in the “Risk Assessment” section of an EIA report:

- Context of the qualitative risk assessment
- Methodology and approach
- Results of the qualitative risk assessment
 - Construction
 - Operation
 - Decommissioning, closure and post-closure
- Quantitative risk assessment (if needed)

4.8.2 Context of the Qualitative Risk Assessment

The external, internal and risk management context in which the rest of the process will take place should be determined. Criteria against which risk will be evaluated should be established and the structure of the analysis defined.

4.8.3 Methodology and Approach

Hazards and risks to humans and facilities, including natural hazards and climate change, are defined as those which are considered to be possible but unlikely to occur during the normal course of project implementation.

The methodology used for identification, assessment and mitigation of hazards and risks that should be considered in preparing the EIA should be presented by the project developer.

The hazard and risk assessment should be based on the experience of the project developer, engineers and environmental consultant in developing and operating similar projects in similar environmental and social settings. Hazards and risks should be identified in close collaboration between the project engineers and the environmental and social consultants.

The risk assessment should be conducted by examining the potential consequences (i.e., a measure of severity of the impact) and the likelihood that those impacts will occur. The assessment of ‘likelihood’ applies specifically to the resulting impact. Often a final impact results from a chain of events, each with an associated likelihood. These ‘conditional likelihoods’ should be considered when determining the final likelihood of the impact occurring.

The risks should be qualitatively evaluated, whereby a number of categories are used to describe the consequences of each impact and the likelihood of that impact occurring. Appendix 10 presents an example of the methodology used for qualitative risk assessment.

If extreme risks are identified and assessed qualitatively, the project developer shall undertake a specific quantitative risk assessment to better evaluate and manage the risk.

4.8.4 Results of the Qualitative Risk Assessment

The results of the risk assessment should be presented for the following project life-cycle phases:

- Pre-Project
- Construction
- Operation
- Decommissioning, closure and post-closure

For the pre-project period, the EIA Report shall present the existing risk (i.e., before the start of the project), such as, for example, the risk of bush fires.

All risk assessments shall include a description of the risks, their assessment (likelihood, consequence and significance of the risks), proposed mitigation measures, and residual risks.

Based on the impact and risk assessments, the project developer shall adopt design, operating and control measures with the specific objective of preventing accidents associated with development and operation of the project. In addition, the project developer shall adopt the following general safeguards during the life of the project:

- Develop and implement emergency response plans (including spill response), and procedures for accidents and hazardous events;
- Coordinate and communicate emergency response plans to local authorities and involved institutions, and inform the local population;
- Develop and implement corporate and operational risk management plans;
- Conduct induction training and periodic refresher training for all employees and contractors on all aspects of safety, including site-specific safety regulations;
- Perform government statutory compliance, notification and liaison requirements and procedures.

These control measures should be included in the ESMMP as specific Management and Monitoring Plans. The requirement for these specific management plans will ensure that the risk for each of the key environmental and social factors is reduced to ALARP (“as low as reasonably practicable”).

4.8.5 Results of the Quantitative Risk Assessment

The project developer shall undertake A specific quantitative risk assessment if significant residual risk is identified. This quantitative risk assessment should be performed by a specialist following internationally recognized methodology. The quantitative risk assessment should be presented in a separate volume, and a summary presented in this section of the EIA Report. The ESMMP shall include the Management and Monitoring Plan resulting from this analysis.

4.9 Cumulative Impact Assessment

Preparation of a cumulative impact assessment is required for projects that may affect other investment projects (Decree 112/PM, Article 4(5)). International institutions such as the IFC request assessment of cumulative impacts for all projects.

The project developer will be required to carry out a cumulative impact assessment if critical cumulative environmental or social issues have been identified during the Scoping Report, and/or during preparation of the EIA Report, or upon the request by MONRE.

The following sub-sections should be included in the “Cumulative Impact Assessment” section of an EIA Report:

- Methodology and approach;
- Determination of valued ecosystem components;
- Determination of a spatial and temporal framework;
- Cumulative impact assessment;
- Development of a management framework.

4.9.1 Methodology and Approach

4.9.1.1 Definition

Cumulative impacts can be defined as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions.”

In the context of an EIA, cumulative impacts refer to the combined impacts of different projects or activities, in conjunction with the proposed project, within a defined spatial and temporal context.

4.9.1.2 Methodology

A simple methodology for determining cumulative effects is proposed as follows:

- Step 1: Identify incremental effects of the proposed project on selected Valued Ecosystem Components (VECs) within the area affected by the project. In this case, VECs are defined as “any part of the environment that is considered important by the project developer, public, scientists and government involved in the assessment process. Importance may be determined on the basis of cultural values or scientific concern.”
- Step 2: Identify other past, present and reasonably foreseeable actions (projects and activities) within time and space that have been or could contribute to cumulative impacts on each VEC or its indicator. Establish appropriate temporal and spatial boundaries;
- Step 3: Assemble information on VECs, and assess their historical and current conditions, including any consideration of thresholds or limits;
- Step 4: Connect the proposed project and other projects or activities in the defined cumulative impact assessment area to the VECs. This activity could involve a range of tools and techniques (e.g., air emission modeling for each industrial source in the project area). Emphasis should be given to the aggregation of impacts on each VEC;
- Step 5: Assess the significance of cumulative impacts on each VEC over the timeframe identified. It is suggested that the same methodology as was used to define the significance of impacts in the EIA be applied. The significance of the residual cumulative impact should be determined considering that the proposed mitigation measures have been implemented (Step 6);
- Step 6: For each VEC, identify mitigation or management actions, including joint cumulative impact management mechanisms.

4.9.2 Determination of Valued Ecosystem Components

The first step in the cumulative impact assessment of the project is to determine a list of Valued Ecosystem Components (VECs). VECs are those elements of the environment that are considered important by the project developer, the public, the scientific and academic

community, non-government organizations and government involved in the EIA process. They are defined through a consultative and iterative process to produce a list of valued environmental and social concerns to the society that could be affected by the project or by other project actions.

Once the VECs have been identified by the project developer and confirmed by stakeholders, they should be evaluated in terms of their trends from historical to current conditions. This should also include identification of any thresholds or limits that may indicate their sensitivity to disturbance.

This list of VECs should be validated and discussed with project stakeholders through a detailed and comprehensive consultative process throughout the affected area. The outcome should be to compile a focused list of stakeholders' key issues and concerns in the project area.

4.9.3 Determination of a Spatial and Temporal Framework

The project developer should define spatial and temporal boundaries to establish a frame of reference for assessing cumulative environmental impacts and to facilitate their identification. Such boundaries can also influence the assessment in a variety of ways. If large boundaries are defined, only a superficial assessment may be possible, and uncertainty will increase. If the boundaries are small, a more detailed examination may be feasible, but an understanding of the broad context may be sacrificed.

The project developer may perceive assessments with large boundaries as onerous or unfeasible, whereas the public may think small boundaries do not adequately encompass all of the project's environmental impacts. In addition,

- different boundaries may be appropriate for different cumulative environmental effects. For example, the boundaries selected for cumulative environmental effects on air quality might be quite different than those chosen for effects on a particular wildlife species;
- spatial boundaries should extend beyond a project's immediate site to include the area likely to be affected;
- temporal boundaries may extend beyond the timing of construction and operation to include the period when the effects may occur.

Spatial and temporal boundaries should be established using the following criteria, listed in order of importance:

- The size and nature of the project and its potential effects;
- The availability of existing data and knowledge about the project, its environmental effects, and the feasibility of collecting new data and knowledge if there are data or knowledge gaps;
- The size, nature and location of past and future projects and activities in the area, and the significance of their adverse environmental effects;
- Relevant ecological boundaries, including physiography, vegetation, land use, habitat, soil and surface materials and climate;
- Relevant aquatic boundaries, including watersheds, sub-watersheds, drainage basins, and hydrogeological discontinuities; and,
- Relevant jurisdictional boundaries, including village, district or province boundaries.

4.9.4 Cumulative Impact Assessment

Once the VECs and a spatial and temporal framework for the CIA have been developed, the project developer shall determine the contribution of each project or activity. The determination of cumulative effects could involve the following approach:

- Finalize spatial and temporal boundaries.
- Finalize list of included projects and activities.
- Identify trends for each VEC, and their sensitivity to disturbance.
- Identify environmental aspects for each project/activity and potential environmental and social impacts.
- Link the projects/activities and their impacts to each VEC, and try to understand the aggregated impact of projects/activities on each VEC. This could involve a range of modified tools including:
 - Checklists
 - Matrices
 - Linkage diagrams
 - Overlays/GIS analysis
- The objective of this exercise is to determine the aggregation of anticipated cumulative effects on each VEC.
- Assess the significance of effects on each VEC over the identified timeframe.
- Identify specific mitigation or management actions to address negative incremental effects of the proposed project and other projects or activities.

4.9.5 Development of a Management Framework

The project developer should develop a management framework to manage the cumulative effects arising from the various interests present in the project area. The intent of the management framework is to identify a number of coordinated management actions to address key impacts on each VEC identified in the CIA process. The management framework should be coordinated by MONRE, with involvement of the provincial authorities, other stakeholders, and the project developer.

4.10 Public Consultation and Disclosure

Involving the public in preparation of the EIA is fundamental to increasing the public's understanding and acceptance of the project (e.g., how the project may affect or improve their living conditions). Public involvement also enables members of the public to identify and bring forward impacts and issues that are not immediately obvious to the EIA preparation team. The earlier in the project preparation process the public can be involved, the more likely that a trusting relationship can be built and useful recommendations made.

In the Lao PDR, the project developer shall undertake a process of consultation during the EIA study involving the affected communities and the project stakeholders. Consultations should take place on a continuous basis starting as early as possible in the EIA process.

The following sub-sections should be included in the “Public Consultation and Disclosure” section of an EIA report:

- Introduction
 - Background and objectives of the project
 - Purpose of consultation in EIA preparation
 - Lao PDR requirements
- Methodology and approach
- Summary of consultation activities undertaken

- Overview of how consultation was undertaken, when, with whom and by whom
- Summary of the opinions of the persons consulted
- Results of consultations during project scoping
 - Issues identified by stakeholders
 - How these issues were taken into account
- Results of consultations on preparation of the EIA report
 - Issues identified by stakeholders
 - How these issues were taken into account
- Results of consultations on the first draft of the EIA report
 - Issues identified by stakeholders
 - How these issues were taken into account
- Results of consultations during EIA review
 - Issues identified by stakeholders
 - How these issues were taken into account
- Recommendations for ongoing consultation
- Appendices:
 - Summary of the project as presented during the public consultations (should provide a brief project description, potential impacts of the project, and mitigation measures for some significant impacts)
 - Detailed proceedings / minutes for each consultation activity
 - Complete list of participants for each consultation activity

4.10.1 Introduction

4.10.1.1 Background and Objectives of the Project

The project developer should briefly introduce the project background and objectives that have been used to define the public consultation and disclosure process. The administrative limits of the study area should be described with the names of the province and district affected.

The project developer's efforts in carrying out the public consultation and disclosure activities should be presented in terms of the specialists involved and time schedule.

4.10.1.2 Purpose of Consultations in EIA Preparation

This section should present the methodology and purposes of the consultations conducted during the EIA studies. In general, the purposes of the consultations can be summarized as follows:

- to collect information for identification of stakeholders and potentially affected persons
- to collect baseline social and environmental data and information
- to inform stakeholders and potentially affected persons about the project and its likely impacts;
- to record public concerns about the project; and
- to record public ideas for impact mitigation, and for maximizing any environmental or social benefits of the project.

4.10.1.3 Lao PDR Requirements

The project developer should describe the public consultation and disclosure requirements of the Lao PDR and funding agencies that have been followed for preparation of the EIA report.

These requirements shall include, as a minimum, those defined in Part II of the *Decree on Environmental Impact Assessment* (no. 112/PM, 16 February 2010). Chapter 2 of part II defines the public involvement process to be followed in preparing an EIA study, and provides details on the rights and duties of people affected by the project and other stakeholders (Article 7), and the participation process (Article 8). This enables reviewers and stakeholders to examine the extent to which the public has been involved in the EIA process, and whether their views and values have been adequately addressed.

Articles 12 and 13 of the Lao PDR *Decree on Compensation and Resettlement of People Affected by Development Projects* (no. 192/PM, 7 July 2005) describe additional requirements when the project involves resettlement and compensation.

The *Public Involvement Guidelines* (WREA, 2011) provide information on the dissemination, participation and consultation activities to be carried during the EIA process.

4.10.2 Methodology and Approach

The methodology and approach used for public consultation will vary according to the project developer and the scale of the project. The following subsections describe the consultation activities that should be undertaken to understand and incorporate the opinions of the affected people.

4.10.2.1 Identification of Stakeholders and Groups Affected by the Project

The stakeholders relevant to the project should have been identified early in the project scoping phase. The project developer should refer to the identification of the stakeholders and groups affected by the project presented in the Scoping Report.

The list of stakeholders and groups affected by the project prepared during the Scoping Report should be revised at the start of the EIA study and improved during the public consultation process.

4.10.2.2 Public Participation Process

The public participation process can be broken down into four key phases, each of which is a prerequisite for the next:

- **Information gathering:** collection of baseline data from the public to feed into the description of the environment and impact prediction;
- **Information dissemination:** stakeholders are informed about the project;
- **Consultation:** stakeholders are given the opportunity to voice their views about the project; and
- **Participation:** an extension of consultation, where stakeholders become joint partners in the design and implementation of projects (mitigation measures, community development activities, etc.) and take part in decision making.

Different techniques can be used for each phase as described in Box 4.4.

Box 4.4 Selection of Techniques for Public Participation			
Information Gathering	Information Dissemination	Consultation	Participation
Questionnaires / surveys	Media (radio, TV, newspapers)	Focus groups / workshops	Village committees
Key informant interviews	Displays, exhibits	Conferences / seminars	Round tables
Participatory appraisal techniques	Public meetings	Participatory appraisal techniques	Consensus building activities

The project developer should describe the techniques used during the public consultation process.

4.10.2.3 Conducting Public Consultation

Public consultation is recognized as a crucial step to preventing or minimizing environmental and social impacts. According to the *Decree on Environmental Impact Assessment* (112/PM, Article 12), public consultations must be conducted at several different stages during preparation of the EIA.

At the beginning of the EIA study, village dissemination meetings need to be organized by the project developer and the local administration to inform villagers about development plans for the project, about possible environmental and social impacts, and to collect the opinions of the people affected by the investment project. Information from the Scoping Report may serve as a basis for preparing these meetings. Only the population from the villages either directly or indirectly affected by the project will be consulted.

During preparation and review of the EIA report and the ESMMP, MONRE, the local administration, the responsible agencies, and the project developer shall organize consultation meetings at the village, district, and provincial levels. These consultation meetings provide a forum for the people affected by the project and other stakeholders to share their opinions and provide their comments on the report and plans, from the first drafts through the final drafts.

A summary of the public consultation meetings should be included in the EIA Report. All summary reports should be signed by the chairperson and some of the participants. According to the *Decree on EIA* (112/PM, Article 12 (4. h)), the minutes of each meeting must also be signed by the project developer and the consultant who prepared the report. The names of the participants and information on how the meetings were organized should also be provided in the EIA report. A summary of the results of each public consultation should be presented, including the opinions of the participants, the comments from the stakeholders, and the responses from the project developer.

4.10.2.4 Disclosure

To facilitate meaningful consultation with groups affected by the project and local NGOs, the *Decree on EIA* (112/PM) requires that suitable information be made available to stakeholders in a language and form that is understandable to them. The project developer must provide stakeholders sufficient time to review and understand the project and its issues to enable them to participate effectively during consultation.

Stakeholders and Public Consultation

For the public consultation meetings, the information to be provided to the people affected by the project and the stakeholders should include the Scoping Report, the initial and final executive summary of the EIA Report and the presentation materials. This information should be provided in Lao and in English.

Project Implementation

The project developer should define how information will be disclosed during project implementation. According the *Decree on EIA* (112/PM, Article 31), the EIA Report and the environmental and social management and monitoring plan (ESMMP) will be made available in Lao and in English at project developer information centers within the area of the investment project, and in related districts.

4.10.3 Summary of Consultation Activities Undertaken

The sub-sections 3.7.2 and 3.7.3 of these EIA Guidelines present the summary of consultation activities undertaken before and during scoping. The information regarding consultation activities provided in the Scoping Report should be used for this summary.

4.10.4 Result of Consultation during preparation of EIA Report

4.10.4.1 Overview

During preparation of the EIA Report, especially during the collection of the baseline data, the project developer and its consultant are requested to collaborate “with local administrations such as the District Water Resources and Environment Offices, the Provincial or Capital Water Resources and Environment Offices, to organise public information meetings at village level to explain general situation of the investment project, as well as the benefits, impacts on the environments and society which may arise from the investment project, measures to prevent and minimize impacts on environment and society, and summarize the comments and opinions given in the meetings to incorporate into the report” (Decree 112/PM, Article 12 (4. d)).

In this section of the EIA Report, the project developer should present the results of all formal and informal consultations undertaken with key stakeholders before preparing the first draft EIA Report, including consultations with national, provincial and district government officials, and affected individuals and communities.

Informal consultation should include regular discussions with local residents and local government staff. Formal consultation should include structured meetings with government authorities and village authorities, as well as individual household surveys.

The information provided during these discussions should be made available for further review. The information collected should be registered and referenced in the EIA Report. All significant project impacts and proposed mitigation measures should be clearly presented to the participants.

4.10.4.2 Issues Identified by Stakeholders

The project developer should carry out several types of consultation with stakeholders, including the people affected by the projects, during preparation of the EIA. The main issues identified during these consultations should be presented in the EIA Report.

The issues raised by the stakeholders during these consultations should be summarized in a table organized according to affected components.

The summary of these consultations, including questionnaires and opinions raised by the stakeholders, should be made available for prior review, and attached as an appendix to the EIA Report. These summaries must be signed by the project developer and consultant, and by representatives of the participants at village meetings or district workshops.

