

**SECTOR GUIDELINES FOR  
ENVIRONMENTAL IMPACT ASSESSMENT (EIA) FOR  
ROADS DEVELOPMENT PROJECTS IN RWANDA**

## **FOREWORD AND DISCLAIMER**

The Organic Law No. 04/2005 of 08/04/2005 determining the modalities of protection, conservation and promotion of environment in Rwanda, requires all projects to be subjected to environmental impact assessment, at various scales. This is consistent with the National Constitution, the Vision 2020, and the environmental sustainability principles enshrined in Agenda 21 and the Millennium Development Goals, especially MDG 7, to which Rwanda subscribes. In order to operationalize these provisions, the Government of Rwanda, through REMA, embarked on putting in place subsidiary legislations and attendant instruments. To this effect, we have developed EIA Regulations and General EIA guidelines. This document is intended to serve as a guideline, which provides recommended approaches and formats for the preparation of a comprehensive EIA report on proposed housing projects.

These sector-specific Guidelines for the Road construction, rehabilitation and upgrading recognize the role that the road networks play in Rwanda's development process and underscore the need to ensure that these developments continue to take place in harmony with environmental aspirations. REMA is optimistic that these guidelines will further clarify the purpose of EIA and facilitate all actors involved in the EIA process for road development, to improve the quality of EIA processes.

This guide should be used together with other EIA instruments developed by REMA i.e. the general guidelines, the regulations and standards, as well as other sector-specific guidelines. It is also meant to be used alongside various other policy and legislation documents relating to housing projects. It should be used with flexibility, as a solid base of practical information to stimulate developer innovation.

These guidelines have been made at a time when development processes are highly dynamic. While they are an authentic administrative tool, they will never-the-less be subjected to technical and public review at a time it is deemed appropriate.

Dr. Rose Mukankomeje

**Director General, REMA**

## **GLOSSARY OF TERMS**

**Cumulative impacts/effects:** The total effects on the same aspect of the environment resulting from a number of activities or projects.

**Developer/Developer:** The entity, person, company/agency proposing to develop/implement/install a new project/sub-project or expand an existing road construction or rehabilitation project.

**Direct impacts:** An effect on the environment brought about directly by the project.

**Disclosure:** Information availability to all stakeholders at all stages of the development.

**Environment:** The totality of the natural (physical and biological components) and societal (cultural, social, economic, political) components and processes that define our surroundings.

**Environment Assessment (EA):** Includes environmental reviews, environmental scans, initial environmental examinations, environmental audits, etc.

**Environmental impact assessment (EIA):** A systematic, comprehensive, logical process of analysis of a project and its effects (positive and negative) on the environment based on prevailing baseline conditions and a description of the mitigative actions that will be carried out in order to avoid or minimize these negative effects.

**Environmental Impact Statement:** Report submitted to the authority by the developer stating the likely impacts of the proposed project, as well as measures for mitigating or managing the environmental impacts during the project development and operation.

**Environmental monitoring:** describes follow-up activities and decisions on a regular basis to ensure the development and operational activities of the project comply with the conditions agreed upon in the environmental management plan.

**Impact:** A positive or negative effect that the project is likely to have on any aspect of the biophysical and/ or socio-economic environment.

**Indirect impact:** A positive or negative effect that the project indirectly has on an aspect of the environment

**Involuntary resettlement:** The forceful loss of land / resources that requires individuals, families and / or groups to move and resettle elsewhere.

**Lead Agency:** The agency with primary responsibility. For instance, the lead agency for environmental matters in Rwanda is REMA.

**Mitigation measures:** The actions identified or proposed to negate or minimize the negative environmental impact that a project may have on the environment.

**Pollution:** Contamination altering the state of purity (e.g. chemical effluent discharge into a surface water body).

**Project and sub-project:** A set of planned activities designed to achieve specific objectives within a given area and time frame. With respect to hydroelectric development projects, the terminology can be confusing.

**Project Brief:** The initial submitted document to REMA to initiate the process that will lead to the issuance of the EIA certificate of approval.

**Scoping:** This refers to the initial stage in an environmental assessment that determines the major environmental parameters which are likely to be affected and the aspects of the project that may cause these effects.

**Reviewing:** Is an assessment of the so far submitted project details by an environmental agency to decide as to whether there are gaps to be answered.

**Screening:** An initial step when a project is being considered for environmental assessment. The screening is the determination of the level of assessment that will be conducted. In the case of GoR, screening will place the project into one of three environmental categories (I, II, or III). At this stage, it may be decided that the project does not require a full EIA and therefore can proceed based on the Project Brief recommendations.

**Stakeholder:** A person, group(s) of persons or institutions who have an interest in the project, and who will be directly or indirectly affected by the project activities.

## ABBREVIATIONS AND ACRONYMS

|            |  |
|------------|--|
| AfDB       | African Development Bank   |
| ASSTEP     | Public Works Contracts Management Agency                         |
| CBD        | Convention on Biological Diversity                               |
| CDF        | Common Development Fund  |
| CMS        | Convention on the Conservation of Migratory Species              |
| COMESA     | Common Markets for Eastern and Southern Africa                   |
| DEO        | District Environment Officers                                    |
| DFID       | UK's Department for International Development and Social Affairs |
| EA         | Environmental Assessment or Analysis                             |
| EAC        | East African Community   |
| EDPRS      | Economic Development and Poverty Reduction Strategy              |
| EIA        | Environmental Impact Assessment                                  |
| EIR        | Environmental Impact Review                                      |
| EIS        | Environment Impact Statement                                     |
| EMP        | Environmental Management Plan                                    |
| FIs        | Financial Institutions   |
| GEF        | Global Environmental Facility                                    |
| GoR        | Government of Rwanda   |
| GTZ        | German Technical Cooperation                                     |
| HIMO       | Labour Intensive Public Works Programme (French Acronym)         |
| IDA        | International Development Association                            |
| IFC        | International Finance Corporation                                |
| IMF        | International Monetary Fund                                      |
| IPCC       | Intergovernmental Panel on climate change                        |
| IPM        | Integrated Pest Management                                       |
| MININFRA   | Ministry of Infrastructures                                      |
| MINALOC    | Ministry of Local Government                                     |
| MINICOFIN  | Ministry of Finance and Economic Planning                        |
| NBI        | Nile Basin Initiative  |
| NEPAD      | New Partnership for Africa's Development                         |
| NGOs       | Non Government Organisations                                     |
| PRA        | Participatory Rural Appraisal                                    |
| RAP        | Resettlement Action Plan   |
| REMA       | Rwanda Environment Management Authority                          |
| RURA       | Rwanda Utilities Regulatory Authority                            |
| SOPs       | Standard Operating Procedures                                    |
| TIG        | <i>Travaux des Interets Generaux</i>                             |
| ToR        | Terms of Reference   |
| <b>RBS</b> | <b>Rwanda Bureau of Standards</b>                                |

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## **CHAPTER 1: INTRODUCTION**

### **1.1 General context**

Roads are one of the most economically important infrastructures in Rwanda, given the fact that more than 95% of the country's international trade is handled by land and there are hardly any land alternatives (such as railway). Internal communication is also almost exclusively by road. Yet the terrain and the economy of Rwanda are such that developing roads is a very costly venture both financially and environmentally. The effects include pollution from vehicles, chemical spills from trucks, displacement of wildlife and vegetation due to construction of new roads and disturbance of hydrological cycles.