4.10.4.3 How These Issues Were Taken Into Account

The project developer should explain how the issues raised by the stakeholders during the EIA study have been incorporated into the project documents, for example, in new designs, additional mitigation measures, better compensation rates, etc. In some cases (e.g., resettlement and compensation), the government authorities may be responsible for responses to these issues.

4.10.5 Result of Consultation on First Draft EIA Report

4.10.5.1 Overview

Decree 112/PM, Article 12 (4. f) requests that the project developer collaborate “with local administrations like District Water Resources and Environment Offices, to organize meetings at villages, with participation of the people affected by the project by the investment project and other stakeholders to deliberate the **first draft** of the report on the EIA and ESMMP, and then revise the report and the plans in accordance with the resolution of the meetings, and then disseminate them back to the people affected by the project by the investment project and other stakeholders to revise them before district meetings.”

The summary of these consultations shall be written and signed by the project developer and consultant (Decree 112/PM, Article 12 (4.h)), and signed by the participants or their representatives. The participants will receive a hardcopy of the information provided, and should keep it for future discussion with the government authorities. The project developer shall attach a copy of the minutes of the meeting to the EIA Report for subsequent review and verification.

4.10.5.2 Issues Identified by Stakeholders

The project developer shall carry out several consultations on the first draft of the EIA report with stakeholders at the village level, including the people affected by the projects. The main issues raised during these consultations should be identified and presented in the EIA report, in terms of opinions and solutions proposed by the project developer or government authorities. The opinions of the participants should be presented in a table indicating the names of the participants and the response from the project developer in terms of the solutions or actions proposed.

The minutes of these meetings and workshops, including the opinions raised by the population, should be presented in an appendix to the report, with the signatures of the chairperson and some of the participants, as well as the project developer and the consultant.

4.10.5.3 How These Issues Were Taken Into Account

The project developer shall explain how the issues raised by the stakeholders during the EIA study have been incorporated into the project documents, such as new designs, additional mitigation measures, better compensation rates, etc. The solutions proposed by the project developer or the government authorities should be as specific as possible.

In some cases (e.g., resettlement and compensation), the government authorities may be responsible for responses to issues raised by the affected people.

4.10.6 Result of Consultation During MONRE EIA Review

4.10.6.1 Overview

Decree 112/PM, Article 12 (4. g) requests that the developer collaborate “with the local administrations like Provincial or Capital Water Resources and Environment Offices, to organize district-level meetings, with participation of the representatives of people affected by the project by investment projects, from each village, the concerned provincial or Capital offices, mass organizations and other district organizations to deliberate the report which was revised in compliance with the resolution of the village meetings.”

The same article requests that the “district-level-revised report must be made either in Lao or in English in which the abstract/executive summary, the ESMMP shall be made in both Lao and English, before submitting them to the MONRE to review.”

The summary of these consultations must be written and signed by the project developer and consultant (Decree 112/PM, Article 12 (4.h)), as well as by the participants or their representatives. The participants will receive a hardcopy of the information provided, and should keep it for future discussion with the government authorities. The project developer shall attach a copy of the minutes of the meeting to the EIA Report for subsequent review and verification.

4.10.6.2 Issues Identified by Stakeholders

The project developer shall carry out consultation(s) on the final draft of the EIA report with stakeholders at the district level, including the people affected by the projects. The main issues raised during these consultations should be identified and presented in terms of opinions and solutions proposed by the project developer or government authorities in the EIA report. The participants' opinions should be presented in a table indicating the name of the participant and the corresponding response from the project developers in terms of solutions or actions proposed.

The minutes of these meetings and workshops, including the opinions raised by the population, should be presented in an appendix of the EIA Report, with the signatures of the chairperson, some of the participants, as well as the signatures of the project developer and consultant.

4.10.6.3 How These Issues Were Taken Into Account

The project developer should explain how the issues raised by the stakeholders during the EIA study have been incorporated in the project documents, such as new designs, additional mitigation measures, better compensation rates, etc. The solutions proposed by the project developer or the government authorities shall be as specific as possible.

4.10.7 Recommendations for Future Consultation

The consultation process is an ongoing activity that will continue throughout the project implementation cycle. The EIA Report should define the future consultation process in terms of:

- Objectives of consultations during
 - Construction
 - Operation
 - Decommissioning, closure and post-closure

- Participants involved in future consultation
- Creation and management of Consultation Committee(s)
- Complaints and Grievance Mechanisms
- Information disclosure.

Action plans designed for the project, such as Resettlement Action Plans, Social Development Plans, ESMMP, etc., can also involve consultation activities that should be carried out during the project implementation cycle. Any such consultation activities should also be included in that Public Consultation section of the EIA Report in order to provide an overview of the ongoing consultation process.

4.10.8 Appendices

The following information should be attached as appendices to the EIA Report:

- Summary of project presented during the public consultations. The summary should provide a brief project description, potential impacts of project, and mitigation measures for certain significant impacts.
- Presentation materials used during the discussions, meetings, workshops, etc.;
- Materials distributed (booklets, brochure, etc.);
- Detailed proceedings / minutes for each consultation activity;
- Complete list of participants for each consultation activity.

4.11 Development Plans

Development Plans may be required by legislation or due to specific characteristics of the project. For example, in the case of hydroelectric power project, preparation of a watershed management plan and/or biomass removal plan may be required. These plans should be prepared and submitted as separate volumes attached to the EIA Report, but summarized in the appropriate section of the EIA report

Social development plans may also be required by international funding agencies or financial institutions, or due to project impacts. In particular, projects having major impacts on the local population (e.g., resettlement, vulnerable groups, disruption of traditional livelihoods and access to natural resources, etc.) will require preparation of social development plans, such as:

- Resettlement and Compensation Plan (Lao PDR Decree 192/PM, IFC, WB, ADB, etc.);
- Stakeholder Engagement Plan (IFC);
- Livelihood Restoration Plan (IFC, WB, etc.);
- Vulnerable Groups Development Plan (IFC, WB, etc.);
- Community Development Plans: intended to resolve community problems, either pre-existing, or caused or exacerbated by the project. Plans may include training, development of alternative livelihood opportunities, strengthening of community organizations, improvement of community services and infrastructure, etc. Such plans are agreed to by the authorities and community representatives. Responsibility for implementing the community development plans is normally shared between the local authorities and the community.
- Others

These social development plans should also be presented in a separate volume attached to the EIA Report, and their content summarized in the EIA Report.

5. Environmental and Social Management and Monitoring Plan (ESMMP)

5.1 Overview

The *EIA Decree* requires that the project developer prepares an Environmental Management and Monitoring Plan (EMMP) and a Social Management and Monitoring Plan (SMMP). However, in practice, these two plans should be presented together as a single coherent, integrated plan. For this reason, the management and monitoring plans are referred to in this guide as a single document called the "Environmental and Social Management and Monitoring Plan" (ESMMP). It should be noted that resettlement and compensation matters are not part of an ESMMP, but should be presented separately.

An environmental and social management and monitoring plan (ESMMP) is an essential tool for ensuring that mitigation of the negative impacts and enhancement of the positive impacts is carried out effectively throughout the life of the project. An ESMMP should be systematically improved on a regular basis to ensure that best available technologies (BATs) and best environmental management practices are implemented in a manner that is pragmatic, efficient and cost-effective.

The *EIA Decree* requires that the ESMMP be prepared in both Lao and English (no. 112/PM, 16 February 2010), Article 12. (4.g.)). The purpose of the ESMMP is to ensure that the recommended mitigation measures are implemented throughout the life of the project. For this reason, the ESMMP should be prepared as a standalone document. This means that there will be some repetition of information from other parts of the EIA documents.

It should be noted that, in accordance with article 18 of the *EIA Decree*, the project developer is required to prepare an ESMMP specifically for the operational phase, and shall submit this plan to MONRE for review and approval six months prior to commencement of operations. The project developer must revise the operational phase ESMMP every 2-5 years, and submit the revised plans to MONRE for review and approval.

In addition, complex projects such as hydroelectric power and mining projects may also be required to prepare a separate construction phase ESMMP.

5.2 Generic Content of an ESMMP

The ESMMP should be structured in three main parts:

- Part I: General Matters
- Part II: Plans and Programs
- Part III: Procedures and Support Programs

A generic table of contents for each part is presented in Appendix 6.

5.3 General Overview

This section of the ESMMP should present the project and its objectives. This section should contain a review of the justification for the project; a summary of the environmental and social activities implemented before and during preparation of the EIA Report, including public consultations; and the presentation of the project developer and

its environmental and social consultants. This section should also present the scope and the structure of the ESMMP.

5.4 Legal Requirements, Environmental and Social Policies and Commitments

This section should present the laws, decrees, regulations, standards, guidelines and corporate policies related to environmental and social matters of the project.

Note that the Confirmation and Letter of Undertaking (see Appendix 7), which the project developer is required to complete and sign, also covers the ESMMP. This means that the project developer confirms the compliance commitments stated in this section.

The section should be divided into three subsections:

- 1) Applicable Laws;
- 2) Contractual and other commitments; and
- 3) Governing parameters.

In accordance with MONRE's normal review and approval procedures, the final approved ESMMP would include the corrections required by MONRE. In addition, the project developer must comply with any conditions that MONRE may include in the Environmental Compliance Certificate. The project developer shall exercise due diligence to ensure that the legal framework presented is complete, accurate and up-to-date. However, it is important to keep in mind that the applicable legal framework is not limited to the laws etc. listed in the ESMMP.

Compliance with environmental legal obligations is an essential project requirement that needs to be considered in the ESMMP. Failure to meet legal obligations could result in the environmental authorization for the project being withdrawn, and could effectively result in operations being halted until such non-compliances are addressed and resolved.

5.4.1 Applicable Laws

This subsection presents the legal framework for the project, which includes applicable laws, decrees, regulations and guidelines of the Lao PDR, as well as international conventions ratified by the Lao PDR. Reference should only be made to those laws and obligations that are relevant to the project and its social or environmental issues.

It should be noted that the project must also comply with any new or revised laws or obligations that are applicable to the project. The ESMMP shall therefore include procedures for ensuring that the project developer is always fully updated with respect to applicable laws and standards.

The following format for presenting the legal framework should be used for each of the following categories: i) Laws, ii) Decrees, iii) Regulations, iv) International Conventions, and v) GOL Guidelines

Table 5.1 Presentation of the Legal Framework of the Lao PDR applicable for the project

Lao PDR - Legal Framework	Summary and Relevance	Year
Law		
1. Title, number and issuing authority	Summary of relevant articles and their implications for the project Indicate the project component affected by the article	Year of promulgation
Decree		
1. Title, number and issuing authority	Summary of relevant articles and their implications for the project Indicate the project component affected by the article	Year of promulgation

5.4.2 Contractual and Corporate Commitments

The second category of commitments includes those that are not directly required by Lao PDR law, but those to which the project developer is committed through concession agreements, contracts, loan agreements, or membership in associations, as well as commitments that project developer has made voluntarily as part of its corporate policy.

The typical commitments in this category comprise IFC performance standards, IFC environmental, health and safety guidelines, ISO and IEC Standards, ADB environmental and social safeguards, EQUATOR Principles, and sustainability reporting guidelines under the Global Reporting Initiative. Applicable sector-specific commitments, such as a commitment to follow the International Cyanide Management Code or the International Commission On Large Dams (ICOLD) Guidelines, should also be mentioned here.

The following format should be used:

Table 5.2 Presentation of the Contractual and Corporate Commitments

Guideline or Standard	Origin of Commitment	Scope and Relevance	Year
1. Title and issuing organization	Title and type of Commitment, e.g., Concession Agreement between [developer and other party], dated [date].	Summary of relevant articles and their implications for the project Indicate the project component relevant to the article	Year of promulgation
<i>See example below for a gold mining operation</i>			
2. Title: International	Loan Agreement between [developer company] and [name of	Cyanide Management Code Cyanide shall be managed,	2009

Cyanide Management Code (ICMC) Issued by: International Cyanide Management Institute	development bank] dated [dd/mm/yyyy]	transported, stored, handled, used, treated and disposed of in strict compliance with the ICMC. An ICMC verification audit shall be conducted upon commencement of operations, and every three years thereafter by independent qualified auditors.	
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5.4.3 Governing Parameters

This subsection deals with the specific emission limit values and ambient environmental quality standards to which the project must adhere. Such parameters may be derived from any of the above listed laws, decrees, regulations, standards or guidelines, and the project developer commits to comply with these limit values.

The governing parameters should be presented and structured as follows:

- 1) Emissions
 - a) Emissions to air
 - i) Project Components
 - b) Emissions to water (may in some cases have to be subdivided according to type and classification of water bodies)
 - i) Project Components
 - c) Noise and vibration emissions
 - i) Project Components
- 2) Ambient Environmental Quality Standards
 - a) Ambient Water
 - i) Water Body
 - b) Ambient Air
 - i) Particulate matter
 - ii) Gases
 - iii) Noise and vibrations
 - c) Soil
- 3) Occupational Health and Safety Standards
 - a) Workplace air quality
 - b) Workplace noise
 - c) Drinking water

As a general rule, where different emission limit values or environmental quality standards are listed in two or more of the applicable laws or contractual or other commitments, the developer must comply with the more stringent limit or standard, which will be listed under the governing parameters in this section. There may be exceptional cases where this is not feasible. In such cases, the project developer shall justify any such deviations and explain how they will be compensated.

Note that as part of the review and approval procedure of the EIA/ESMMP, MONRE may require revisions to the Emission Limit Values (ELV) or Environmental Quality Standard (EQS) or additional ELV or EQS. MONRE may also, at its own discretion, determine ELV and EQS in conditions to the Environmental Compliance Certificate (ECC) for the project.

An ELV may be defined as a concentration value and/or a load value. Load values are particularly important in cases where an EQS shall be met. In calculating and proposing a load-based ELV, the project developer should take into consideration that there may be other existing or future sources of pollution in the area, and the load should therefore only contribute to a portion of the relevant EQS. For example, IFC EHS Guidelines on Air Emissions and Air Quality, 2007 suggests that, as a general rule, 25% of the applicable air quality standards should be held in reserve to allow for additional, future sustainable development in the same airshed.

If the project developer proposes to apply governing parameters from other countries, it must provide a translation of the original copy of these parameters to MONRE.

Any use of modeling or engineering calculations should be clearly explained and referenced.

A generic format for presenting governing parameters is presented below.

Table 5.3 Presentation of the Governing Parameters

Emission Limit Values for Project Component			
Parameter	Unit	Emission Limit Value	Source / Reference
See example below for work camps, sanitary facilities, domestic wastewater and landfill effluent			
Biochemical Oxygen Demand (BOD) in receiving water bodies	mg/L	30	IFC General Guidelines Wastewater and Ambient Water Quality, April 30, 2007

5.5 Organization Structure, Roles and Responsibilities

The roles and responsibilities of the key parties involved in implementing the ESMMP (in particular, the management actions and monitoring requirements), in meeting the conditions of the ECC, and in meeting the environmental and social obligations of any concession agreements that may have been entered into should be clearly defined. The key parties may include:

- Project Developer
 - Presentation of the organization chart of the developer for this project, including the Environmental and Social Department (ESD)
 - Presentation of the ESD, including its roles and responsibilities, the staff members, and the relationship between the ESD, the contractor and subcontractors;
 - Clearly define the transfer of responsibility for implementing the ESMMP from the project developer to the contractor and subcontractors during the construction and operation phases
- Government Authorities
 - MONRE
 - Sector Ministries
 - Provincial Authorities
 - District Authorities
 - Village Authorities
 - Environmental Management Unit (EMU)
 - Others

Note that if a project involves resettlement, MONRE has developed a detailed organizational model complete with duties, responsibilities and memberships. This model can be obtained from MONRE upon request.

A flow diagram should be included showing responsibilities and communication channels. Where specific ESMMP responsibilities are assigned to contractors or subcontractors, these should be clearly stipulated and included in the contract documentation.

The roles of MONRE, the Provincial and District Authorities, and Environmental Management Units (where such have been or are expected to be established by MONRE) related to environmental and social matters of the project should be described. The purpose of clearly describing these roles is mainly internal, to make sure that the developer's management and personnel concerned have a good understanding of the roles and functions of government authorities. As mentioned above, for projects that are under the concession agreement system, MONRE has developed a "Standard Environmental and Social Obligations" or SESO, which includes the roles and duties of the EMUs and government authorities concerned.

5.6 Description of Project Phase

5.6.1 Instructions for Presentation

Note that the content of the ESMMP should follow the structure indicated in Section 5.2, "Generic Content of an ESMMP," and in Appendix 6.

Each project phase, i.e., construction (including pre-construction), operation; and decommissioning, closure and post-closure should be described in separate chapters in the ESMMP. The ESMMP should describe the environmental and social mitigation or enhancement measures and monitoring plans for each of these project phases. In this way, all issues and key information related to a particular phase of the project are contained in one coherent chapter of the ESMMP.

However, for the sake of simplicity and convenience, the instructions and guidance in this Guideline are not divided by project phase, but aggregated under the following two headings: 5.6.2 Description of Activities and Installations; and 5.7 Management and Monitoring.

5.6.2 Description of Activities and Installations

As mentioned above, the instructions and guidance provided in Section 5.6.2, "*Description of Activities and Installations*," apply to all project phases, i.e., construction (including pre-construction), operations, and decommissioning, closure and post-closure.

To a certain extent, the description of project phase activities and installations should borrow from the project description section of the EIA report itself. Accordingly, the instructions and guidance provided in Section 4.5.3 of this Guideline also apply here, except that, in the ESMMP, there is no discussion of alternatives: the description should focus solely on presenting the activities and installations of the particular phase of the project being considered.

The description of the activities and installations should be accompanied by maps developed in accordance with this Guideline.

It is important to include an implementation schedule indicating the timing of activities and operations, together with the related environmental engineering works and inspection and monitoring schedule of the project developer. A template for such an implementation schedule is provided in Table 5.4 below.

The implementation schedule is particularly important for the construction phase activities and installations.

Table 5.4 Template for Implementation Schedule

Implementation Schedule	month/ year	month/ year	month/ year	month/ year	month/ year	month/ year	month/ year	month/ year	month/ year
Site									
Activities/ Operations									
Environmental Engineering Measures									
Environmental and Social Monitoring and Inspection									

Implementation schedules should be site specific, and there should be references to maps, site specific management and monitoring plans, and/or relevant thematic management plans.

5.7 Management and Monitoring

Note again that the content of the ESMMP should follow the structure indicated in Section 5.2, “Generic Content of an ESMMP” and in Appendix 6.

This means that each project phase, i.e., construction (including pre-construction), operation, and decommissioning, closure and post-closure should be described in separate chapters in the ESMMP. The ESMMP should describe the environmental and social measures and monitoring plans for each of these project phases. In this way, all issues and key information related to a particular phase of the project are contained in one coherent chapter of the ESMMP.

However, for the sake of simplicity and convenience, the instructions and guidance in this Guideline are not divided by project phase, but aggregated under the following two headings: 5.6.2 Description of Activities and Installations; and 5.7 Management and Monitoring.

5.7.1 Overview of Impacts and Mitigation Measures

The ESMMP must be based upon the impacts and mitigation measures identified in the EIA Report, as well as any additional requirements in the ECC and Concession Agreement. A summary of the project impacts, proposed mitigation measures, responsibilities and costs for implementation of these mitigation measures must be presented for each project phase, i.e., construction (including pre-construction), operation, and decommissioning, closure and post-closure.

Example summaries of impacts and mitigation measures is presented in Table 5.5 (Thematic) and in Table 5.6 (Site Specific).

Table 5.5 Thematic Overview of Impacts and Mitigation Measures

Environmental Aspect / Issue	Impacts and causes of impacts, their geographic location and impacted area	Measures to avoid, prevent, remedy or compensate the impacts	Residual Impacts (duration and timing, reversible/ irreversible, scale and magnitude)	Compliance: (Reference to applicable Standards, BAT, Best Practices, guidelines)	Responsible Unit and Reference to Sub-Plans or Site Specific Plans
Theme: Water Quality					
Reservoir water quality					
Downstream water quality					
Effluents					
Theme: Fauna – Aquatic Life					

Table 5.6 Site Specific Overview of Impacts and Mitigation Measures

Site or Area/ Environmental Aspect / Issue	Impacts and causes of impacts	Measures to avoid, prevent, remedy or compensate the impacts	Residual Impacts (duration and timing, reversible/ irreversible, scale and magnitude)	Compliance: (Reference to applicable Standards, BAT, Best Practices, Guidelines)	Responsible Unit and Reference to Sub-Plans or Site Specific Plans
Theme: Water Quality					
Reservoir water quality					
Downstream water quality					

Effluents					
Theme: Fauna – Aquatic Life					

5.7.2 Thematic and Site Specific Management and Monitoring Plans

The management and monitoring plans provide the core information of the ESMMP. As highlighted above, these plans should be presented for each phase of the project.

Specific requirements to implement the mitigation measures may need to be developed during the detailed design, and as part of the bidding and sub-contracting process for the construction phase. These specific requirements must be included in the updated version of the ESMMP and approved by MONRE.

For each project phase, a series of management and monitoring plans must be developed. These management and monitoring plans can be divided into two main categories: 1) Thematic Management and Monitoring Plans; and 2) Site Specific Management and Monitoring Plans.

The most important criterion for deciding on which themes and sites should be covered by individual management plans is **operational feasibility**. For large projects, this means that the management and monitoring plans should match the project developer's organization (or vice versa) as much as possible.

Typical **Thematic Management and Monitoring Plans** are listed below:

- Noise management plan
- Air quality management plan
- Erosion and sedimentation management plan
- Natural hazards management plan
- Climate change adaptation management plan
- Water quality management plan
- Water use management plan
- Leak and spillage management plan
- Wastewater and storm water management plan
- Materials handling and storage management plan
- Solid waste management plan
- Hazardous material handling management plan
- Biodiversity and conservation management plan
- Visual protection management plan
- Site clearing and landscaping plan
- Rehabilitation and re-vegetation management plan
- Worker accommodations management plan
- Occupational health and safety management plan
- Employment and training management plan
- Emergency plans
- In-migration management plan
- Traffic management plan
- Communicable diseases management plan
- Community health and safety management plan
- Archaeological and cultural heritage management plan

- Investment and procurement management plan
- Visual protection management plan
- Others, etc.

For the same project, development of **Site Specific Management and Monitoring Plans** may also be required to address issues that can be located within a particular area or component of the project, for example:

- Processing plants
- Main structures and installations e.g., a dam
- Access roads
- Pipelines
- Transmission lines
- Waste disposal or treatment facilities
- Storage facilities (fuels, chemicals)
- Reservoirs
- Borrow pits
- Work camps
- Mine pits

5.7.3 Description of Management and Monitoring Plans

The description of each management and monitoring plan shall include the following sub-sections:

- Objectives
- Context
- Legal Requirements
- Management Actions (or Mitigation Measures)
- Monitoring Program
- Performance Specifications
- Implementation Schedule
- Responsibilities

5.7.3.1 Objectives

The objectives of each management and monitoring plan should be clearly defined and should address the identified project impacts, including the opinions raised during the public consultation and the conditions stipulated in the ECC and Concession Agreement.

5.7.3.2 Context

The context should include background information and a brief description of the current environmental and social setting relevant to the management theme.

5.7.3.3 Legal Requirements

This subsection should present the legal requirements that must be followed or reached for the specific management and monitoring plan. This will of course to some degree repeat information from the section on “Legal Requirements and Environmental and Social Policies and Commitments” (see Section 5.4), but the reasons for including this information in each of the management plans are to make it clear where the requirements are applicable, which will also make inspection and monitoring more straightforward. The

other main reason is that an individual management plan sometimes is pulled out of the ESMMP and given to a contractor or operator for implementation.

Additional reference to Environmental Best Practice and Best Available Techniques for this particular Management Plan should be described.

5.7.3.4 Management Actions or Mitigation Measures

Management actions or mitigation measures are actions that are feasible, practical and cost-effective, and that need to be implemented to achieve the objectives described above. These actions are based on the mitigation and enhancement actions identified in the EIA, together with additional information that may become available subsequent to completing the EIA. The project developer should specify a program for implementing the management actions, including by whom, when and how each action will be completed, as well as what resources should be allocated.³

Key requirements for determining whether management actions are clearly defined are provided in Box 5.1. Potential negative secondary impacts as a result of management actions should be taken into consideration in the design and implementation of the ESMMP.

Box 5.1: Requirements for Determining Whether Management Actions are Clearly Defined

To determine whether the management actions are adequately defined, they need to satisfy the following key requirements:

- *Written:* Management actions should be stipulated in writing. This forces the originators to think through each action carefully.
- *Dated:* A management action must indicate a specific time by which the action should be implemented.
- *Risk- or impact-specific:* Each management action must link to a specific impact (either positive or negative) or environmental risk, and should be worded in specific rather than general terms.
- *Time and space specific:* Indicate the how often the management action will be applied (continuously or only in the event of contingencies). The time (such as the season or time of day) and location of application should also be specified.
- *Measurable:* Management actions must, where possible, be quantitatively defined. A standard with which performance can be compared should be set. Objectives and targets of the management action must be clearly stated.
- *Achievable:* The management action must be realistic, feasible and achievable;
- *Reasonable:* The management action must be readily implementable within the time and budget constraints of the project.
- *Timely:* Measures must be put in place to coincide with specific project activities (milestones).
- *Understandable:* Management actions must be described simply, using clear, non-technical language where possible.

Source: EMP Guidelines, South Africa, June 2005

³ EMP Guidelines-South Africa, June 2005

5.7.3.5 Monitoring Program

Monitoring serves the following objectives:

- to measure the impacts that occur during project construction, operation, and decommissioning, closure and post-closure;
- to ensure compliance with legal requirements and corporate commitments;
- to determine the effectiveness of mitigation measures and other environmental or social protection measures, such as enhancement measures;
- to determine the accuracy of impact predictions;
- to facilitate impact management by warning of unanticipated impacts.

The monitoring programs (e.g., air quality or groundwater monitoring) should be designed by specialists in consultation with the project developer and relevant stakeholders, depending on the complexity of the monitoring required. Where monitoring programs are required, these should be designed to be pragmatic and to provide immediate results. This allows appropriate management actions to be taken as soon as possible in the event of non-compliance with ELV, EQS or committed performance levels.

Table 5.7 Template for Thematic Overview of Environmental Monitoring

Environmental Aspect / Issue	Compliance: (Standards, BAT, Best Practices)	Monitoring methods	Monitoring frequency	Responsible Unit	Reference to Management Plans
Theme: Water Quality					
Reservoir water quality					
Downstream water quality					
Effluents					
Theme: Fauna – Aquatic Life					

Table 5.8 Template for Site or Area Specific Overview of Environmental Monitoring

Environmental Aspect / Issue	Compliance: (Standards, BAT, Best Practices)	Monitoring methods	Monitoring frequency	Responsible Unit	Reference to Management Plans
Reservoir					
Water quality					

Hydrology					
Fisheries					
Navigation					
Bank Erosion					
Dam Site					
Water Release					
Water Quality					

Parameters need to be selected for monitoring of each of the environmental media. The parameters should reflect the characteristics that are important and relevant to the media being monitored, and those most likely to be impacted by project development. For example, Table 5.9 shows the test parameters for each medium (13 for surface water, 14 for waste water and 13 for water supply) selected for monitoring of a hydroelectric power project and its potential impacts on water bodies. Analysis of water is to be carried out both in the field and at the laboratory.

Table 5.9 Parameters Selected for Water Quality Monitoring

No.	Parameters	Surface Water	Waste Water	Water Supply	Analysis
1	pH	√	√	√	Field
2	Temperature	√	√		Field
3	Dissolved Oxygen (DO)	√	√		Field
4	Total Dissolved Solids (TDS)	√		√	Field
5	Conductivity (EC)	√	√		Field
6	Turbidity	√	√	√	Field
7	Residual Chlorine (Cl ₂)		√		Field
8	Sludge Volume (SV30)		√		Field
9	Chemical Oxygen Demand (COD)		√		Lab
10	Total Suspended Solids (TSS)	√	√		Lab
11	Nitrate nitrogen (NO ₃ -N)	√			Lab
12	Ammonia nitrogen (NH ₃ -N)	√	√		Lab
13	Phosphate (PO ₄)		√		Lab
14	Nitrite (NO ₂)			√	Lab
15	Nitrate (NO ₃)			√	Lab
16	Sulfate (SO ₄)			√	Lab
17	Iron (Fe)	√		√	Lab
18	Aluminum (Al)			√	Lab
19	Manganese (Mn)	√		√	Lab
20	Total Coliform (TC)		√	√	Lab
21	Fecal Coliform (FC)			√	Lab
22	Color, true			√	Lab

23	Total Hardness (CaCO ₃)			√	Lab
24	Biological Oxygen Demand (BOD)	√	√		Lab
25	Oil and Grease		√		Lab
26	Hydrogen Sulfide (H ₂ S)	√			
	Total Parameters	13	14	13	

The monitoring program could be comprised of three main aspects:

- **Baseline measurement:** This should occur prior to the start of the project or activity in order to determine the level and status of the environmental and social components prior to any impacts associated with the project or activity. Baseline monitoring would normally have been completed as part of the EIA studies, but in many cases, the time lapse between the EIA studies and project implementation means that the baseline data need to be updated.
- **Performance monitoring:** Performance monitoring should be implemented throughout the project life cycle to ensure that environmental and social impacts are within the predicted levels, and that specified environmental and social performance targets are being achieved.
- **Compliance monitoring:** Compliance monitoring should be implemented to ensure that the prescribed mitigation measures are having the predicted and desired effect. This type of monitoring is typically conducted periodically, the timing of which will vary from project to project. It should be used to check that the levels of specific environmental and social parameters comply with the applicable laws, regulations, standards or guidelines. The program should provide for effective remedial measures to be implemented in the event of non-compliance, e.g., when mitigation measures are inadequate or when impacts have been underestimated in the EIA.

The ESMMP should include a description of how the final monitoring arrangements will be accepted by the competent authority. For example, the following information must be included:

- measuring equipment, and precision of equipment;
- use of certified measurement equipment (Certification by accredited laboratory must be provided);
- environmental specialist(s) required for measurement and sampling, and to ensure quality control;
- accredited laboratories (for measurement, sampling, analysis, etc.);
- certified methods of testing; and
- Specifications for calibration, testing, measurement and sampling methods.

Detailed monitoring and analytical methods, or at least reference to appropriate methods, should be included in the ESMMP.

The following additional aspects should be addressed in the description of the monitoring activities where relevant:

- Indication of the linkages between the impacts identified in the EIA;
- Environmental and social parameters to be monitored;
- Indicators to be measured;
- Mitigation objectives;
- Targets for optimum performance (minimum environmental and social impact);

- Thresholds;
- Monitoring methods to be used (where a range of alternative methods exist);
- Sampling locations;
- Frequency of monitoring measurements;
- Detection limits (where appropriate);
- Definition of thresholds that will signal the need for corrective action;
- Responsibility for monitoring;
- Responsibility for corrective action;
- Details of how results will be analyzed to determine whether corrective actions are necessary;
- Quality control procedures (e.g., blind sample, etc.);
- Reporting procedures; and
- Opportunities that will be provided for interest and affected parties to contribute input into the revision of the ESMMP and to the design of corrective actions where appropriate

The design of the monitoring activities should be based on the type of information required to determine whether the objectives and targets are being met. Not all projects, nor all impacts of any one project, need to be monitored. Monitoring will be necessary and appropriate if:

- there are residual negative impacts that could not be avoided through changes to the project design, or reduced by implementing other mitigation measures;
- indirect negative impacts arise as a result of the mitigation measures;
- there is significant public concern or controversy about an impact;
- potential impacts are complex and poorly understood, or, for example, if there is disagreement among the specialists employed for the EIA;
- the outcome of the recommended mitigation measure(s) is uncertain.

The management actions and monitoring need to take into account the following three scenarios:

- Normal operations
- Abnormal situations (e.g., planned shutdown to service equipment)
- Emergency situations (e.g., unexpected oil spill).

The monitoring programs shall be divided into two sections, as requested by the EIA Decree 112/PM (Article 13). The first section shall present the monitoring activities of the project developer, and the second, the monitoring activities of the government agencies concerned.

5.7.3.6 Performance Specifications

Performance specifications (e.g., criteria or targets) should be provided for each management action, or mitigation measure or monitoring activity, in order to assess whether the actions have been effective. Performance specifications could be based on the level at which an environmental condition must remain (e.g., habitat in a part of the site that must not be disturbed), the level to which the environmental condition should be restored (e.g., habitat rehabilitation), legislated or agreed limits (e.g., air quality standards), or the level of socio-economic benefits to be realized through the project (e.g., use of local labor and enterprises). Where possible, these performance specifications should be quantitative. The performance specifications should be revised during implementation of the ESMMP, in the spirit of promoting continuous improvement.

5.7.3.7 Implementation Schedule

An implementation schedule should be prepared showing the sequence and timing (including frequency and duration) of the management actions, mitigation measures and monitoring activities of the ESMMP. Where monitoring reports are to be produced, the timing of such reports should be indicated. The schedule should be drawn up with the project developer to ensure that the necessary links are made between the implementation schedule for the ESMMP and the overall project schedule.

5.7.3.8 Responsibilities

Responsibilities for each of the various parties involved in implementing the management actions, mitigation measures and monitoring activities must be clearly defined.

When identifying the responsibilities, the project developer should ensure that the responsible authorities have agreed to take on an assigned role, that they have the budget, experienced staff, training, and facilities (equipment, vehicle, etc.) required, and that they have the capacity to adhere to the time schedule allocated to implement a particular management action or monitoring activity.

The contractor and subcontractors are often responsible for implementing the management actions or mitigation measures during the construction phase. If the developer assigns the task to a contractor or/and subcontractor, the developer shall incorporate the terms and conditions of the ESMMP into the contract to ensure that the subcontractors implement the plan comprehensively (EIA Decree 112/PM, Article 13 h, 2). The developer shall ensure that the contractor or/and subcontractor will implement the management plans within the approved timeframe.

As part of implementing the management actions, method statements should be prepared by the contractor and/or subcontractor. These method statements should specify how they will manage potential environmental impacts in line with the requirements of the ESMMP, and, where relevant, environmental best practices; and how they will ensure that the objectives of the ESMMP are achieved in practice.

MONRE may ask the developer to revise and resubmit the ESMMP if it finds that the plan does not identify potential problems as required, if sufficient measures to minimize and solve the problems are not provided, or if the ESMMP fails to achieve the required goals (EIA Decree 112/PM, Article 13 h, 3).

5.7.4 Emergency Plan

The ESMMP shall include an emergency plan to address risks associated with accidents or emergencies during construction and operation, as requested in Article 13 c of Decree 112/PM. This emergency plan should be linked to other local emergency plans. In general, the emergency plan should include:

- a description of the different potential situations that could arise;
- pertinent information in case of emergency (e.g., contact information of the responsible authorities, available equipment, and maps with prioritized routes);
- the command structure in case of an emergency, and the mode of communication with the local or regional authorities;
- a list of priority actions in case of emergency (e.g., emergency calls, traffic detours, road signs, and methods of evacuation);
- methods to update and reassess the emergency measures.

5.8 Public Consultation and Disclosure

The consultation process will continue throughout the construction, operation and decommissioning, closure and post-closure phases. The ESMMP Report should define the future consultation process in terms of:

- Objectives of the consultation for each project phase
- Consultation committee(s)
- Complaint and grievance mechanisms
- Disclosure

5.8.1 Objectives of the Consultation

The objectives of the consultation shall be adapted to the project context and be clearly defined in the ESMMP. Article 7 (6) of Decree 112/PM stipulates that the people affected by the project and other stakeholders should participate in discussions on implementation of the environmental and social activities, as well as the ESMMP of the investment project. Article 7 (7) affirms that people affected by the project and other stakeholders have the right and duty to make a written proposal to solve the environmental and social problems caused by the investment project to the local administrations at each level, or directly to MONRE if the problems have not yet been solved.