Road construction and upgrading have tremendous environmental impact if not carefully done. It involves heavy earth excavation, burning of fossil fuels, noise and destruction of vegetation and trampling of the earth. Air pollution is increasing and very much linked to health problems including cancer, bronchitis among others.

### **1.2 Road Scheme Project Cycle**

A road scheme may take any of the following:

- 1) Opening up a new road, whether asphalt paved or earth;
- 2) Re-constructing an existing road i.e. excavating and replacing an existing layer;
- 3) Upgrading an existing road – could be expanding an existing road and/ or paving an existing earth road (from earth to tarmac road);
- 4) Rehabilitating an existing road through maintenance activities such as patching broken parts, reconstructing the drainage systems, constructing turnouts, etc.

In general, road projects follow 4 well-defined phases, starting with planning and feasibility studies, then preliminary design, detailed design, contract preparation and tendering, and construction, and finally, operation and maintenance. For all road projects, an essential first step is to identify and consult relevant government agencies and the public likely to be affected (whether positively or negatively). It is important to note that EIA is project and site specific, and so it can only be undertaken once the project concept is clear including the route, road size, length, and other features. Because of the different activities and seasons in each phase of project development, environmental impacts vary by phase. The project cycle is described so as to identify key areas where and which environmental issues are likely to manifest and figure out how to address them in each project cycle phase. The project cycle is summarised in figure 1.



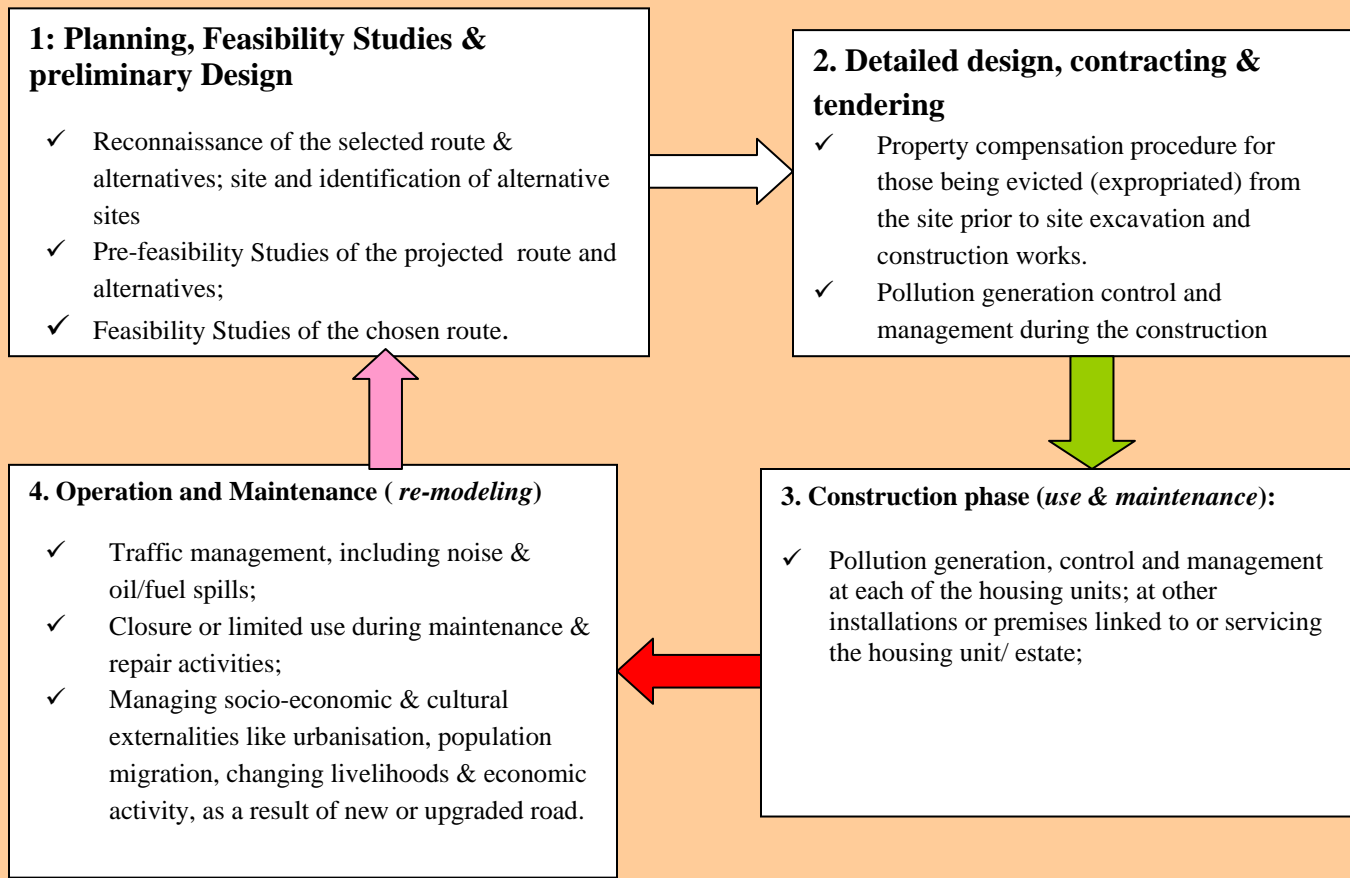


Figure 1: Phases/ Project Cycle of a Road Scheme and associated environmental impacts.

## 1.2 Why the EIA Process?

Environmental impact assessment (EIA) is a recent phenomenon when it comes to Government agencies but has been used since the early 1970s by international development agencies, as concern for environmental and social impact of large scale infrastructure projects increased. Subsequently, EIA legislation and standard guidelines development have been shaped by agencies which have developed sector- and sometimes area-specific EIA guidelines. These agencies include the World Bank; the United States Agency for International Development (USAID); African Development Bank (AfDB); Asian Development Bank (ADB); Organisation for Economic Cooperation and Development (OECD) and the Inter-American Development Bank (IADB) and the Japan International Cooperation Agency (JICA).

The main purpose of EIA in road development is to identify the positive and negative impacts of a proposed road project on the natural and human environment and then to formulate appropriate remedial/ mitigation measures to avoid/minimize adverse negative impacts and to enhance beneficial impacts. The EIA process can help develop more environmentally friendly road projects by reducing negative environmental impacts through alternative approaches, design modifications, and remedial measures.

### **1.3 Purpose of the Road sector EIA Guidelines**

Roads are one of the most important infrastructure developments in Rwanda, and by their nature, they have potentially disastrous environmental impacts. Hence there is need for EIA guidelines to ensure that such infrastructure developments are pursued in environmentally friendly and sustainable way.

Since around 2001 when the emergency post-genocide rehabilitation ended, the Government of Rwanda embarked on long-term development, often including large scale infrastructure developments. Accordingly, the number and scale of national and district road projects has increased considerably, leading to a significant increase in the number of Environmental Impact Studies to be undertaken for roads. With the enactment of the Organic law on environment (No. 04/2005 of 08/04/2005), these projects are increasingly being required to address complex environmental issues.

The Rwanda Environment Management Authority (REMA) along with MININFRA (Roads Unit, ASSETP) and local authorities have recently made considerable efforts in strengthening EIA capacity, through strict enforcement of laws; awareness raising and technical training in partnership with major infrastructure donors.

These guidelines will help in ensuring that the lessons learned from these experiences are integrated into future best practice in relation to EIA for road projects. National road projects, by their nature, tend to be large, high profile projects extending over a substantial geographical area, and involving huge funding. These schemes generally attract a high level of public interest, making road projects multi-sectoral. The planning of national road schemes differs fundamentally from other types of development in three principle ways:

- Road projects occur over long distances that typically cross through a number of different environmental and administrative settings.
- Identification of significant environmental resources and avoidance of environmental impacts is achieved during the constraints and route selection stages.
- An EIS for a road project needs to allow sufficient scope to cater for procurement methods that sometimes provide scope for design input by the contractor after development consent has been obtained. This may often involve the use of innovative methods by the contractor to mitigate significant environmental impacts.

These reasons constitute the rationale for the development of sector-specific guidelines for the preparation of a road EIS. The objective of these guidelines is to ensure that road EIAs continue to follow correct statutory procedures while at the same time achieving quality and consistency in the identification and mitigation of environmental impacts.

These guidelines build on and attempt to reinforce the general EIA guidelines already developed by REMA by focusing more specifically on the road infrastructure sector. These guidelines will assist road developers, contractors, EIA practitioners and planners in the road sector, to:

- a) ensure that road infrastructure development meets the statutory provisions of article 67 of the organic law No. 04/2005 on environment, and associated subsidiary legislations;
- b) provide a tool (e.g. a simple, clear document) that guides the EIA process so that EIA in the road sector is satisfactory and cost-effective. To ensure this, these guidelines:
  - provide basic information to be collected on biophysical, social, cultural and economic parameters relevant for roads development, in each phase of the road development project cycle;
  - advise on the methodology for collecting and analyzing data;
  - provide a generic framework for logically documenting and presenting the EIA results (general report outline);
  - provide basic guide on how to execute EIA activities including conducting public hearings for multi-stakeholder projects like roads development;

Notice, however, that while these guidelines provide part of the quality assurance in EIA activities (basic procedures and processes), they should in no way be used as excuse for illogical, incompetent or poor quality EIA work/ outputs by proponents or their agents.

Finally, these guidelines are dynamic just as Rwanda's economic transformation and environmental governance are rapidly evolving – they are bound to be reviewed especially with emerging regional and international cooperation, and new legislations coming up in areas environment, natural resources, economic and infrastructure development. Continuous updates will enable Rwanda to deal with new challenges.

## **CHAPTER 2: POLICY, LEGAL AND INSTITUTIONAL FRAME WORK**

### **2.1 Policy framework**

Since the end of the post-genocide emergency resettlement and rehabilitation metamorphosed into a clearer, more coherent long-term development programme around 2000, the Government of Rwanda (GoR) has made substantial investments in roads rehabilitation; reconstruction and opening up of new roads, at the national level as well as within districts. The country has a road network of more than 14,000 Km, of which 4.698 km are classified as national roads. More than 3,500 Km are gravel (MININFRA, 2008: Transport Sector Policy). Most national roads serve as cross-border highways: Rusumo – Kigali serves as the main entrance to and through the country from Tanzania; Gatuna-Kigali is the most popular and busy route from Uganda and Kenya, and generally part of the northern corridor that serves the Eastern Democratic Republic of Congo (DRC) and Burundi; Gisenyi-Ruhengeri-Kigali is the main entry into the country from the North Kivu province of DRC, and major outlet of local, regional and international traffic into the DRC.

Roads are perhaps the most important post-conflict reconstruction and development intervention that GoR has undertaken. Since 2000, more than 1000 Km of paved road has been rehabilitated, reconstructed or constructed, linking Kigali city to all provincial towns and most major secondary urban areas in Rwanda. This large scale investment in road construction, rehabilitation and maintenance, has already yielded dividends – facilitating movement of people and goods within and through Rwanda, which has contributed significantly to the more than 6% annual economic growth.

But Road construction and maintenance in Rwanda is one of the most costly and difficult work, considering the fact that roads constitute the main source of transport; and the steep and rugged terrain in most parts of Rwanda. For this reason, Environmental impact assessment (EIA) is an important aspect of sustainable road sector investments in Rwanda. The policy framework guiding roads development in Rwanda currently entails the following:

*1. The National transport policy* highlights the main objective of the road sub-sector in Rwanda as to Maintain, Rehabilitate and Develop the National Road Network, which is responsible for more than 80% of human and goods traffic in the country. The policy's strategies to meet these objectives are:

- a) expanding and improving Rwanda's road infrastructure, protecting existing capital investments, and improving road safety;
- b) establishing an appropriate institutional framework for the accelerated development of the road sub sector;
- c) financing road maintenance works through multi-year maintenance contracts,
- d) renewable under performance evaluation;

- e) encouraging community participation in road maintenance through the district
- f) development committees;
- g) improving the ability and quality of local road infrastructure, thereby enabling the rural community to market its crops;
- h) creating an environment conducive to the encouragement of Private Sector Participation in rehabilitating, maintaining, and developing road infrastructure. Accordingly, a Road Maintenance Fund was established to provide adequate, reliable financing for road maintenance activities; and a Road Maintenance Strategy was formulated to guide the process.

2. *The Road Maintenance Strategy (RMS)* of May 2008 emphasises routine maintenance as a more cost-effective of establishing and managing road infrastructure;

The strategy aims to: a) provide a policy framework to guide RTB/Districts/ or Roads Agency staff in maintenance programming, planning and execution; b) ensure that investments that are made in the development of roads; c) ensure that infrastructures are safeguarded and allowed to deliver their maximum benefit; and to allow all stakeholders to understand the investment decisions taken by MININFRA.

The RMS lays emphasis on building capacity, fostering public-private partnerships and a long-term project cycle involving multi-year contracts management. Environmental management is a key aspect of the RMS, as this is critical for cost-effective road maintenance and rehabilitation.