The consultation process during the construction, operation and decommissioning, closure and post-closure phases should focus on the major residual impacts on the affected people. The objectives of the consultation will be to reduce these residual impacts to an acceptable level.

At the same time, the project developer should enhance the positive impacts of the project for the affected people, particularly in terms of employment, local development, health and safety, etc.

5.8.2 Consultation Committee(s)

The establishment of Consultation Committee(s) should help to maintain ongoing linkages with the public, and to receive opinions about how the project is being implemented and current impacts.

For example, the project developer may establish:

- a project liaison committee that will ensure that effective communication with all stakeholders is maintained during the construction, operation and decommissioning, closure and post-closure phases.
- a project mediation committee to help solve environmental and social issues, especially complaints and grievances from the public and the affected population.

The project developer shall indicate how it will maintain communication with the affected people and the local authorities in the ESMMP.

5.8.3 Complaints and Grievances Mechanism

The project developer shall establish a complaints and grievances mechanism (CGM) related to environmental and social issues arising during the construction, operation and decommissioning, closure and post-closure phases. It is suggested that this CGM be managed by the project developer with involvement of local authorities. This may be accomplished by setting up a project mediation committee that will meet on a regular basis, or in response to a particular incident.

The project developer should indicate how it will manage complaints and grievances in the ESMMP.

5.8.4 Disclosure

Disclosure of information is an important part of the project developer's engagement process during the construction, operation and decommissioning, closure and post-closure phases. At the start of the construction phase, the project developer should prepare and distribute informational materials about the construction activities. Information disclosure should be focused on the local and district levels.

All informational material shall be provided in Lao and in English, and written in non-technical terms to make it easy to understand by the population. Regular contact with the district and local authorities will help to ensure that the information is distributed to the local population. During construction, information should be disclosed on subjects such as:

- construction activities;
- recruitment policies and job opportunities;
- supplier opportunities;
- transportation and traffic in the project area, including road access restrictions or diversions;
- health and safety awareness programs;
- environmental and social issues;
- local worker training;
- management of workers' accommodation camps, including codes of conduct for workers;
- complaint and grievance process.

Maintaining a dedicated information center within the study area and near the affected people is recommended to facilitate information disclosure.

5.9 Procedures and Support Programs

5.9.1 Training and Capacity Building

Training is essential for ensuring that the provisions of the ESMMP are implemented efficiently and effectively. Training needs should be identified based on the existing and available capacity of the site and project personnel (including the developer, contractors and subcontractors) to undertake the required management actions and monitoring activities.

A training program should be presented in this section of the ESMMP. The training program should be developed and delivered by suitably qualified personnel, in a language and medium understood by workers or employees.

5.9.2 Awareness Environmental and Social Program

Environmental and social awareness should be fostered among the project's workforce to encourage implementation of environmentally and socially sound practices throughout the duration of the project (construction, operation, decommissioning, closure and post-closure). The awareness program ensures that environmental accidents are minimized, and environmental compliance maximized. The onus is on the different parties involved in the various phases of the project to be environmentally and socially conscious. Contractors should forward internal environmental awareness procedures to the project developer for comment prior to beginning work on the project.

Environmental and social awareness could be fostered in the following manner:

- induction course for all workers before beginning work on site;
- refresher courses as required;
- daily awareness talks at the start of each day, where all workers on site may be alerted to particular environmental or social concerns associated with their tasks for that day, or the area/habitat in which they are working.

5.9.3 Supporting Databases

The project developer shall develop and maintain computer-based environmental management databases in order to keep track of all data collected or to be collected during project preparation and implementation. The databases should include:

- Monitoring information such as:
 - location code, description (including elevation) and map reference;
 - sampling interval;
 - sampling date and time;
 - the variable measured;
 - unit of measure;
 - result;
 - comparison with relevant guideline;
 - quality assurance / quality control information.

The databases should be readily accessible to relevant personnel to allow timely and informed decisions to be made.

5.9.4 Documentation and Record Keeping

A document control system shall be established to ensure accurate updating of ESMMP documents, and that all documents required for effective operation of the ESMMP are available. The document control system should be devised by the project developer and/or contractor, and agreed upon by all key parties. Responsibilities shall be assigned to relevant personnel for ensuring that the ESMMP documentation system is maintained and that document control is maintained by ensuring that the appropriate documents are accessed by and distributed to identified personnel.

Supplementary ESMMP documentation could include:

- ESMMP implementation specifications (including method statements);
- standard operating procedures;
- site instructions;
- quality assurance reports;
- emergency preparedness and response procedures;
- incident reporting and responses records;
- personnel induction and training records;
- site inspection reports;
- monitoring reports;
- auditing reports; and
- complaints received and actions taken.

The developer's environmental and social department should be responsible for ensuring that all relevant ESMMP documentation is registered and updated.

5.9.5 Reporting Procedures

Reporting procedures for conveying information from the monitoring activities should be developed to ensure that management is able to take rapid corrective action should certain thresholds be exceeded.

Project-specific ESMMPs should include reporting procedures for dealing with:

- internal monitoring and inspection
- incidents, accidents and emergencies
- measuring performance indicators, interpreting the results and taking action based on them;
- training programs, and evidence of appropriate levels of skills or abilities developed.

In addition, monthly and annual reports should be prepared and sent to MONRE for informational purposes.

5.9.6 Auditing

A procedure for conducting ESMMP audits should be developed by the project developer. This procedure should incorporate processes for scheduling and reporting, as well as the timing and frequency of the audits.

The audit should assess whether ESMMP implementation has been undertaken according to planned arrangements, and whether the ESMMP itself is being updated appropriately. The audit should confirm that identified corrective actions have been undertaken, and assess the effectiveness of such actions. The timing of the audits should be included in the implementation schedule of the ESMMP.

The audit should also assess whether objectives and targets have been met, and whether there are discrepancies from the stipulated ESMMP and legal requirements.

5.9.7 Responding to Non-Compliance

The system employed by the project developer for dealing with non-compliances with the ESMMP requirements (e.g., incentives for compliance or disincentives for non-compliance) will vary depending on the type and specific nature of the project.

The system should be described in the ESMMP, included in the tender documents and contracts, and made clear to all project workers.

5.9.8 Management, Review and Approval of the ESMMP

ESMMPs should be dynamic, flexible, and subject to periodic review before and during each project cycle phase. The extent to which ESMMPs should be reviewed will vary depending on the project or activity. Where the major negative impacts are associated with the construction or operation phases, the ESMMP may require revision during these phases. Significant changes in the ESMMP shall be submitted to MONRE for review and approval.

The project developer shall describe the method and frequency for reviewing the ESMMP and the related environmental management system. Such reviews shall ensure the continuing suitability, adequacy and effectiveness of the ESMMP and its environmental management system. Reviews shall include assessing opportunities for improvement and the need for changes. Records of the management reviews shall be retained. As a general rule, the following situations would require revision of the ESMMP and submission to MONRE for review and approval:

- changes in the legislation applicable to the environmental or social issues of the project;
- the measures are insufficient or inadequate to mitigate the actual or likely impacts of the project, i.e., environmental performance does not meet the required level despite implementation of the mitigation measure;
- new information becomes known about how harmful the adverse impacts of the project are, or are likely to become;
- the project has adverse impacts that were not foreseen at the time the ESMMP was approved, or the ECC was issued;
- the adverse impacts of the project are greater than the anticipated impacts that formed the basis for preparation, submission and approval of the ESMMP and ECC;
- the size or boundaries of the project change, or an extension or second or subsequent phase of development is proposed, thereby changing the basis for the initial measures;
- new techniques that meet the definition of “best available techniques” become available, which would significantly reduce the impacts or increase the benefits of the project;
- the adverse impacts of the project can be reduced through applying best practices without commercially significant extra cost to the project developer;
- the measures of the ESMMP or conditions of the ECC are unnecessary or ineffective in mitigating the adverse impacts.

5.9.9 Implementation Budget

The budget for implementing the ESMMP (Example in Appendix 11) shall include the following costs:

- project developer Environmental and Social Department costs;
- costs for implementation of management plans (management actions), broken down by management action plan and project phase;
- internal monitoring, including the budget for purchasing, operating and maintaining measuring equipment. These costs will be broken down by management plan and project phase;
- external monitoring;
- auditing;
- public consultation;
- training;
- worker and public awareness.

The budgets for external institutional monitoring will be presented for:

- Project ESMU
 - Equipment
 - Staff
 - Training
 - Vehicle
 - Office
- MONRE
 - Transportation
 - Accommodation

- Allowances
- Monitoring costs

These budgets will be updated each year and after any revision of the ESMMP, as stipulated in the *EIA Decree* or the ECC conditions.

6. MONRE Requirements for EIA Reporting

6.1 Methodology Requirements

The Scoping Report, EIA Report, Environmental and Social Management and Monitoring Plan (ESMMP), and development plans must be presented in a clear and concise way, and must be limited to the elements pertinent to the understanding of the project and its impacts. The methods and criteria used must be presented and explained. When possible, the reliability, degree of accuracy and limits of interpretation of numerical data should be explained. For the description of the environment, information that would enable the quality of the data to be assessed must be provided. For example, for field surveys, the locations and dates of sampling, the techniques used and their limitations should be clearly explained. Sources of information must be provided in references. The name, occupation and the job title of the persons who contributed to the preparation of the study must also be indicated.

The information and data collected or produced during preparation of the EIA, both quantitative as well as qualitative, should be analyzed and summarized in tables, figures, drawings, or other formats that aid in interpretation of the data. Information with a geographic component should be presented on maps at an appropriate scale. Additional information that facilitates understanding or interpretation of the data, such as inventory methods, should be provided in a separate section in order to facilitate comprehension of the text.

The International Standard System of Units (SI or *Système International d'unités*) must be used within the EIA Report, ESMMP and appendices. If another system of measurement is used, the conversion to SI units must also be presented.

If there is sufficient evidence to prove that the report has been copied from another investment project, the report will be rejected (*EIA Decree 112/PM*, Article 15, f (2) (c)).

6.2 Confidentiality Issues

The Lao PDR *Decree of Environmental Impact Assessment* (no. 112/PM, 16 February 2010, Article 32) defines the management of confidential information during the EIA process. In general, MONRE may consider keeping some information presented in the EIA Report and ESMMP confidential upon written request (enclosed with the information in question) from the project developer. This information includes:

- Information on the privacy of individuals;
- Information on property;
- Information on licenses.

Within 25 public working days, MONRE shall conclude whether all or some part of the information in question is confidential. If the submitted information is considered confidential, it should be kept confidential for 4 years. If the project developer wishes to extend this period, a request must be submitted to MONRE 60 public working days prior to the expiry date. Otherwise, the information will not be regarded as confidential information any longer.

6.3 Requirements for Report Preparation and Printing

6.3.1 Scoping Report and TOR for EIA

The project developer shall initially send 4 hardcopies and an electronic copy (PDF, Portable Document Format) of the Scoping Report and TOR for EIA to MONRE, including colour maps, diagrams, layouts, etc. After administrative review has been completed and the Scoping Report and TOR have been accepted for technical review, the project developer shall send 10 additional hardcopies and an electronic copy of the Scoping Report and TOR for EIA, including color maps, diagrams, layouts, etc.

For each additional revision, the project developer shall prepare 10 hardcopies and an electronic copy of the Scoping Report and TOR for EIA.

6.3.2 EIA Report, ESMMP and Development Plans

The project developer shall initially send 4 hardcopies and an electronic copy of the EIA Report, ESMMP and development plans to MONRE for administrative review, including color maps, figures, diagrams, layouts, etc. If MONRE is not satisfied with the report, an additional 4 hardcopies and an electronic copy of the revised version of those reports and plans, including color maps, figures, diagrams, layouts, etc., should be prepared and sent to MONRE for completion of the administrative review. The revised softcopy should be presented in two different files, one with change tracking activated to facilitate review of the updates made since the previous version was submitted, and one “clean” version without change tracking.

When this first review step is completed and the EIA Report, ESMMP and development plans are accepted for technical review, the project developer shall send an additional 15 hardcopies of these reports and plans, including color maps, figures, diagrams, layouts, etc.

For each additional revision, the project developer shall provide two additional hardcopies and an electronic copy of the EIA Report, ESMMP and/or development plans to MONRE. MONRE will inform the project developer if additional copies are required.

When the EIA Report, ESMMP and Development Plans are accepted by MONRE, the project developer shall provide 15 hardcopies and an electronic copy of the final versions to MONRE, including colour maps, figures, diagrams, layouts, etc.

Note that the number of hardcopies may be higher or lower according to the scope of the project and number of stakeholders requesting the document. Requirements for information disclosure (e.g., making the reports available in information centers to be maintained by the developer) are not included, and should be the responsibility of the project developer, under the supervision of MONRE.

6.4 Other Requirements from MONRE

If MONRE requires revision of the Scoping Report, TOR for EIA, EIA Report and/or ESMMP, the project developer shall provide an electronic copy of the report with change tracking activated, an electronic copy without change tracking, and a summary of the modifications that have been made to the report.

These EIA Guidelines will undergo a trial period of 2 years. During this period, it is requested that project developers, EIA consultants and other EIA practitioners follow these guidelines rigorously. If any improvements are required, the project developers, EIA consultants, EIA practitioners or stakeholders should contact the Department of Environmental and Social Impact Assessment of MONRE.

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Appendix 1: List of Projects Subject to EIA



Lao People's Democratic Republic Peace Independence Democracy Unity Prosperity

**The Prime Minister Office
Water Resources and Environment Administration of Lao PDR**

**No. 697 /PMO -MONRE
Vientiane Capital, 12 Mar 2010**

Agreement on List of Investment Projects subject to IEE and EIA

- Pursuant to Decree of Prime Minister on Nomination and TOR of MONRE, No. 149/PM, dated 10 May 2007
- Pursuant to Decree of Prime Minister on Environment Impact Assessment, No. 112/PM, dated 16 February 2010

Minister of Prime Minister's office

Head of Water Resources and Environment Administration

Article 1: List of Projects subject to IEE and EIA. They are separated into 2 groups: Project classifies under Group I is required to perform IEE and project classifies under Group II is required to perform EIA. The list of project subject to IEE and EIA is hereby promulgated.

Article 2: Individual, entity, public and private sectors must comply with the Decree.

Article 3: DESIA (MONRE) has the responsibility to coordinate with the stakeholders.

Article 4: This decree shall enter into force on the date it is signed.

Minister of Prime Minister's office
Head of Water Resources and Environment Administration

Khampheng Pholsena

List of Investment Projects subject to perform IEE or EIA

The project lists are including of project type, project size. There were separated in to 2 groups: Group I is required to perform FS to IEE and Group II is required to perform FS to EIA. There are 5 types of sectors as follow: (1) Energy Sector; (2) Agriculture and Forestry Sector); (3) Industrial Sector; (4) Infrastructure Sector; (5) Mining Sector

		Category 1	Category 2
Type of investment projects		IEE	EIA
I. Energy Sector Development Project			
1.1	Hydro power plant project	< 15 MW or reservoir capacity < 200,000,000 m ³ or reservoir area < 1,500 ha	≥ 15 MW or reservoir capacity > 200,000,000 m ³ or reservoir area > 1,500 ha
1.2	Nuclear power plant project		All
1.3	Natural gas power plant project	5-50 MW	> 50 MW
1.4	Coal power plant project	≤ 10 MW	> 10 MW
1.5	Gas and oil pipeline project		All
1.6	Oil refinery project		All
1.7	High voltage electrical power line project		
1.7.1	High voltage >230 kV	≤ 50 km	> 50 km
1.7.2	High voltage <230 kV	All	If the transmission line goes through NPAs or urban areas
1.7.3	High voltage transformer substation	< 10 ha	> 10 ha
II. Agriculture and Forestry Development Project			
2.1	Forest plantation project	20 – 300 ha	> 300 ha
2.2	Agricultural products and herbal flora plantation for supplying to industrial work	20 – 500 ha	> 500 ha
2.3	Irrigation construction project	100 – 2,000 ha	> 2,000 ha
2.4	Cattles farm (e.g., cow, buffalo, horse and others)	> 500 units	
2.5	Poultry farm	> 1,000 chickens	
2.6	Pig farm	> 200 pigs	
2.7	Fish raising and aquaculture project (fish raising in the pond)	>10 ha	
2.8	Fish raising and aquaculture project (fish cage raising in the river)	>300 m ³	
2.9	Crocodile farm	>100 Ton	
III. Industrial Sector Development Project			
3.1	Meat production, processing and	≤ 20 Ton/day	> 20 Ton/day

	storages and production factory		
3.2	Fish processing, storages and production factory	≤ 20 Ton/day	> 20 Ton/day
3.3	Fruit/vegetable processing and storages and production factory	All	
3.4	Milk manufacturing plant	≤ 40 Ton/day	> 40 Ton/day
3.5	Tapioca factory	50 – 100 Ton/day	> 100 Ton/day
3.6	Feedstuff factory	All	
3.7	Sugar factory	≤ 50 Ton/day	> 50 Ton/day
3.8	Foodstuff factory	>1 Ton/day	
3.9	Alcohol, wine, beer production factory	$\leq 500,000$ L/yr	$> 500,000$ L/yr
3.10	None alcoholic production factory (soda, soft drink, mineral waters production)	All	
3.11	Pure drinking water factory	All	
3.12	Tobacco factory	All	
3.13	Fabric, thread, fibre production factory	All	
3.14	Clothes, decoration and painting, animal hairs production factory	All	
3.15	Animal skin processing factory	All	
3.16	Leather production factory (handbag, luggage, saddle, etc.)	$\leq 1,000,000$ Pc/yr	$\leq 1,000,000$ Pc/yr
3.17	Leather shoes production factory	$\leq 1,000,000$ Pair/yr	$> 1,000,000$ Pair/yr
3.18	Handicraft Factory (using wood, bamboo, straw, etc.)	All	
3.19	Bamboo production factory	$\leq 100,000$ m ² /yr	100,000 m ² /yr
3.20	Paper and pulp production plant project	≤ 50 Ton/day	> 50 Ton/day
3.21	Printing service and stationary production plant project	All	
3.22	Petroleum industry		All
3.23	Basic chemical production factory besides chemical fertilizer and production that contained acid	≤ 500 Ton/yr	> 500 Ton/yr
3.24	Pesticide and chemical fertilizer production factory		All
3.25	Medical supplies, equipment and traditional medicine factory	≤ 500 Ton/yr	> 500 Ton/yr
3.26	Soap and detergent, cleansing material, brush, perfume and other cosmetic factory	≤ 10 Ton/day	> 10 Ton/day