*Decentralisation Policy* has, since 2001, effectively transferred power and service delivery responsibilities from the central Government to districts. As a result of this policy, a lot of financing for district roads and other infrastructure establishment are managed by districts, through the Common Development Fund (CDF) and the Road Maintenance Fund. Under decentralization, the District Departments of Infrastructure have the responsibility of executing road maintenance procedures, with technical guidance from MININFRA. Districts are required to undertake and report regularly, on road maintenance activities.

*Land Policy 2004* emphasises productive use of land based on suitability of specific land units. It also advocates for and entrenches land rights and tenure security by promoting land registration and titling. For road scheme development, the implications of this policy relate to resettlement and compensation; assessing the suitability of particular areas for road infrastructure; and the influence of infrastructure development on the changing value and use of land.

*The Environmental Protection, conservation and management policy 2004*, seeks to integrate environmental sustainability principles into all development processes, programmes and projects. For roads, the nature of the terrain in Rwanda makes environmental issues (e.g. water runoff and landslides), the main threats to sustainable road maintenance. The terrain and the settlement patterns also indicate that roads – which are the most common mode of transport – could be a potentially dangerous development, unless environmental and social considerations of human safety, risk of losses, are prior anticipated, identified, analysed and integrated into the project design and implementation. This underscores the importance of EIA in road projects.

## **2.2 Legal and regulatory framework**

The main national legislations that provide for and guide Environmental Impact Assessment (EIA) for road infrastructure, and the provisions, thereof, include the following: National Constitution of June 2003 obliges the Government of Rwanda - current and future – together with the population, to carefully harness environmental resources in order to ensure sustainability and inter-generational equity. The degree of relevance of these legislative instruments varies with the activity and area, because environmental consequences of development tend to be area and theme specific.

*1. The Constitution of the Republic of Rwanda, June 2003:* In particular, articles 29, 30, 49, 62, 88, 90, 93, 108, 118, 190, 191 and 201, make various provisions for environmental management- from guaranteeing rights to a healthy environment for every citizen.

Organic Law N° 04/2005 determining the modalities for the protection, conservation and promotion of environment in Rwanda.

Organic Law N° 08/2005 of 14/07/2005, determining use and management of land in Rwanda;

Law N° 18/2007 of 19/04/2007 determining Expropriation in Public Interest in Rwanda;

Ministerial Instruction No. 02/UPPR/09 with respect to Excavations and restoration of public infrastructure by communications and Infrastructure Service Providers (CISPs) operating in Rwanda, April 21, 2009.

General Guidelines and Procedures for Environmental Impact Assessment of November 2006, prepared by REMA.

## **2.3 Institutional Framework**

The roads sector is an anchor to social and economic transformation, and for this reason, has spider web-like networks with other sectors, including agriculture, international trade, local governance, education, health; etc. The institutional framework for environmental impact assessment in the roads construction and maintenance sector is, therefore, complex. The main institutions involved and their roles are summarised in Annex 4.

## CHAPTER 3: EIA PROCESS

### 3.1 Illustrative Summary of the Roads EIA Process

The EIA for roads projects is a fairly complicated process as it often traverses many administrative and ecosystem boundaries, and is a multi-stakeholder affair. Figure 2 summarises the EIA process in a road scheme.

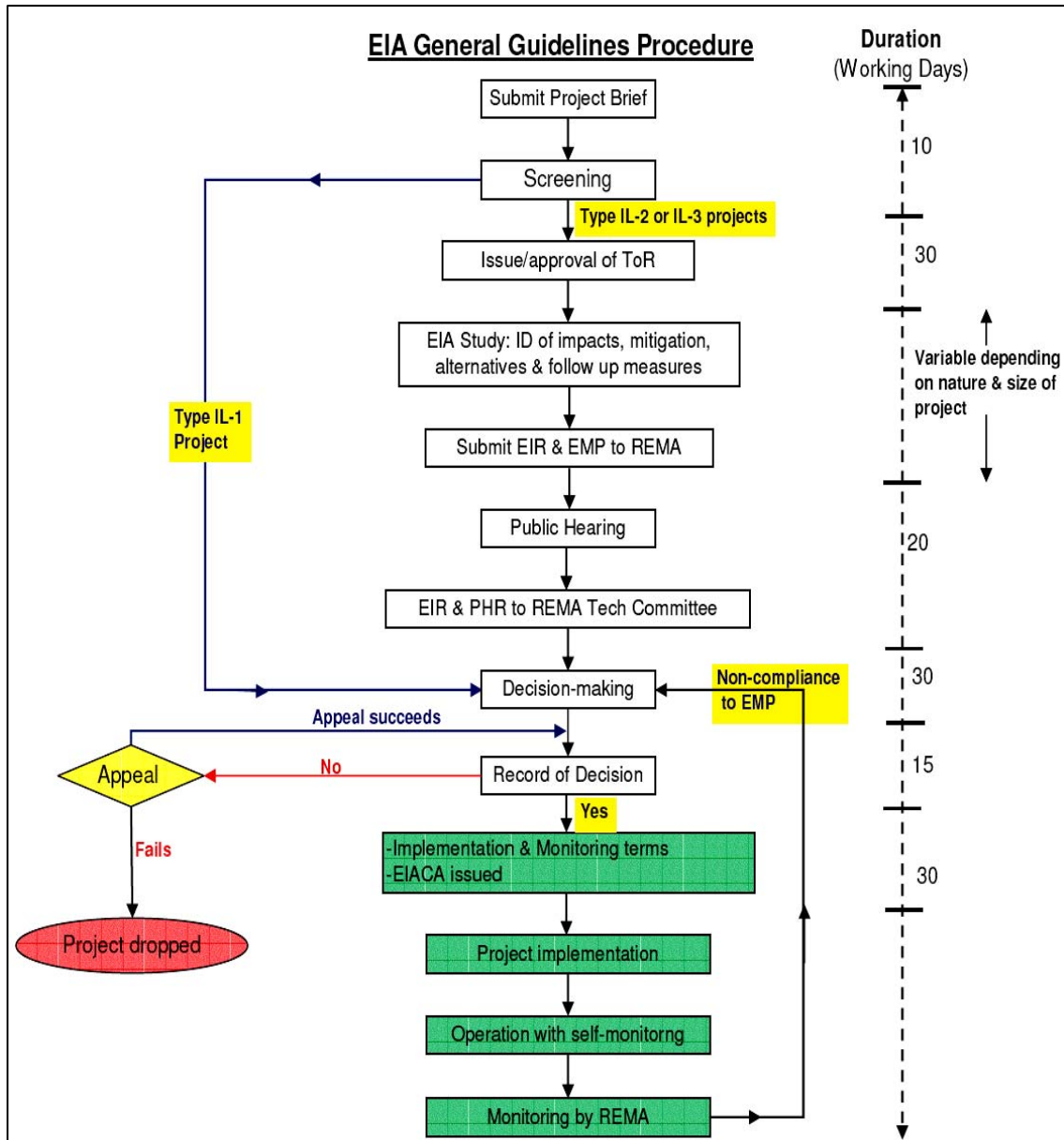


Figure 2: Graphic Illustration of the EIA process in the Roads Sector

### **3.2 Project brief preparation and submission**

The project brief provides information on the intended project, and provides the basis the screening and on which the Authority designs or approves the EIA Terms of Reference (ToRs). In preparing the project brief, it is important to identify, analyse and include the structure and interests of the key actors in roads development depending the scale i.e. the Ministry responsible for infrastructures (roads); the Ministry responsible for finance, the ministry responsible for environment; the Authority (REMA) and the concerned Local Governments (where road is to be constructed or pass). Include the donors and development partners.