3.27	Chemical production factory		All
3.28	Rubber processing factory	100 – 300 Ton/yr	> 300 Ton/yr
3.29	Plastic factory project	≤ 500 Ton/yr	> 500 Ton/yr
3.30	Glass industry and glass production factory	All	
3.31	None metallic ores production factory	All	
3.32	Cement, lime and plaster cement factory	≤ 30 Ton/hr	> 30 Ton/hr
3.33	Steel and iron smelting factory	≤ 120 Ton/day	> 120 Ton/day
3.34	Non-Ferrous metal smelting factory	≤ 50 Ton/day	> 50 Ton/day
3.35	Steel processing factory	≤ 50 Ton/day	> 50 Ton/day
3.36	Non-Ferrous metal processing factory	All	
3.37	Metal frame, tank, basin/sink production factory	All	
3.38	Dynamo production factory	All	
3.39	Domestic appliances production factory	All	
3.40	Office material equipment, accounting stationeries and computer production plant	All	
3.41	Generator and apparatus production factory	All	
3.42	Battery and dry cell battery production factory	≤ 100 Ton/yr	> 100 Ton/yr
3.43	Radio, television and communication device and tool production factory	All	
3.44	Medical equipment, meter and eyesight, watch and clock factory	All	
3.45	Vehicle assembly plant (light truck, heavy truck and semi-trailer, etc.)	All	
3.46	Spare parts and vehicle parts and engine factory	$\leq 1,000$ Ton/yr	>1,000 Ton/yr
3.47	Bicycle and wheel of disable people	$\leq 10,000$ Unit/yr	> 10,000 Unit/yr
3.48	Furniture factory	$\leq 10,000$ products/yr	> 10,000 products/yr
3.49	Storage of solid waste not producing hazardous	All	
3.50	Disposal of solid waste producing hazardous		All
3.51	Solid waste treatments and environment management		All

3.52	Water supply factory	All	
IV. Infrastructure and Service Development Project			
4.1	Lake, river, channel land filling project impacts on public		All
4.2	Dormitories, resettlement construction project	> 50 rooms	
4.3	Golf course construction plant project	9 holes	
4.4	Multi-games sport project		All
4.5	Petrol depot construction project	600 – 60,000 barrels	
4.6	Industrial zone construction and development project		All
4.7	Special economic zone construction and development project		All
4.8	Inland waterway navigation project	All	
4.9	Waste water treatment plant project (waste water from district, hospital and industrial processing factory)		All
4.10	Road construction through national or provincial protected areas		All
4.11	New railway construction project		≥ 100 km
4.12	New road construction project (national, provincial, district, urban, extra construction)		All
4.13	Road improvement project (national, provincial, district, extra road improvement)	All	
4.14	Road rehabilitation or upgrading project (national, provincial road rehabilitation)	All	
4.15	New runway airport construction project	1,000 – 2,500 m	>2,500 m
4.16	Hospital construction project	≤ 100 beds	> 100 beds
4.17	Hotel or resort construction project near the river	≤ 80 rooms	> 80 rooms
4.18	Hotel or resort construction project	≤ 50 ha	>50 ha
4.19	Tourism and resort development project in the National or provincial protected area		All
4.20	Solid domestic waste recycle plant project	All	
4.21	Incinerator for domestic solid		All

	waste project		
4.22	Incinerator for industrial solid waste project		All
4.23	Project using part or whole national or provincial protected area, historical or cultural vestiges, or unique landscape, conservation area of local authorities		All
4.24	Telecommunication network construction project	All	
4.25	River communication (improvement of river channel for boat)	≤ 200 Ton	> 200 Ton
4.26	Port construction project		
4.26.1	Passenger port	≤ 500 Ton DWT	> 500 Ton DWT
4.26.2	General transportation port	≤ 500 Ton DWT	> 500 Ton DWT
4.26.3	Transportation port producing hazardous such as chemical, engine oil		All
4.27	Embankment construction project		> 1 km
4.28	Community solid waste management construction	≤ 50 ha	> 50 ha
4.29	Solid waste management construction		All
4.30	Industrial solid waste landfill site project		All
V. Mining and extractive industry			
5.1	The use of groundwater resources for industrial, agricultural, and urban consumption	$\leq 4,500$ m ³ /day	$> 4,500$ m ³ /day
5.2	Project for extraction of rock and sand from a river	1,000 – 50,000 m ³ /yr	$> 50,000$ m ³ /yr (per point)
5.3	Project for rock extraction and crushing	≤ 50 Ton/day	> 50 Ton/day
5.4	Project for extraction of surface materials (soil, rock, sand) for construction	$< 100,000$ m ³ /yr	$\geq 100,000$ m ³ /yr
5.5	Project for extraction of solid mineral ore (without using chemicals)		All
5.6	Project for extraction and processing of mineral ore with the use of hazardous chemicals		All
5.7	Project for processing of solid mineral ore	$\leq 50,000$ Ton/yr	$> 50,000$ Ton/yr
5.8	Project for extraction of		$> 5,000$ m ³ /day

	groundwater		
5.9	Project for use of surface water		> 10,000 m ³ /day
5.10	Project for extraction of natural mineral waters (surface and groundwater) for usage and/or consumption		> 1,000 m ³ /day
5.11	Project for extraction of natural mineral waters (surface and groundwater) for bathing, medicinal (skin diseases) and other purposes		> 500 m ³ /day
5.12	Project for extraction of mineral ore using chemicals		All
5.13	Project for extraction of oil and natural gas		All

Remark: For Investment Project under Industrial Sector which are not included in this list (section III), please refer to the list of projects of Ministry of Industry and Commerce.

Appendix 2: Scoping Report – Table of Contents

Scoping Report – Table of Contents

1. Executive Summary
2. Context of the Project
 - 2.1 Presentation of the Project and its justification
 - 2.2 Related Projects and Developments
 - 2.3 Presentation of the project developer and the EIA consultant
3. Overview of the Policy, Legal and Institutional Framework
 - 3.1 Overview of Corporate Environmental and Social Policies
 - 3.2 Overview of Policy and Legal Framework in the Lao PDR
 - 3.3 International Conventions, Treaties and Agreements
 - 3.4 Lao PDR Government Institutional Framework
 - 3.5 International Policies, Guidelines and Standards (if applicable)
4. Project Description and Alternatives
 - 4.1 Presentation of the Project and Description of Alternatives
 - 4.2 Comparison and Selection of the Project Alternatives
5. Description of the Environment
 - 5.1 Setting the Study Limits
 - 5.2 Physical Components
 - 5.3 Biological Components
 - 5.4 Socio-Economic Components
 - 5.5 Cultural Components
 - 5.6 Visual Components
6. Preliminary Environmental Impact Assessment and Mitigation Measures
 - 6.1 Methodology and Approach
 - 6.2 Identification of Potential Environmental Impacts
 - 6.3 Key Potential Environmental Impacts and Mitigation Measures
 - 6.3.1 Pre-Construction
 - 6.3.2 Construction
 - 6.3.3 Operation
 - 6.3.4 Decommissioning, closure and post-closure
7. Public Consultation and Disclosure
 - 7.1 Methodology and Approach
 - 7.1.1 Identification of stakeholders and groups affected by the project
 - 7.1.2 Conducting public consultation
 - 7.1.3 Disclosure
 - 7.2 Summary of Consultation Activities Undertaken
 - 7.2.1 Overview of consultation activities
 - 7.2.2 Summary of the opinions of the persons consulted
 - 7.3 Results of Consultation during Project Scoping
 - 7.3.1 Issues identified by stakeholders and groups affected by the project
 - 7.3.2 How these issues were taken into account
 - 7.4 Recommendations for Consultation to be undertaken during the EIA
8. Conclusions and Recommendations

Appendix1: Terms of Reference for EIA

Appendix 3: Example of Impact Identification and Assessment Matrix

[illegible]

Appendix 4: TOR for EIA – Table of Contents

Terms of Reference for EIA – Table of Contents

Executive Summary

1.0 Introduction

- 1.1 Presentation of the project developer
- 1.2 Presentation of the Environmental and Social Consultant
- 1.3 Presentation of the Associate Organizations
 - 1.3.1 Laboratory (including accreditations)
 - 1.3.2 University
 - 1.3.3 Others
- 1.4 Project Outline
- 1.5 Report Layout

2.0 Policy, Legal and Institutional Framework

Briefly describe the Policy, Legal and Institutional Framework that will be followed during project implementation.

- 2.1 Corporate Environmental and Social Policies (if applicable)
- 2.2 Policy and Legal Framework
- 2.3 International Conventions, Treaties and Agreements
- 2.4 Lao PDR Government Institutional Framework
- 2.5 International Policies, Guidelines and Standards (if applicable)
- 2.6 Project' Environmental and Social Standards

3.0 Project Description and Alternative Selection

Review briefly the project description including the potential alternatives, the methodology for comparison and selection of alternative, and the project description by phase.

- 3.1 Project Rationale and Background
- 3.2 Project Location
- 3.3 Project Infrastructure
- 3.4 Alternatives to the Project
- 3.5 Comparison and Selection of Alternative
 - 3.5.1 Methodology
- 3.6 Description of the Selected Alternative
 - 3.6.1 Technical Description of the Selected Alternative
 - 3.6.2 Pre-Construction Activities
 - 3.6.3 Construction Activities
 - 3.6.4 Operation Activities
 - 3.6.5 Decommissioning, closure and post-closure Activities

4.0 Baseline Study

The limit of the study area(s) for the project shall be identified based on the results from the Scoping Report., The project developer shall provide the level of effort that will be spent to collect adequate information for each Physical, Biological, Socio-Economic, Cultural and Visual Component that must be described for the preparation of the EIA Report. Item 4.2.4.2 provides example of what kind of information should be included in the TOR for EIA.

- 4.1 Setting the Study Limits
- 4.2 Outline of Content
 - 4.2.1 Related Issues
 - 4.2.2 Objectives of Study

- 4.2.3 Scope of Study
- 4.2.4 Method of Study
 - 4.2.4.1 Compilation of secondary data
 - 4.2.4.2 Survey for primary data collection (description of activities)
 - This information will be provided for each component and sub-component that will require primary data collection. Primary data collection may not be required for all the sub-components listed in sections 4.3, 4.4, 4.5 and 4.6. It will depend of the project potential environmental and social impacts.
 - e.g., for Physical and Biological surveys the following information shall be provided
 - *Sampling and analysis (including methodologies and parameters, calibration requirements)*
 - *Field Analysis(including methodologies and parameters)*
 - *Laboratory Analysis(including methodologies and parameters, laboratory accreditation)*
 - *Analytical result interpretation and assessment*
 - e.g., for Socio-economic surveys the following information shall be provided
 - *Type of survey (specific socio-economic surveys like household survey, collection of data from government organizations at national, provincial, district levels, field survey for land use characteristics, water supply quality (chemical and physical parameters), data collection from health centers and field investigations related to health surveys, archaeological surveys, identification and mapping of sites of spiritual or traditional value, field surveys related to housing and living conditions, identification and profile of vulnerable groups, gender studies, etc.*
 - *Area of survey*
 - *Field Analysis(including methodologies and parameters)*
 - *Laboratory Analysis(including methodologies and parameters)*
 - *Analytical result interpretation and assessment*
 - 4.2.4.3 Mapping
 - 4.2.4.4 Level of Efforts
 - 4.2.4.4.1 Qualification of specialists
 - 4.2.4.4.2 Time for literature review
 - 4.2.4.4.3 Time for field surveys by specialist
 - 4.2.4.4.4 Time for reporting by specialist
 - 4.2.4.4.5 Number of field surveys
- 4.3 Physical Components
 - 4.3.1 Climate/Meteorology (including climate change)
 - 4.3.2 Topography
 - 4.3.3 Geology/Seismology
 - 4.3.4 Soils
 - 4.3.5 Natural Hazards
 - 4.3.6 Hydrology
 - 4.3.7 Erosion and Sedimentation
 - 4.3.8 Surface and Groundwater Quality
 - 4.3.9 Mineral Resources
 - 4.3.10 Noise and Vibration
 - 4.3.11 Air Quality
 - 4.3.12 Others
- 4.4 Biological Components
 - 4.4.1 Terrestrial Ecology/Wildlife
 - 4.4.2 Forest/Vegetation Cover
 - 4.4.3 Aquatic Biota and Habitats
 - 4.4.4 Wetlands

- 4.4.5 Protected Areas
- 4.4.6 Biodiversity
- 4.5 Socio-Economic Components
 - 4.5.1 Administrative Organizations and Limits
 - 4.5.2 Population and Communities
 - 4.5.3 Social Profile
 - 4.5.4 Health Profile
 - 4.5.5 Vulnerable Groups
 - 4.5.6 Gender Issues
 - 4.5.7 Economic Activities
 - 4.5.8 Employment
 - 4.5.9 Traditional Production Systems
 - 4.5.10 Land Use (current and planning)
 - 4.5.11 Infrastructure Facilities
 - 4.5.12 Water Use and Water Supply
 - 4.5.13 Transportation
 - 4.5.14 Energy Sources
 - 4.5.15 Agriculture
 - 4.5.16 Forestry
 - 4.5.17 Fisheries/Aquaculture
 - 4.5.18 Industries
 - 4.5.19 Mineral Development
 - 4.5.20 Tourism
 - 4.5.21 Residential, Commercial, Tourism and/or Industrial Developments
 - 4.5.22 UXO
 - 4.5.23 Concerns of local communities
 - 4.5.24 Others
- 4.6 Cultural Components
 - 4.6.1 Archaeology
 - 4.6.2 Sites of Natural, Spiritual or Cultural Values
 - 4.6.3 Ethnic Groups
 - 4.6.4 Others Elements of Heritage Interest
- 4.7 Visual Components
 - 4.7.1 Landmarks
 - 4.7.2 Point of Interests
 - 4.7.3 Landscape
 - 4.7.4 Details of Local Materials, Styles, etc.
 - 4.7.5 Others

5.0 Impact Assessment and Mitigation Measures

The project developer will provide information (summary) on the methodology that will be used for the assessment of the impact, the limits of the study area, the modeling activities that will be required according to the potential impacts of its project and the potential impacts of the project that will be studied during each phase of project implementation.

- 5.1 Impact Assessment Methodology
 - 5.1.1 Scope of Assessment
 - 5.1.2 Geographical Scope: Study Area Boundaries
 - 5.1.3 Temporal Scope
 - 5.1.4 General Methodology
 - 5.1.5 Methodology for the determination of Significance
 - 5.1.6 Mapping
 - 5.1.7 Key Issues and Selection of Valued Ecosystem Components
 - 5.1.8 Modeling Requirements
 - 5.1.8.1 Outline of Content
 - 5.1.8.1.1 Methodology
 - 5.1.8.1.2 Model
 - 5.1.8.1.3 Specialist
 - 5.1.8.2 Air Emissions
 - 5.1.8.3 Green-house Gases

- 5.1.8.4 Surface Water Quality
- 5.1.8.5 Groundwater Quality
- 5.1.8.6 Noise
- 5.1.8.7 Climate Change
- 5.1.8.8 Natural Hazards
- 5.1.8.9 Others (as required)
- 5.1.9 Outline of Content
 - 5.1.9.1 Pre-Construction Phase
 - 5.1.9.1.1 Potential Impacts
 - 5.1.9.1.2 Proposed Mitigation Measures
 - 5.1.9.1.3 Residual Impacts
 - 5.1.9.1.4 Proposed Monitoring
 - 5.1.9.2 Construction Phase
 - 5.1.9.2.1 Potential Impacts
 - 5.1.9.2.2 Proposed Mitigation Measures
 - 5.1.9.2.3 Residual Impacts
 - 5.1.9.2.4 Proposed Monitoring
 - 5.1.9.3 Operation Phase
 - 5.1.9.3.1 Potential Impacts
 - 5.1.9.3.2 Proposed Mitigation Measures
 - 5.1.9.3.3 Residual Impacts
 - 5.1.9.3.4 Proposed Monitoring
 - 5.1.9.4 Decommissioning, closure and post-closure Phase
 - 5.1.9.4.1 Potential Impacts
 - 5.1.9.4.2 Proposed Mitigation Measures
 - 5.1.9.4.3 Residual Impacts
 - 5.1.9.4.4 Proposed Monitoring
- 5.2 Physical Impact Assessment
 - 5.2.1 Air Quality
 - 5.2.2 Noise
 - 5.2.3 Surface Water Quality
 - 5.2.4 Groundwater Quality
 - 5.2.5 Erosion and Sedimentation
 - 5.2.6 Others
- 5.3 Biological Impact Assessment
 - 5.3.1 Fish and Fish Habitat
 - 5.3.2 Ecosystem
 - 5.3.3 Terrestrial Mammals, Amphibians and Reptiles
 - 5.3.4 Birds and Bats
 - 5.3.5 Protected Areas
 - 5.3.6 Others
- 5.4 Socio-Economic Impact Assessment
 - 5.4.1 Economic Development
 - 5.4.2 Employment
 - 5.4.3 Education and Training
 - 5.4.4 Resettlement, Land Acquisition and Compensation
 - 5.4.5 Demographic Changes
 - 5.4.6 Public Health and Nutrition
 - 5.4.7 Occupational Health and Safety
 - 5.4.8 Gender
 - 5.4.9 Ethnic Groups
 - 5.4.10 Vulnerable Groups
 - 5.4.11 Land Use Changes
 - 5.4.12 Traditional Livelihoods and Production Systems
 - 5.4.13 Access to Natural Resources (NTFP, Water, Hunting Areas, etc.)
 - 5.4.14 Local Business
 - 5.4.15 Existing Productive Activities (e.g., Fisheries/Aquaculture, Agriculture, Forestry, Mineral Resources, Tourism, etc.)
 - 5.4.16 Communication and Transport

- 5.4.17 Vulnerability to Natural Hazards and Climate Change
- 5.4.18 Others
- 5.5 Cultural Impact Assessment
 - 5.5.1 Archaeology
 - 5.5.2 Cultural Heritage
 - 5.5.3 Traditional Values and/or Lifestyles
 - 5.5.4 Others
- 5.6 Visual Impact Assessment
 - 5.6.1 Aesthetic
 - 5.6.2 Cultural, Traditional and/or Tourism Sites
 - 5.6.3 Particular Landscape
 - 5.6.4 Others
- 6.0 Risk Assessment**
 - 6.1 Methodology
 - 6.2 Qualitative Risk Assessment
 - 6.2.1 Pre-Construction Phase
 - 6.2.2 Construction Phase
 - 6.2.3 Operation Phase
 - 6.2.4 Decommissioning, closure and post-closure Phase
 - 6.3 Quantitative Risk Assessment
- 7.0 Cumulative Impact Assessment**
 - 7.1 Methodology and Approach
 - 7.2 Determination of Valued Ecosystem Components
 - 7.3 Determination of a Spatial and Temporal Framework
 - 7.4 Cumulative Impact Assessment
 - 7.5 Development of a Management Framework
- 8.0 Environmental and Social Management and Monitoring Plan**
 - 8.1 Context of the ESMMP
 - 8.1.1 Context of the Project
 - 8.1.2 project developer's Environmental and Social Policies and Commitments
 - 8.1.3 Institutional Arrangements
 - 8.1.4 Legal Requirements
 - 8.1.5 Summary of Impacts and Mitigation Measures
 - 8.2 Management and Monitoring Plans

Briefly describe the content of each management and monitoring plan applicable for your project. These plans will be required for each phase of project implementation. Note that the list of Thematic Management and Monitoring Plans and the Site Specific Management and Monitoring Plans is indicative and will depend to the project's impacts.