The EIA team and the proponent should endeavour to simplify technical and engineering information to levels easily comprehensible by non technical managers and decision makers. The project brief should indeed be brief, no more than 10 pages for the most sophisticated project including any attachments except technical drawings.

The project brief should present arguments of fact justifying the project, including the potential benefits and the analysis of alternatives. Project motivations are important especially to inform the analysis of costs and benefits and in considering trade-offs and future sustainability. Two major questions should be asked and answered in the EIA viz:

- i) What are the likely benefits and how will these be spread/ distributed? In other words, who are the beneficiaries?; and secondly
- ii) What are the alternatives, and what are the implications in terms of cost, social acceptability, economic and ecological sustainability, and a conclusive argument proving that the selected site and the project design are the best alternative?

An outline of the key information to be presented in the Project brief is attached as Annex 2.

### **3.3 Screening**

#### **3.3.1 What and when is screening?**

Basically, Screening answers the question: *Which roads projects require an Environmental Impact Study?* In other words, it's about determining whether or not a project should be subject to EIA. The term 'Screening' is used to describe the process of ascertaining whether a road scheme requires an EIA. In Rwanda, it is determined by reference to mandatory and discretionary provisions of Article 67 of the Organic Law No. 04/2005 on Environment; the Law on Roads; and the General Guidelines for EIA Applications in Rwanda, 2008; among others.

The overriding consideration in determining whether a road project should be subject to EIA is the likelihood of significant environmental impacts. Significant impacts may arise by virtue of



the type of road project, the scale or extent of the road project and the location of the road project in relation to sensitive ecosystems. In interpreting which projects are likely to have significant environmental effects and for which projects is EIA mandatory or required, the road project categories in section 3.3.2 should be reviewed. For "limited-impact-projects requiring limited environmental analysis, the Ministry or Agency responsible for Roads or the RTB will prepare a screening report;- For major-impact-projects, the RTB or Road Agency should develop terms of reference, send them to the Authority for approval, undertake detailed EIA and obtain a Certificate from the Authority.

### 3.3.2 Basic EIA Considerations for Road Development Projects

Detailed EIA study is required if the road project considered in its entirety meets any of the following criteria:

a) *In case of new construction (new alignment):*

- All main highways and national roads
- All roads longer than 5 km and the road reserve is  $\geq 15$  m and;

b) *In case of rehabilitation, upgrading or other improvement:*

- Upgrading of roads to provide 4 or more lanes (continuous section of 10 Km or more)
- The road reserve is  $\geq 15$  m and the length of the road project is  $> 30$  km;
- The road reserve is  $< 15$  m and the length of the road project is  $> 60$  km.

c) *For all types of road projects:*

- The road project or temporary infrastructure affects partly or completely more than 100 households;
- The road project or temporary infrastructure crosses a river on a distance of 300 m (or less) inside the flood plain;
- The road project or temporary infrastructure is located along an existing river bank at a distance of less than 30 m and on a total length of more than 100 m;
- The road project or temporary infrastructure is located 10 km from or within national parks, conservation areas or forest reserves;
- The road project crosses a sensitive area.

For purposes of these guidelines, 'sensitive areas' are defined as:

- Areas covering more than 10 hectares of wetlands (e.g., floodplain, swamp, or marsh);
- Areas susceptible to erosion, landslides, or any other tectonic movements;
- Areas with unique, rare, endangered, or threatened plants and animal species;
- Areas of unique socio-cultural, archaeological, or scientific interest or areas with potential tourist value;
- Polluted areas;
- Coastal areas (e.g., beach front and mangrove swamps);
- Areas declared as watershed reserves, sacred areas, or hot springs;
- Green belts, parks, or public open spaces in urban areas;
- Burial sites and graves, churches, mosques, or temples;

- Indigenous territories and reserves;
- Areas occupied by vulnerable indigenous populations.

### 3.3.3. Road Categories and EIA requirements

As emphasised in section 3.2.3, the size (width and length) of road, the type of road (whether asphalt, earth,..), the intention/ objectives of road (the kind of traffic for which it is being designed) and the terrain and land use/ cover in the area where the road is to be constructed, are all important factors that determine the level and depth of EIA. For purposes of EIA, road types are categorised according to 2 sets of criteria as follows:

1. Using **size and administration** criteria, roads are generally categorised into the classes:

*i) National roads* – includes international highways connecting international traffic and national roads connecting different parts of the country, usually from the centre (capital). These roads are generally first class asphalt and may vary in distance and often form part of an international road network or connect to other forms of international transport like airports and railway (when it finally gets to Kigali). They are generally wider and part or, ideally all, of the distance is dual carriage.

*ii) Inter-district roads* – connect two or more districts within a province. Under decentralisation, the Ministry (MNINFRA) or Roads Agency, through the Provincial Administration, has responsibility for this category of roads.

*iii) District / Municipal roads* – includes roads within a city, town/ municipality or district established and serviced by the local authority. They may stretch anything up to 100 Km connecting various areas within the district. They are often surface-covered by asphalt (tarmacked) but currently include earth roads for most districts.

*iv) Local roads* – generally short distance earth roads and often not paved except perhaps city lanes. They are often maintained by local authorities or community efforts, using simple technology characterised by more manual than machinery; less technical design. Roads constructed under the Labour Intensive Public Works Programme (HIMO) and the Community service programme (popularly known as TIG) fall under this category.

2. Using nature of the road works and the conditions, roads are classified as per the following table 1. It should be noted that these guidelines tend to focus more on typical national roads which are the standard<sup>1</sup> for environmental assessment.