 - 8.2.1 Outline of Content
 - 8.2.1.1 By Project Phases
 - 8.2.1.1.1 Design
 - 8.2.1.1.2 Pre-Construction
 - 8.2.1.1.3 Construction
 - 8.2.1.1.4 Operation
 - 8.2.1.1.5 Decommissioning, closure and post-closure
 - 8.2.1.2 Content of each Management and Monitoring Plans
 - 8.2.1.2.1 Objectives
 - 8.2.1.2.2 Context
 - 8.2.1.2.3 Legal Requirements
 - 8.2.1.2.4 Management Actions
 - 8.2.1.2.5 Monitoring Plans
 - 8.2.1.2.6 Implementation Schedule
 - 8.2.1.2.7 Responsibilities
 - 8.2.2 Management and Monitoring Plans (Examples)
 - 8.2.2.1 Thematic Management and Monitoring Plan
 - 8.2.2.1.1 Noise management plan
 - 8.2.2.1.2 Air quality management plan
 - 8.2.2.1.3 Erosion and sedimentation management plan

- 8.2.2.1.4 Water quality management plan
- 8.2.2.1.5 Site clearing and landscaping plan
- 8.2.2.1.6 Rehabilitation and re-vegetation management plan
- 8.2.2.1.7 Biodiversity and conservation management plan
- 8.2.2.1.8 Worker accommodations management plan
- 8.2.2.1.9 In-migration management plan
- 8.2.2.1.10 Solid waste management plan
- 8.2.2.1.11 Water use management plan
- 8.2.2.1.12 Materials handling and storage (e.g., hazardous substances) management plan
- 8.2.2.1.13 Leak and spillage management plan
- 8.2.2.1.14 Wastewater and stormwater management plan
- 8.2.2.1.15 Transportation management plan
- 8.2.2.1.16 Communicable diseases management plan
- 8.2.2.1.17 Occupational health and safety management plan
- 8.2.2.1.18 Community health and safety management plan
- 8.2.2.1.19 Archaeological and cultural heritage management plan
- 8.2.2.1.20 Employment and training management plan
- 8.2.2.1.21 Investment and procurement management plan
- 8.2.2.1.22 Visual protection management plan
- 8.2.2.1.23 Others
- 8.2.2.2 Site Specific Management and Monitoring Plan
 - 8.2.2.2.1 Temporary access road management plan
 - 8.2.2.2.2 Permanent access road management plan
 - 8.2.2.2.3 Borrow pit management plan
 - 8.2.2.2.4 Workers camp management plan
 - 8.2.2.2.5 Refinery management plan
 - 8.2.2.2.6 Others
- 8.2.3 Emergency Plan
- 8.2.4 Public Consultation and Disclosure
- 8.2.5 Implementation Program

9.0 Public Consultation and Disclosure

Briefly indicate what has been done so far in the project in terms of public consultation activities, what efforts you will make to meet the key stakeholders and the affected population, and how you will do that (disclosure, numbers of meetings, types of meetings, means of information disclosure, how the opinions and comments of the key stakeholders and the affected populations will be integrated, Suggested mechanisms for complaints and grievance mechanisms?

- 9.1 Overview
- 9.2 Consultation to Date
 - 9.2.1 Government
 - 9.2.2 Affected Peoples
- 9.3 Further Proposed Consultation
 - 9.3.1 Meetings with Local Administrations
 - 9.3.2 Meetings with Affected Communities and Peoples
 - 9.3.3 Presentation of the First Draft EIA Report
 - 9.3.4 Presentation of the Final EIA Report
- 9.4 Disclosure
 - 9.4.1 Preparation and distribution of booklets (in Lao)
 - 9.4.2 Local Radio

10.0 Development Plans

Development Plans are required by the Law, Decree, and Regulations and/or by the Funding Agency. The plans must also integrate monitoring activities to control their implementation

- 10.1 Watershed Management Plan (for Hydroelectric power or Dam Project)
- 10.2 Biomass Removal Plan (for Hydroelectric power or Dam Project)

- 10.3 Resettlement and Compensation Plan
- 10.4 Stakeholder Engagement Plan
- 10.5 Livelihood Restoration Plan
- 10.6 Community Development Plan
- 10.7 Vulnerable Groups Development Plan
- 10.8 Others

11.0 Visual and Graphic Presentation

The project developers shall identify the methodology that they will use to provide mapping support during preparation of the EIA for the project description, the alternatives, the description of the environment, social, cultural and visual components and sub-components that can be affected by the project. The scale of the maps and the resolution of the satellite images used for the project shall be provided.

11.1 GIS (utilization during the baseline study)

- 11.1.1 Related Issues
- 11.1.2 Objectives
- 11.1.3 Scope
- 11.1.4 Method

11.2 Remote Sensing Application

- 11.2.1 Related Issues
- 11.2.2 Objectives
- 11.2.3 Scope
- 11.2.4 Method

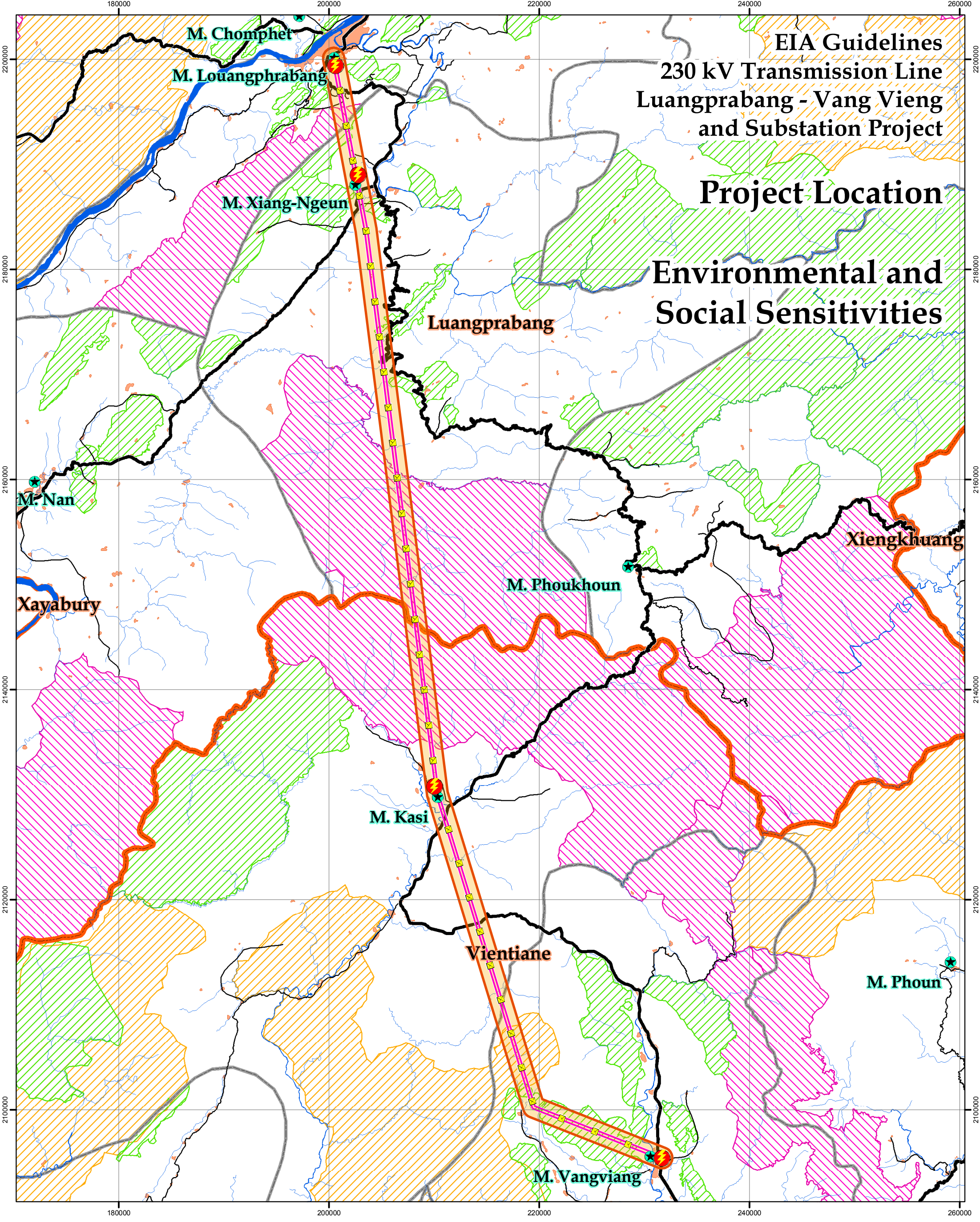
11.3 Mapping

- 11.3.1 Related Issues
- 11.3.2 Objectives
- 11.3.3 Scope
- 11.3.4 Method

12.0 Implementation Program

- 12.1 Time Schedule
- 12.2 Team Qualifications and Experience
- 12.3 Involvement by Specialists

Appendix 5: Mapping – Project Presentation



Environmental and Socio-Economic Description

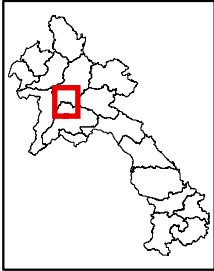
- | | | | |
|--|-----------------|--|---------------------|
| | District Center | | Provincial Boundary |
| | National Road | | District Boundary |
| | Road | | Built-Up Area |
| | River/Stream | | Main River/Water |

Project Components

- | | |
|--|-------------------|
| | Substation |
| | Transmission Line |
| | Study Area |

Biological Environment

- | | |
|--|----------------------------|
| | Production Forest |
| | Protection Forest |
| | District Protection Forest |



Ministry of Natural Resources and Environment (MONRE)
Environmental Management Support Programme (EMSP)
Vientiane Capital, Lao PDR
P.O. BOX 7864, Tel: (+856) 21 222 752

Sources:
- Protected Area provided by FIPD
- Administration boundaries and road data provided by NGD

Map Datum: WGS 84
Projection: UTM Zone 48N

0 2.5 5 10
Kilometers
Scale 1:320,000



Appendix 6: EIA Report – Table of Contents

Volume 1: EIA Report

Executive Summary

1.0 Context of the Project

- 1.1 Presentation of the Project and its justification
- 1.2 Related Projects and Development
- 1.3 Presentation of the project developer and the EIA Consultant(s)
- 1.4 project developer' Commitments
- 1.5 Structure of the EIA Report

2.0 Policy, Legal and Institutional Framework

- 2.1 Corporate Environmental and Social Policies
- 2.2 Policy and Legal Framework
- 2.3 International Conventions, Treaties and Agreements
- 2.4 Lao PDR Government Institutional Framework
- 2.5 International Policies, Guidelines and Standards (if applicable)
- 2.6 Project' Environmental and Social Standards

3.0 Project Description and Alternatives

- 3.1 Presentation of the Project and Description of Alternatives
 - 3.1.1 Project Rationale and Background
 - 3.1.2 Project Location
 - 3.1.3 Project Infrastructure
 - 3.1.4 Alternatives
- 3.2 Comparison and Selection of Alternative
 - 3.2.1 Methodology
 - 3.2.2 Comparison and Selection of Alternative
- 3.3 Description of the Selected Alternative
 - 3.3.1 Technical Description of the Selected Alternative
 - 3.3.1.1 Pre-Construction Activities
 - 3.3.1.2 Construction Activities
 - 3.3.1.3 Operation Activities
 - 3.3.1.4 Decommissioning, closure and post-closure Activities
 - 3.3.2 Detail Design

4.0 Description of the Environment

- 4.1 Setting the Study Limits
- 4.2 Physical Components
 - 4.2.1 Climate/Meteorology (including climate change)
 - 4.2.1.1 Methodology
 - 4.2.1.2 Description
 - 4.2.2 Topography
 - 4.2.3 Geology/Seismology
 - 4.2.4 Soils
 - 4.2.5 Natural Hazards
 - 4.2.6 Hydrology
 - 4.2.7 Erosion and Sedimentation
 - 4.2.8 Surface and Groundwater Quality
 - 4.2.9 Mineral Resources
 - 4.2.10 Noise and Vibration
 - 4.2.11 Air Quality
 - 4.2.12 Mapping
- 4.3 Biological Components
 - 4.3.1 Terrestrial Ecology/Wildlife
 - 4.3.2 Forest/Vegetation Cover
 - 4.3.3 Aquatic Biota and Habitats
 - 4.3.4 Wetlands

- 4.3.5 Protected Areas
- 4.3.6 Biodiversity
- 4.3.7 Mapping
- 4.4 Socio-Economic Components
 - 4.4.1 Administrative Organizations and Limits
 - 4.4.2 Land Use
 - 4.4.3 Social Profile
 - 4.4.3.1 Communities
 - 4.4.3.2 Demography
 - 4.4.3.3 Education
 - 4.4.3.4 Housing Conditions
 - 4.4.3.5 Vulnerable Groups
 - 4.4.3.6 Ethnic Groups
 - 4.4.3.7 Gender Situation
 - 4.4.3.8 Religion
 - 4.4.3.9 Political and Social Organizations
 - 4.4.4 Health Profile
 - 4.4.4.1 Mortality and Morbidity
 - 4.4.4.2 Incidence of Infectious Diseases
 - 4.4.4.3 Incidence of Chronic Diseases
 - 4.4.4.4 Diet and Nutrition
 - 4.4.4.5 Mental Health and Well Being
 - 4.4.4.6 Health Seeking Behavior
 - 4.4.4.7 Access to Health Services
 - 4.4.4.8 Access to Drinking Water, Sanitation and Waste Management
 - 4.4.4.9
 - 4.4.5 Economic Profile
 - 4.4.5.1 Employment
 - 4.4.5.2 Traditional Production System
 - 4.4.5.3 Household Income
 - 4.4.5.4 Cost of Living
 - 4.4.5.5 Land Ownership
 - 4.4.5.6 Local Business
 - 4.4.5.7 Existing Productive Activities (e.g., Fisheries, Agriculture, Forestry, Mineral Resources, Tourism, etc.)
 - 4.4.5.8 Others
 - 4.4.6 Infrastructure Facilities
 - 4.4.6.1 Roads
 - 4.4.6.2 Navigation and Ports
 - 4.4.6.3 Airports
 - 4.4.6.4 Transmission Lines
 - 4.4.6.5 Electricity
 - 4.4.6.6 Pipelines
 - 4.4.6.7 Hospitals and Health Care Centers
 - 4.4.6.8 Schools and Educational Centers
 - 4.4.6.9 Day Care Centers and Kindergartens
 - 4.4.6.10 Temples
 - 4.4.6.11 Cemeteries
 - 4.4.7 Water Sources, Use and Supply
 - 4.4.8 Energy Sources, Use and Supply
 - 4.4.9 UXO
 - 4.4.10 Mapping
 - 4.4.11 Concerns of Local Communities
- 4.5 Cultural Components
 - 4.5.1 Archaeology
 - 4.5.2 Temples, Monuments
 - 4.5.3 Minority Groups
 - 4.5.4 Mapping
- 4.6 Visual Components

- 4.6.1 Aesthetic
- 4.6.2 Point of Interests
- 4.6.3 Landscape
- 4.6.4 Mapping

5.0 Impact Assessment and Mitigation Measures

- 5.1 Impact Assessment Methodology
 - 5.1.1 Scope of Assessment
 - 5.1.2 Geographical Scope: Study Area Boundaries
 - 5.1.3 Temporal Scope
 - 5.1.4 Methodology
 - 5.1.4.1 Assessment and Mitigation
 - 5.1.4.2 Thematic Presentation
 - 5.1.4.3 Site Specific Presentation
 - 5.1.5 Mapping
 - 5.1.6 Modeling Requirements
 - 5.1.6.1 Air Quality
 - 5.1.6.1.1 Methodology
 - 5.1.6.1.2 Results
 - 5.1.6.1.3 Mapping
 - 5.1.6.2 Surface Water Quality
 - 5.1.6.3 Groundwater Quality
 - 5.1.6.4 Noise
 - 5.1.6.5 Others
- 5.2 Identification of Impacts
- 5.3 Impacts, Mitigation Measures and Residual Impacts
 - 5.3.1 Biophysical Impact
 - 5.3.1.1 Air Quality
 - 5.3.1.1.1 Pre-Construction
 - 5.3.1.1.2 Construction
 - 5.3.1.1.3 Operation
 - 5.3.1.1.4 Decommissioning, closure and post-closure
 - 5.3.1.2 Surface Water Quality
 - 5.3.1.3 Groundwater Quality
 - 5.3.1.4 Erosion and Sedimentation
 - 5.3.1.5 Water Resources
 - 5.3.1.6 Fish and Fish Habitat
 - 5.3.1.7 Ecosystem
 - 5.3.1.8 Terrestrial Mammals, Amphibians and Reptiles
 - 5.3.1.9 Others
 - 5.3.2 Social Impact Assessment
 - 5.3.2.1 Communities and Services
 - 5.3.2.1.1 Pre-Construction
 - 5.3.2.1.2 Construction
 - 5.3.2.1.3 Operation
 - 5.3.2.1.4 Decommissioning, closure and post-closure
 - 5.3.2.2 Economic Development
 - 5.3.2.3 Employment
 - 5.3.2.4 Education and Training
 - 5.3.2.5 Resettlement, Land Acquisition and Compensation
 - 5.3.2.6 Demographic Changes
 - 5.3.2.7 Public Health and Nutrition
 - 5.3.2.8 Occupational Health and Safety
 - 5.3.2.9 Gender
 - 5.3.2.10 Ethnic Groups
 - 5.3.2.11 Vulnerable Groups
 - 5.3.2.12 Changes in Land Use
 - 5.3.2.13 Traditional Livelihoods and Productive Systems
 - 5.3.2.14 Access to Natural Resources (e.g., NTFP, Water Sources, Hunting Areas, etc.)