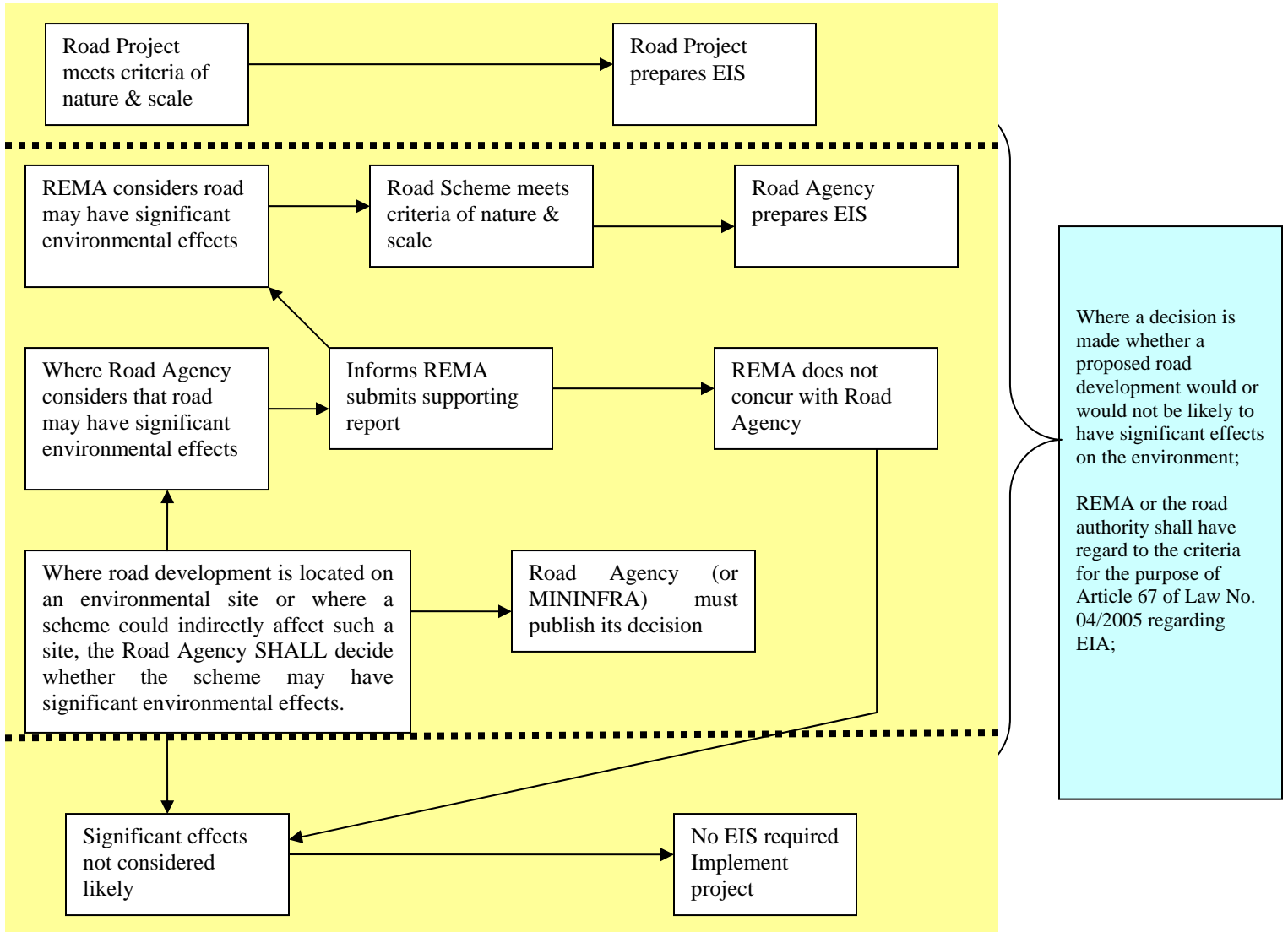
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<sup>1</sup> The intension here is that with national roads, everything that needs to be looked at in EIA is included.

**Table 1: Road project types and their EIA characteristics**

| <b>Project category</b>             | <b>Description/</b>   | <b>Characteristics and implications for EIA</b>   |
|-------------------------------------|---|---|
| a) New construction                 | New construction projects involve building a road section on a new alignment. Major land acquisition is needed. Examples include: <ul style="list-style-type: none"> <li>▪ New roads;</li> <li>▪ Bypasses;</li> <li>▪ Realignments (changing the route).</li> </ul>   | Opening new road involves breaking new ground, changing land use and introducing heavy infrastructure where it never existed or resettling people.  |
| b) Re-construction and/or Upgrading | An upgrading project involves changing the road category (e.g., from seasonal road to all-weather road, from secondary to primary, or from gravel to paved). Land acquisition is needed in most cases. Examples include: <ul style="list-style-type: none"> <li>▪ <i>Expanding or adding new lanes (e.g. from 2 to 4);</i></li> <li>▪ <i>Changing road surface (e.g., from gravel to paved or widening intersections).</i></li> </ul>   | Expanding an existing road,, upgrading single to dual carriage road, all may result in destruction of housing hence relocation or resettlement; cutting down forests, and attracting new traffic and economic activity. |
| c) Improvements                     | In this category, the road specifications are improved. Most of the work is done on the existing platform or surfaces. Additional land may be needed. Examples include: <ul style="list-style-type: none"> <li>▪ <i>Widening lanes and shoulders; tarmac earth/ murrum roads;</i></li> <li>▪ <i>Adding extra lanes in steep inclines;</i></li> <li>▪ <i>Improving curves;</i></li> <li>▪ <i>Strengthening bridges.</i></li> </ul>   |   |
| d) Rehabilitation                   | Road rehabilitation is a substantial intervention to strengthen a road, repair structural defects, and/or restore the road to its initial condition. It is often carried out after the road has deteriorated to a non-maintainable state. Rehabilitation sometimes includes changes or improvements to previous characteristics/conditions. The work is done on the existing platform/right of way. No additional land is needed. Examples include: <ul style="list-style-type: none"> <li>▪ <i>Improving drainage, slopes, embankments, and/or other structures;</i></li> <li>▪ <i>Strengthening pavements;</i></li> <li>▪ <i>Complete resurfacing;</i></li> <li>▪ <i>Recuperating civil works.</i></li> </ul> |   |
| e) Maintenance                      | Maintenance work consists of routine or periodic works to maintain the road in good working condition. This work is done on the existing platform, for instance: <ul style="list-style-type: none"> <li>▪ <i>Routine works: patching potholes and clearing drains;</i></li> <li>▪ <i>Periodic works: resurfacing, lane marking, and bridge maintenance.</i></li> </ul>  |   |

**Figure 3. The Screening Process for EIA for a Roads Project/ Scheme**



### 3. 4. Scoping (Environmental Impact Assessment - Phase 1)

The next stage, after screening and determining that a proposed road scheme should be subject to the EIA process, is to decide on the scope and contents of the EIS. The Road sector legislations, the Organic Law on Environment (No. 04/2005); the Organic Environment Law Legislation and associated Regulations determine a core of key topics that must be covered as the minimum information to be contained in an EIS. These minimum requirements are set out in section 3.3.2. Each Environmental Impact Assessment is a unique interaction of the components of a specific road scheme with a specific set of environmental factors and a unique receiving environment.

**Scoping** is the process of specifying the content of an EIS. During scoping, the key issues specific to a particular road project or a specific receiving environment, that are likely to be significantly impacted during EIA, are identified, and those that are not are eliminated. The process of scoping is examined in more detail in section 3.3.

The aim of scoping is to identify matters that should be covered in the EIS. The process of scoping involves assessing a project's possible impacts and the alternatives that could be addressed, and deciding which impacts are significant. An initial scoping of possible impacts may identify those impacts thought to be potentially significant, those thought to be not significant and those where significance is unclear. Those considered to be not significant are eliminated; those in the uncertain category are added to the initial category of other potentially significant impacts.

**For non-major-impact-projects**, an Initial Environmental Examination (IEE) is required i.e. if the project:

- Is unlikely to involve setting up temporary infrastructure within the existing road reserve;
- Is unlikely to require any resettlement (within or outside of the road reserve);
- Is unlikely to affect any sensitive area e.g. a habitat of rare or threatened species;
- Is unlikely to require a new borrow-pit or other facilities (e.g., site camps);
- Is unlikely to create any important induced development.

The general information required to be included in the EIS is detailed in Annex 7. Based on this, an EIS should contain descriptions of:

- the proposed road development comprising information on the site, design and size of the proposed road development;
- the measures envisaged in order to avoid, reduce and, if possible, remedy significant adverse effects on the environment;
- the data required to identify and assess the main effects which the proposed road development is likely to have on the environment;
- the main alternatives studied by the road authority concerned and an indication of the main reasons for its choice, taking into account the environmental effects;
- a summary in non-technical language of the above information.

Scoping builds on the minimum requirements, already identified, to determine the issues that are relevant to the particular road project. All parties must be conscious of the need to keep the EIS comprehensive and at the same time as tightly focused as possible. In this regard, the following 3 basic criteria may be useful guides to the scoping process:

- ✓ Use *precedence*; avoid ‘re-inventing the wheel’. Where similar projects in similar locations, e.g., in a specific type of habitat, have previously been the subject of a satisfactory EIS then it is reasonable to use such reference for scoping;
- ✓ Use *Likely and Significant* as criteria for determining the range of impacts and thresholds for data assembly respectively.
- ✓ Maintain the *environmental focus*. Note that EIA remains a techno-scientific process of identifying and dealing with environmental issues.

### 3.5 Terms of References for EIA

The terms of reference (ToRs) shall be developed by the Roads Agency (or the Ministry responsible for Infrastructure) and approved by the Authority before the EIA process commences. The project brief submitted and any follow-up discussions may be the main basis for modification, approval or rejection of the ToRs. The general format of the terms of reference (ToRs) for a roads scheme is attached as Annex 3.

### 3.6 EIA Study

#### 3.6.1 Basic Issues to be included in the Road Project EIA Study

The main issues to be assessed and described in the EIA of a typical road development project are outlined as follows:

- Land planning/zoning and detailed location of the land affected by the road scheme;
- Status of the land where the road is proposed to pass (e.g., municipal area, national park or reserve, private property), describe land ownership rights) and expropriation issues;
- Provide spatial information of the Road scheme, including, where possible, recent aerial photographs and topographic maps.
- Technical specifications for the conception of the road and other road infrastructures (e.g., road type, right-of-way, dimension, volume of traffic, and geometry of the road);
- Preliminary surveys, construction activities, and operation (e.g. deforestation, burning, excavation, explosion, digging, filling, extraction of material, deviation and/ or crossing of watercourse, drainage of watercourse, removal of top soil, soil compacting using heavy equipment);
- Temporary infrastructure installations (e.g., access roads, retaining walls, temporary deviation of a watercourse, temporary bridges and culverts, and material storage areas). Include infrastructures such as temporary housing for construction staff;
- Excavation and filling (i.e., estimate the volume, origin, transport, storage and disposal area of excavated material or fill);
- Surface and drainage water (i.e., collection, control, deviation, and confinement);
- Solid and liquid wastes (i.e., volume produced, and storage and disposal areas);
- Material required (i.e., quantity, characteristic, and access);

- Maintenance and operation (i.e., layout of the right-of-way, landscape planning, maintenance of the road reserve, installations, and infrastructure);
- Measures to reduce the use of resources (e.g., reduction at source, more efficient use, or application of new technologies);
- Schedule for the construction activities including duration of the construction work (i.e., start date, end date, and work sequence);
- Employees required and daily work schedule based on construction program;
- Duration of the project and future development phases;
- Cost estimate of the project and the alternatives, including the maintenance costs.

### **3.6.2 Composition and Qualifications of the EIA Team of Experts**

The type of expertise needed in the EIA team for roads project will vary with the location and magnitude of the project but should in any case include:

- Civil Engineer, preferably with specialization in roads or highways design, traffic management;
- Hydrogeologists, hydrologists and soil scientists
- Environmental Management Specialist with extensive experience in environmental impact assessment, environmental legislation and hands-on knowledge of biodiversity, land management and aquatic ecosystems;
- Transport and/ or Development Economists particularly those specialised in investment analysis and/ or rural economy
- Sociologist or Social Anthropologist.

The selection of EIA experts should be guided by the team's overall experience and/ or reputation in EIA or related assignments; the appropriateness of the team (including balance of professionals/ expertise, allocation of responsibilities), as well as the formal/ academic qualifications including professional affiliation. For Architects, Engineers, Surveyors and Accountants, professional certification or affiliation should be strongly considered for ethical concerns.

### **3.7 The Environmental Management Plan**

An EMP lays out the mitigation measures to address the environmental impacts identified and time frame. The logic is that whenever a significant impact has been identified, the proponent must describe how the impacts will be managed. Once approved, the EMP set out in this part will be legally binding in terms of the National, international laws, regulations and ministerial instructions on environment, resettlement and compensation. An EMP should be a realistic plan of action that can be implementable, and not just an impressive set of ideas designed for purposes of getting the EIA report passed. This report should be furnished with the Authority (REMA); the district authorities where the road will pass/ be constructed; the Agency or Authority responsible for Land registration and management; the Ministry of Finance and

Economic Planning, especially the Directorate responsible for investments Coordination; and other relevant stakeholders.

The main issues to consider in the EMP include the following:

**1. Time frame (duration) and sequencing of mitigating activities:** *Every mitigation measure in the EMP must have a specific plan and timeframe, and there must be logic in the way the activities are sequenced.* These dates are estimates and are dependant on the economic and social conditions pertaining from time to time. There might be need for adjustments, which must be agreed with the Authority and the Ministry or Agency responsible for Roads. The plan should spell out the start and duration of construction period; proposed rehabilitation programme; proposed dates for opening and use of road; and proposed operational programme;

**2. Resettlement Plan and Compensation Procedures:** Resettlement and Compensation: should be completed before construction commences and the EMP should clearly show how it's to be done, which area of group of affected people will be resettled or compensated when. Major impact and resettlement issues include:

- ✓ Displacement of people from an area;
- ✓ Loss of land, property, and businesses;
- ✓ Economic losses for affected individuals and families (e.g., loss of crops and economic fruit trees) with a temporary or permanent loss of income for subsistence (e.g., loss of a roadside location for an informal business);
- ✓ Equity issues (i.e., people with fewer resources and skills become more vulnerable);
- ✓ Social disruption and break-up of families due to displacement and relocation;
- ✓ Health problems and various forms of psychological depression;
- ✓ Loss of community benefits and social disintegration.