- 5.3.2.15 Local Business
- 5.3.2.16 Existing Productive Activities (Fisheries, Agriculture, Forestry, Mineral Resources, Tourism, etc.)
- 5.3.2.17 Communication and Transport
- 5.3.2.18 Water Sources and Water Supply
- 5.3.2.19 Vulnerability to Natural Hazards and Climate Change
- 5.3.2.20 Others
- 5.3.3 Cultural Impact Assessment
 - 5.3.3.1 Archaeology
 - 5.3.3.1.1 Pre-Construction
 - 5.3.3.1.2 Construction
 - 5.3.3.1.3 Operation
 - 5.3.3.1.4 Decommissioning, closure and post-closure
 - 5.3.3.2 Cultural Heritage
 - 5.3.3.3 Traditional Values and Lifestyles
 - 5.3.3.4 Others
- 5.3.4 Visual Impact Assessment
 - 5.3.4.1 Aesthetic
 - 5.3.4.1.1 Pre-Construction
 - 5.3.4.1.2 Construction
 - 5.3.4.1.3 Operation
 - 5.3.4.1.4 Decommissioning, closure and post-closure
 - 5.3.4.2 Point of Interests
 - 5.3.4.3 Particular Landscape
 - 5.3.4.4 Others

6.0 Risk Assessment

- 6.1 Context of the Qualitative Risk Assessment
- 6.2 Methodology
- 6.3 Results of the Qualitative Risk Assessment
 - 6.3.1 Pre-Construction Phase
 - 6.3.2 Construction Phase
 - 6.3.3 Operation Phase
 - 6.3.4 Decommissioning, closure and post-closure Phase
- 6.4 Results of the Quantitative Risk Assessment

7.0 Cumulative Impact Assessment

- 7.1 Methodology and Approach
- 7.2 Determination of Valued Ecosystem Components
- 7.3 Determination of a Spatial and Temporal Framework
- 7.4 Cumulative Impact Assessment
- 7.5 Development of a Management Framework

8.0 Environmental and Social Management and Monitoring Plan

Only a Summary of the ESMMP should be presented in that section to ensure that the ESMMP is in line with the impact assessment and proposed mitigation measures. The full ESMMP should be presented in Volume 2.

- 8.1 Summary of the ESMMP
- 8.2 Reference to ESMMP

9.0 Public Consultation and Disclosure

- 9.1 Introduction
- 9.2 Methodology and Approach
- 9.3 Summary of Consultation Activities Undertaken
- 9.4 Results of Consultation during Project Scoping
- 9.5 Results of Consultation during preparation of EIA Report
- 9.6 Results of Consultation on First Draft EIA Report
- 9.7 Results of Consultation during EIA Review
- 9.8 Recommendations for Ongoing Consultations

10.0 Development Plans

- 10.1 Summary of Development Plans (if required)
 - 10.1.1 Watershed Management Plan (for Hydroelectric power or Dam Project)
 - 10.1.2 Biomass Removal Plan (for Hydroelectric power or Dam Project)

- 10.1.3 Resettlement Action Plan
- 10.1.4 Stakeholder Engagement Plan
- 10.1.5 Livelihood Restoration Plan
- 10.1.6 Community Development Plan
- 10.1.7 Vulnerable Groups Development Plan
- 10.1.8 Others
- 10.2 Reference (if other volumes or specialist reports are prepared for this EIA Report)

Appendices: (for example, could be a separate Volume)

- Appendix 1: Mapping
 - Project Description
 - Description of the Environment
 - Impacts and Mitigation Measures
- Appendix 2: Description of the Project
 - Flow Diagrams
 - Layouts
 - Others
- Appendix 3: Specialist Reports
 - Fisheries Study
 - Sedimentation and Erosion Study
 - Socio-Economic Study
 - Others
- Appendix 4: Modeling Reports (if required)
 - Air Quality
 - Surface Water Quality
 - Groundwater Quality
 - Noise
 - Others
- Appendix 5: Public Consultation and Disclosure
 - Minutes of Meetings

Volume 2: ESMMP

PART I GENERAL MATTERS

- 0.0 Terms and Definitions
- 1.0 General Overview
- 2.0 project developer's environmental and social policies and commitments
- 3.0 Legal Requirements and Environmental and Social Policies and Commitments
 - 3.1 Applicable Laws
 - 3.2 Contractual and Corporate Commitments
 - 3.3 Governing Parameters
- 4.0 ESMMP Organizational Structure, Roles and Responsibilities
- 5.0 Authorities and other Stakeholders

PART II PLANS AND PROGRAMS

- 6.0 Construction Phase
 - 6.1 Description of Construction Works
 - 6.2 Management and Monitoring Plans
 - 6.2.1 Site or Area Specific Plans
 - 6.2.2 Thematic Plans and Programs
- 7.0 Operational Phase
 - 7.1 Description of Operations
 - 7.2 Management and Monitoring Plans
 - 7.2.1 Site or Area Specific Plans
 - 7.2.2 Thematic Plans and Programs
- 8.0 Decommissioning, Closure and Post-closure
 - 8.1 Description of Decommissioning, Closure and Post-closure

8.2 Management and Monitoring Plans

8.2.1 Site or Area Specific Plans

8.2.2 Thematic Plans and Programs

PART III: PROCEDURES AND SUPPORT PROGRAMS

9.0 Management Procedures

9.1 Competence, training and awareness

9.2 Internal and External Communication

9.3 Documentation (GIS, GPS, photos, video recording, forms and reports, etc.)

9.4 Control of Documents

9.5 Operational Control

9.6 Emergency preparedness and response

10.0 Checking

10.1 Monitoring, measurements

10.2 Evaluation of Compliance

10.3 Non-compliance, corrective action and prevention action

10.3.1 Non-compliance Level and Communication

10.3.2 Non-compliance procedure

10.4 Control of Records

10.5 Internal Audit

10.6 External Audit

11.0 Management review

12.0 Cross Reference of ISO 14001:2004 Requirements and Sections in the ESMMP-OP

13.0 Cross Reference to Standards

14.0

Volume 3: Development Plans (if required)

- Watershed Management Plan
- Biomass Removal Plan
- Resettlement Action Plan
- Stakeholder Engagement Plan
- Livelihood Restoration Plan
- Community Development Plan
- Vulnerable Groups Development Plan
- Others

Appendix 7: Form of Confirmation and Letter of Undertaking for EIA/ESMMP

[Letterhead of Company (or if Company not yet formed, of the Lead Sponsor)]

Ministry of Natural Resources and Environment

[_____]

[_____]

Vientiane, Lao PDR

Attn: [_____] Department]

**Re: Environmental Impact Assessment Report in respect of the
[_____] Project (the “EIA including ESMMP”)**

Dear [_____] ,

We refer to the captioned EIA which was prepared and finalized by *[insert name of Consultant(s) preparing the EIA)]*¹ in accordance with the *[_____ insert name of law / regulation establishing the requirement for preparation / submission of the EIA and the matters it is required to address]* under instruction by *[the Lead Sponsor]*, dated [_____] and formally submitted by *[_____ insert name of entity submitting the EIA]* to *[_____ insert name of receiving Department at MONRE]* under letter dated [_____].

Intending to be legally bound hereby and financially liable to **[GOL / MONRE]** hereunder, we:

- a. Endorse and confirm to **[GOL / MONRE]** the accuracy and completeness of the EIA,
- b. Confirm and undertake to **[GOL / MONRE]** that the EIA has been prepared in strict compliance with applicable Lao PDR law including EIA Decree No. 112/PM and with the Terms of Reference dated [_____] as approved by **[GOL / MONRE]** on [_____] as evidenced by the *[_____ Certificate / Letter of Approval]* issued on such date], and
- c. Confirm and undertake to **[GOL / MONRE]** that the Project Company established by **[the Lead Sponsor]** in respect of the [_____] Project shall at all times comply fully with: (i) any and all commitments and obligations as set forth in the EIA, and (ii) any and all plans and the various components thereof including without limitation impact avoidance, mitigation, and remediation measures, and with respect to both (i) and (ii), including but not limited to such commitments, obligations, plans and measures as relate to the development, construction, commissioning, operation and maintenance of the Project, and any circumstance in which work done or to be done, or services performed or to be performed in connection with the Project’s development, construction, commissioning, operation and maintenance is carried out

¹ NOTE: If more than one Consultant has prepared the EIA (or OP-ESMMP), or if the Lead Sponsor and / or other Sponsors or the Project Company have had any role in preparing the EIA, a table clearly and comprehensively outlining the division of work among each shall be attached as a Schedule to this confirmation letter. Note, further, that regardless of who has prepared the EIA, the entity submitting this confirmation letter shall bear full responsibility for the EIA and its contents, completeness and accuracy.

or intended or required to be carried out by any contractor, subcontractor or other party.

- d. We acknowledge and agree that any failure to so comply shall subject us to liability for breach of this undertaking and that, in addition to making financial compensation to [**GOL / MONRE**] and the payment of any applicable penalties under law or under the Project's Concession Agreement and its appendices, [**we / Project Company**] shall be responsible to [**GOL / MONRE**] to carry out and to bear all costs of the immediate and proper rectification of the event of non-compliance and any effects thereof.
- e. We acknowledge and agree, further, that any failure to so comply may be treated by [**GOL / MONRE**] as a breach by the Project Company under the Concession Agreement which, if not rectified in accordance with the terms and conditions of the Concession Agreement, and may lead to termination or other due exercise by GOL of remedies available to it thereunder.

The issuance of this confirmation and undertaking has been duly authorized by all necessary corporate action and a copy of the resolution of the [**shareholders / Board of Directors**] authorizing it and the Power of Attorney explicitly granting signing authorization to the individual who has signed below are attached as schedules hereto.¹

[_____ C., LTD.]

By _____

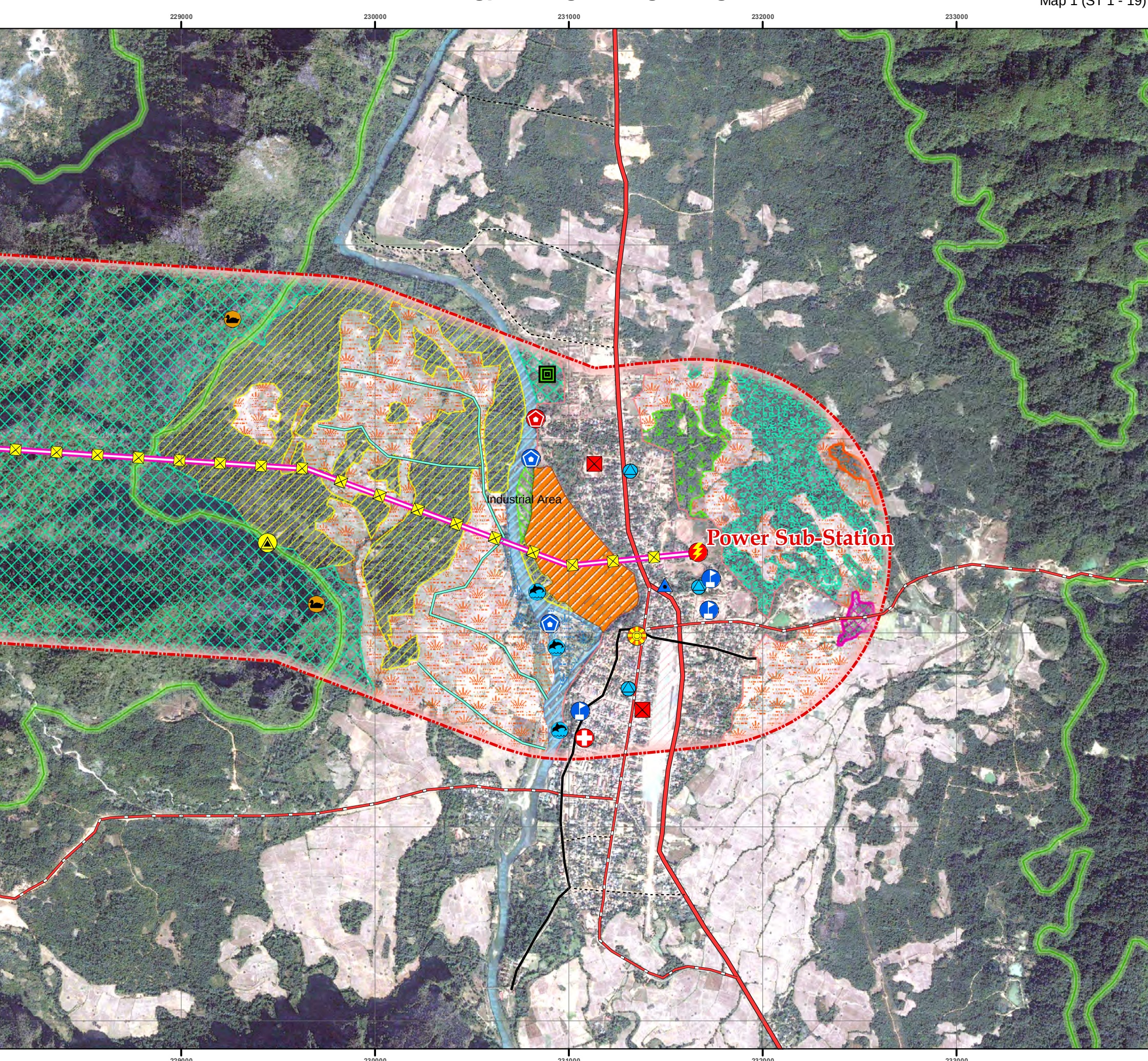
Name: _____

Title: _____

Schedules attach

¹ NOTE: MONRE should require an extract of the shareholders / Board resolution to be certified (by the CEO / General Manager) and attached to this undertaking along with a certified copy of a Power of Attorney properly empowering the named individual who has signed the confirmation and undertaking.

Appendix 8: Mapping – Environmental Baseline Data – Example



- Built Environment

School

Hospital

Industrial Area

Residential Area

Planned Development
- Agriculture

Irrigation network

Rice Field

Fruit Trees

Rubber Plantation
- Vegetation

National Protected Area

Natural Forest

Regenerated Forest

Teak Plantation

Wetlands
- Fauna

Fish Habitat

Bird Habitat
- Archaeology and Heritage

Temple
- Physical Resources

River
- Tourism Area

Resort

Cave

Kayaking

Rafting
- Infrastructure

National Road

Provincial Road

District Road

Village Road

Potable Water Intake

Meteorological Station

Telecommunication Tower

Borrow Pit
- Administrative Limit

Provincial Boundaries

District Boundaries
- Project Components

Project Study Area

230 kV Transmission Line

230/115/22 kV Substation

Appendix 9: Impact Assessment Methodology - Example

IMPACT ASSESSMENT METHODOLOGY

The assessment of environmental impacts is carried out in two steps: their identification and their evaluation. Sections 1 and 2 below describe each of these steps.

1. Identification of Impacts

The identification of positive or negative impacts caused by project implementation is based on the analysis of effects resulting from interactions between the affected environmental components and the various equipment or activities to be carried out. The equipment and activities are thus considered as sources capable of producing changes in one or many of the sensitive environmental components.

Every element of the project is examined accordingly to its potential effects on each of the environmental components. The possible interactions between the different environmental components (indirect effects) are equally considered. The elements of the project linked to construction, operation, maintenance and closure phases are all considered.

During construction, the potential impact sources include:

- Building access roads;
- Development of the work site installations;
- Transportation and traffic caused by the moving of labour, machinery and construction materials;
- Deforestation;
- Earthwork and excavation, including dynamiting and drilling;
- Operating quarry and borrow pits;
- Disposal of excavated material;
- Work in watercourse (bridges, dams, port, etc.);
- Construction and development of facilities and the appurtenant structures;
- Waste disposal;
- Management of contaminated products;
- Job creation;
- Workforce accommodations;
- Procurement of goods and services;
- Others

During the operation, maintenance and closure period, activities that are sources of impacts are related to:

- Operation of equipment (noise, atmospheric emission, waste and dangerous goods management, purchase of goods and services, and job creation);
- Equipment maintenance and eventually equipment restoration;
- Equipment dismantling at end of its useful life.

The physical, biological or human environmental components which may be affected by the project are the sensitive elements in the study area, that is, those likely to change significantly because of components or activities linked to the project. They include:

- Air quality;
- Noise;
- Water quality;
- Sediment quality

- Soil Quality
- Terrestrial and aquatic vegetation
- Fauna;
- Threatened species
- Land use;
- Infrastructure;
- Cultural and archaeological heritage;
- Landscape;
- Economic activities;
- Others

2. Impact Assessment

When all the potential effects of a project on an environmental component have been identified, the importance of the predicted modifications of this component is evaluated.

For this second step, the methodological approach followed is adapted from impact assessment methods recommended by Hydro-Québec (1990), by the ministère des Transports du Québec (1990), by the ministère de l'Environnement et de la Faune du Québec (1996), by the Canadian Environmental Assessment Agency (1999) and by the World Bank (1991) and International Finance Corporation (Dec. 1998).

The approach used to assess environmental impacts of the project determines the **Intensity**, **Extent**, and **Duration** of the anticipated positive or negative impact. These three qualifiers are grouped under one synthesis indicator, the **Significance** of the impact. This indicator provides an overall assessment of the anticipated impacts on a given environmental component. Figure 1.1 schematically presents the basic process leading to assessment of the impact Significance.

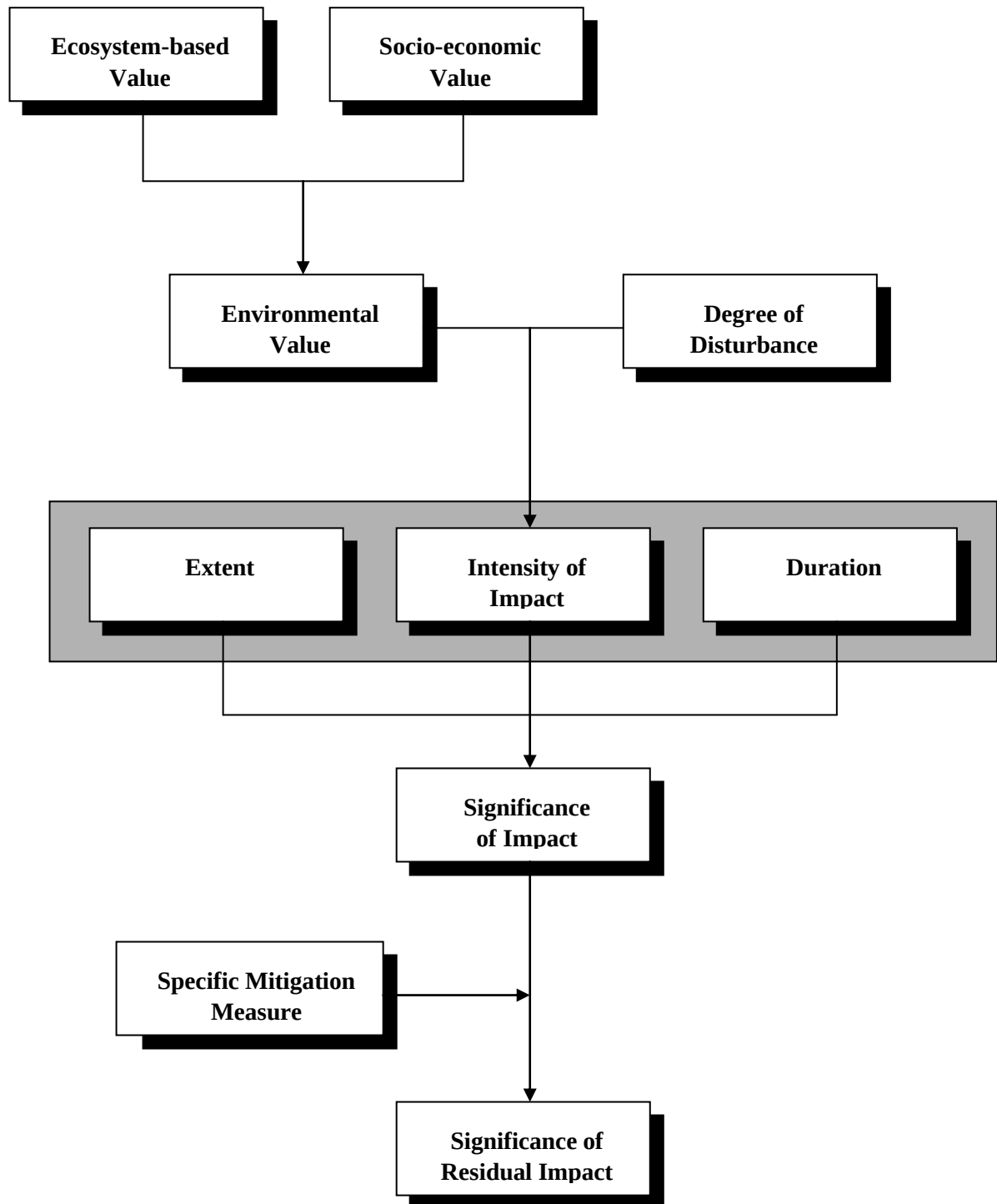
Although the impacts on the physical environment are described and quantified as accurately as possible, they cannot be assigned a value in and of themselves. Impacts on physical components, for example water quality, can only be assessed in terms of their resulting impacts on biological and human components, and not through its intrinsic value. The effects of changes on the physical environment, therefore, serve as input to the assessment of impacts on the biological and human environments.

2.1 Intensity of the Impact

The **Intensity** of an impact expresses the relative importance of consequences attributable to a change in an environmental component. The **Intensity** of impact is an integration of the component's **Environmental Value** with its **Degree of Disturbance** and can be either positive or negative.

The **Environmental Value** of a component is the synthesis of its **Ecosystem-Based Value** and its **Social Value**.

Figure 1: Impact Assessment Methodology



The **Ecosystem-Based Value** expresses the relative importance of a component to the ecosystem as measured by its function or role. It integrates other notions as representativeness, patterns of use, diversity, or rare or unique characteristics. This value is the result of the judgment of specialists based on a systematic analysis of the characteristics of the environmental component.

The **Ecosystem-Based Value** of a given component is considered:

- **High**, when the component is of major interest in terms of its ecosystem-based function, biodiversity, or exceptional qualities and there is a consensus in the scientific community that it should be conserved or protected;
- **Medium**, when the component is of strong interest and recognized qualities, and there is concern, although not consensus, for its conservation or protection; and
- **Low**, when the component holds little interest, has few notable qualities, and there is little concern for its conservation or protection.

The **Social Value** of a component expresses the relative importance attributed to the component by the public, the various levels of government, or any other legislative or regulatory authority. The **Social Value** indicates the popular or political desire or will to conserve the integrity or the original character of a component. This will is expressed through the legal protection that the component is accorded, or by the concern of the local or regional public for the component. The **Social Value** evaluation is based on information gathered during various public consultations in the study zone.

The **Social Value** of a given component is considered:

- **High**, when the component is the object of legislative or regulatory measures (threatened or endangered species, conservation parks, etc.) or is essential to human activities (e.g., potable water);
- **Medium**, when the component is valued or used by a significant portion of the concerned population, but is not legally protected; and
- **Low**, when the component is of little concern or is not used by the population.

The **Environmental Value** integrates the **Ecosystem-Based Value** and the **Social Value** and retains the higher of the two values as shown in Table 1.1.

TABLE 0.1 Grid for Determining Environmental Value

Social Value	Ecosystem-Based Value		
	High	Medium	Low
High	High	High	High
Medium	High	Medium	Medium
Low	High	Medium	Low

The **Degree of Disturbance** for a component defines the scope of the changes that affect the component given its sensitivity to the proposed project. The changes for a given component may be negative or positive and the effect on the environmental component may be direct or indirect. The cumulative, synergetic, or delayed impacts, beyond the simple relation of cause and effect, could amplify the degree of disturbance of an environmental component when the environment is especially fragile. The **Degree of Disturbance** is:

- **High**, when an impact affects the continued viability of the environmental component, strongly and irreversibly impairs the component, or restricts its use in a significant way.
- **Medium**, when the impact changes, either by reducing or increasing, the quality or use of the environmental component affected, without, however, compromising its integrity;

- **Low**, when the impact affects the quality, use or integrity of the environmental component in a way that is barely perceptible; and
- **Undetermined** when it is impossible to assess how and to what extent the component will be affected. When the **Degree of Disturbance** is undetermined, the impact assessment cannot be completed for that component.

The **Intensity** of the impact results from the interaction of the three **Degrees of Disturbance** (High, Medium and Low) with the three classes of **Environmental Value** (High, Medium and Low). Table 1.2 shows the possible combinations of these inputs and the resulting Intensity.

TABLE 0.2 **Grid for Determining Intensity of an Impact**

Degree of Disturbance	Environmental Value		
	High	Medium	Low
High	Very High	High	Medium
Medium	High	High	Low
Low	Medium	Low	Low

2.2 Extent of the Impact

The **Extent** of the impact expresses the spatial influence of the effects produced by an intervention on the environment. This refers either to a distance or an area over which a component will undergo changes. It could also refer to the portion of the population that will be affected by the changes.

The three levels of extent are:

- **Regional**, when an impact affects a large geographic area or a number of components located a significant distance from the project, or when it is experienced by the entire population or by a significant portion of the population in the study area;
- **Local**, when the impact affects a relatively restricted area located within, near, or at a limited distance from the project site; or when it is experienced by a limited portion of the population in the study area; and
- **Site-Specific**, when the impact affects only a very restricted area in the proximity of the project site; or is experienced by only a small number of individuals in the study area.

2.3 Duration of the Impact

The **Duration** of the impact describes the period of time during which a component undergoes changes due to the impact. **Duration** is not necessarily equivalent to the period of time during which the direct source of impact is active. It must also take into consideration the frequency when the impact is intermittent. **Duration** is characterized as:

- **Long**, when the effects are experienced continuously for the life of the facility, or even beyond if the effect is irreversible;
- **Medium**, when the effects are experienced over a relatively prolonged period of time, but less than the duration of the life of the facilities; and
- **Short**, when the effects are experienced over a limited period of time, generally corresponding to the period of construction, the start-up period, a single season, etc.

2.4 Significance of the Impact

The interaction between the **Intensity**, **Extent**, and **Duration** defines the **Significance** of an impact on a given environmental component. Table 1.3 presents the grid for determining **Significance** and differentiates between five levels of significance, ranging from Very High to Very Low.

The relative importance of each impact is assessed based on the understanding that general mitigation measures will be integrated into the baseline project. For example, if the project states as a general mitigation measure that forests will be protected near water courses, the impact analysis assumes that all forests will be untouched wherever there will be activities near water courses. Here is another example applicable to an industrial project: if it is anticipated that a silencer should be installed on a chimney, the evaluation of noise impacts will take into account the noise reduction attributable to the silencer. However, if no such equipment was anticipated at the beginning of the project and that the noise level is unacceptable, a mitigation measure will be suggested (ex: installing a silencer on the chimney). When the general mitigation measures reduce impacts to the point of rendering them negligible they are excluded from further analysis.

Once the **Significance** of an impact is established as more than negligible, it is described and additional, specific mitigation measures may be proposed to allow optimal integration of the project into the environment.

The final assessment phase consists of determining the residual significance of the impact after all mitigation measures are taken in consideration. The issue here, then, is to clarify how the mitigation measure changes one or several of the inputs in the impact assessment process described above.

- The thought processes leading to the impact assessment are summarized in **Impact Sheets**, which are filled for each significant impact. When required, the uncertainty level that affects the assessment as well as the probability that the impact occurs are indicated on the **Impact Sheets**.

Table 1.3: Grid for Determining Impact Significance

Intensity	Extent	Duration	Significance
Very High	Regional	Long Medium Short	Very High Very High Very High
	Local	Long Medium Short	Very High Very High High
	Site-specific	Long Medium Short	Very High High High
High	Regional	Long Medium Short	Very High High High
	Local	Long Medium Short	High High Medium
	Site-specific	Long Medium Short	High Medium Medium
Medium	Regional	Long Medium Short	High Medium Medium
	Local	Long Medium Short	Medium Medium Low
	Site-specific	Long Medium Short	Medium Low Low
Low	Regional	Long Medium Short	Medium Low Low
	Local	Long Medium Short	Low Low Very low
	Site-specific	Long Medium Short	Low Very low Very low

Appendix 10: Methodology for Qualitative Risk Assessment – Example

METHODOLOGY FOR QUALITATIVE RISK ASSESSMENT

Risk is defined as the product of the potential consequence (or severity) of an event and the likelihood (or probability) of that consequence occurring.

Typically a risk assessment includes:

- Setting the risk context, including objectives and the proposed activities;
- Identification of potential impacts associated with the relevant environmental factors;
- Determination of management measures for each of the identified potential impacts. Depending on the phase of the project, these measures are based on existing controls and standard practice or are additional mitigation controls required to lessen the risk to ‘As Low as Reasonably Practicable’ (ALARP); and
- Assignment of a severity and likelihood factor for each potential impact to determine the risk rating and its significance as either low, minor, moderate, major or critical.

The risk assessment methodology used to identify and rank the potential environmental impacts associated are compliant with AS/NZS 4360 Risk Management.

The descriptors used in this example are based on the Standards Australia’s HB 203:2006 (Standards Australia, 2006b) and the South Australian Guidelines for miners: preparation of a mining lease proposal or mining and rehabilitation program in South Australia (PIRSA, 2009). These descriptors are more appropriate for a mining project (Table 1).

Table 1. Descriptors used to classify likelihood and qualitative measures of impact

Level	Descriptor	Detail of Description
Likelihood		
A	Almost certain	Is expected to occur in most circumstances, or is of a continuous nature, or likelihood is unknown.
B	Likely	Will probably occur during mine lifetime.
C	Possible	Could occur in most mines.
D	Unlikely	Could occur in some mines, but not expected to occur.
E	Rare	Occurs only in exceptional circumstances.
Consequence		
1	Catastrophic	Health – death or widespread health effects, or toxic release off-site with detrimental effect. Environmental – extreme permanent changes to the natural environment (not able to be practically or significantly rehabilitated or alleviated). Social – major public outrage. Financial – huge financial loss (greater than A\$500 million). Or the consequences are unknown.
2	Major	Health – extensive injuries or significant staff numbers incapacitated resulting in a loss of production capability.

		Environmental – substantial and significant changes to the natural environment or only partially able to be rehabilitated or alleviated. Social – will attract public concern in wider community. Financial – major financial loss (A\$100 to 500 million). Or changes will be substantial if cumulative effects are considered.
3	Moderate	Health – medical treatment required. Environmental – significant local changes, but can be rehabilitated or alleviated with difficulty at significant cost and with outside assistance. Social – will attract concern of adjoining community. Financial – high financial loss (A\$10 to 100 million).
4	Minor	Health – first aid treatment required. Environmental – on-site release immediately contained very local consequence with no significant long-term changes or may be simply rehabilitated. Social – not of significant concern to wider community. Financial – medium financial loss (A\$1 to 10 million).
5	Insignificant	Health – no injuries. Environmental – negligible environmental impact. Social – unlikely to be noticed by public. Financial – low financial loss (less than A\$1 million)

The level of risk for each potential impact was then determined by combining consequences and likelihood using the risk matrix shown in Table 2.

Table 2. Qualitative risk analysis matrix

			Severity of Consequence				
			1	2	3	4	5
			Catastrophic	Major	Moderate	Minor	Insignificant
Likelihood of Consequence	A	Almost Certain	Extreme	Extreme	Extreme	High	High
	B	Likely	Extreme	Extreme	High	High	Moderate
	C	Possible	Extreme	Extreme	High	Moderate	Low
	D	Unlikely	Extreme	High	Moderate	Low	Low
	E	Rare	High	High	Moderate	Low	Low

Appendix 11: Budget for Social and Environmental Management and Monitoring

Budget for Social and Environmental Management and Monitoring Mining Project – Example

Management aspects	Costs		
	Capital	Operating (per year)	Closure
Community Management			
Stakeholder Liaison			
Government Liaison			
Contractors / Consultants			
Community relations budget			
Public Consultation			
Public Awareness			
Training – Workers			
Sub-total			
Environmental Management			
Miscellaneous network and equipment:			
Water quality multi-parameter probe (2 units)			
Air quality monitoring equipment (2 units)			
Noise monitoring equipment (1 unit)			
Digital camera (2 units)			
Handheld GPS (2 units)			
Equipment Maintenance (5% of capital cost)			
Aquatic Fauna - Biennial Monitoring			
Socio-Economic Surveys (every 2 years)			
Analytical Equipment and Reagents			
Internal Monitoring			
External Monitoring			
Environment & Social Auditing			
Progressive Rehabilitation			
Sub-total			
Company Environmental and Social Management Staffs			
Risk Manager (1)			
Superintendent (1)			
Senior Officers (2)			
Officers (4)			
Senior assistants (6)			

Assistants (25)			
Vehicles (2)			
Computers			
Sub-total			
Closure Management			
Mine Site/Waste Dumps			
Process Site Plants			
Tailings Storage Facility			
Closure Investigations			
Other, erosion control and stabilization, etc.			
Sub-total			
External Institutional Monitoring			
Project EMU			
- Equipment			
- Sound Level Meter			
- Air Quality Monitoring Equipment			
- Water Quality Monitoring Equipment			
- Digital camera (2 units)			
- Handheld GPS (2 units)			
- Equipment Maintenance (5% of capital cost)			
- Others			
- Staff			
- 1 EIA Manager			
- 1 Sociologist			
- 1 Biologist			
- Training (twice / year)			
- Vehicle (operation and maintenance)			
- Office (Rent, Furniture, AC, Internet...)			
MONRE			
- Bi-Annual Monitoring Session : 5 MONRE Staffs / 5 days per session)			
- Transportation			
- Accommodation			
- Allowances			
- Monitoring Costs			
Sub-total			
Total Costs			
Total			