Compensation and/or resettlement shall be carried according to the Expropriation and Compensation law N° 01/2007 of 20/01/2007, and the Organic Law on Land (2005), Organic Law on Environment No 04/2005 and any other law relevant to compensation or resettlement issues. The Constitution provides for property ownership rights in its articles 29 and 30. The developer shall effect compensation or resettlement to affected parties in accordance with the evaluation and verification of any claim within a specified period.

**3. Responsibility for environmental restoration:** The Road Agency must submit a rehabilitation bond to the Authority before being cleared to excavate stone, rock, sand or soil quarry site for purposes of construction. This is to guarantee that after the project has been commissioned, the Road Agency (Contractor) fulfils the obligation to rehabilitate the area or provide funding to that effect. This arrangement might, however, require subsidiary legislation building on the Polluter Pays principle enshrined in the Organic Law No. 4/ 2005.

**4. Financial provision:** the EMP must include assurances that the Road Agency has made sufficient financial provision (Budget) to implement the measures indicated in the EMP.



## **3.8 Public Participation / Consultation Process**

### **3.8.1 General considerations**

Involving stakeholders through participatory direct or indirect consultations is central to completion of the EIA. But for Roads, it's a complicated activity because of the multiple stakeholders involved often cutting across administrative boundaries (more than one district). The EIA team should:

- i. identify and list known interested and affected parties and their representatives. This may be done in consultation with the relevant authorities;
- ii. conduct public consultations with key stakeholders. These consultations should aim at:
  - a) disseminating project information to all the affected communities and interested parties, updating them on progress made and eliciting their views on the project; and,
  - b) establish environmental issues of public concern from individual and group perspectives as well as local and regional standpoints and beyond.

### **3.8.2 Precautions for public consultations**

When planning or undertaking public consultation, the following should be considered:

- i) *Undertake detailed stakeholder analysis* – by visiting all places where the project is planned; consulting experts and community leaders; analyzing project documentation especially on likely road users and other beneficiaries; and structuring the stakeholders according to interests and socioeconomic categories.
- ii) *Select a representative sample of each stakeholder group for consultation.* EIA teams must be careful to avoid “gate keepers” who purport to represent their group interests whereas they are self-seekers. Sensitive EIA activities like compensation and re-settlement often go wrong because of inadequate stakeholder representation;
- iii) *Ensure that public consultations are transparent* because they are a form of public accountability and participation in project development. In any case, the authority must conduct public hearings to confirm the findings and whether the proposed mitigation measures are satisfactory to affected parties.
- iv) Roads Agency should provide details of the hearings and meetings with relevant authorities, groups and individuals. It is obliged to respond to issues raised during the meetings.
- v) The authority has responsibility to review the quality and adequacy of the consultation process. It should examine critically whether the Road Scheme followed the procedures and ask the Road Agency leadership to provide information pertaining to the issues discussed; concerns raised and responses/ feedback from the EIA team; as well as the Public Hearing Panel's observations.

**Public Hearings:** the authority will hold public hearings in respect of the application and EIS report in circumstances where:

- the project is likely to result in significant dislocation, relocation or resettlement of the communities, or disruption of business;
- there is likely to be adverse public reaction to the commencement of the project;
- the Authority considers that the project could have extensive and far-reaching effects on the environment, and the suggested mitigation measures may raise some questions;

**A Public hearing Panel** may be appointed by the Authority to facilitate/ moderate/ guide the public hearing process. The panel should:

- i) be comprised of at least three-to-five eminent professionals, knowledgeable in the subject matters of the project, with high integrity and a sense of judgment;
- ii) be held close to the most affected areas, or at least one-third of the audience at the public hearing should be residents or natives of the area where the project is planned;
- iii) not be facilitated by people with vested interests. None of the panellists should have a known stake in the project (e.g. residents, professionals in the ministry responsible or with connections with contractors) to avoid any form of intended bias.

### **3.9 Post-EIA Monitoring and Audit**

An environmental monitoring plan should include provisions made for on-site monitoring during site preparation, construction and commissioning phases; future maintenance requirements; and provision for audit during the operation of the project. It should provide a clear implementation schedule for mitigation, which shall include: environmental impacts identified; recommended mitigation measures; objectives of the recommended measures and main concerns to address; responsible party (who is accountable for implementing the proposed/approved measures); location of the impacts and measures; appropriate implementation time and place of the measures; standards to be achieved; responsible officer/party to provide feedback to the relevant authorities; additional studies necessary to implement the EMP. Annex 8 presents a format of a typical EMP.

### **3.10 EIA Reporting**

#### **3.10.1 General outline of an EIA report**

After the EIA study has been undertaken, a report is submitted detailing the profile of the intended road scheme, the likely impacts and proposed mitigation measures. A general outline of an EIA for a Road scheme is summarised below:

**1. Title page:** Include the project title; location of project; the names of the EIA experts; submitting Agency/ Ministry; signatures and date of submission.

**2. Executive Summary:** Outline the key environmental impacts and the proposed mitigating measures i.e. highlight the main findings and recommendations for the road project, while emphasising issues of environmental and social impact and sustainability.

**3. Project Description:** Describe the project characteristics, including route and distance, biophysical and socioeconomic characteristics; including land ownership and existing infrastructure. Include technical plans showing the main and alternative routes; bridges, etc on maps and photographs of specific points of the route.

**4. Policy, Legal and Institutional framework:** Discuss the policy, legal and institutional framework regarding roads and the transport sector; the environment and social management issues of the road scheme.

**5. Baseline Data:** Describe the existing environmental and social conditions that are relevant to decision-making. The scope is the proposed road route and the entire area of road influence determined by the local socio-economic circumstances. Provision of accurate data is important, and should include maps, photographs, tables, graphs, etc. The EIA report should include:

- Data sources, data collection methodology, and site investigations;
- Result of site investigation in form of a geotechnical report (subsurface strata, water table levels, results of soil percolation tests, trial pits,..);
- Information on the uncertainties and assumptions involved in interpreting or using results for predictive methods and analytical techniques and a description of gaps in baseline and other data used in EIA reporting.
- Baseline data on biophysical aspects (e.g. air quality, water quality, noise, ecological resources and their conditions including species and habitats, and ecologically sensitive areas, microclimate, hydrology / hydrogeology, management practices, etc);
- Baseline data on socioeconomic setting e.g. settlement patterns, presence of sacred sites, tenure systems, community relations.
- Data gaps, constraints in data collection, and proposed remedial measures.

**6. Impacts and risks:** Analyse the direct and indirect environmental and social impacts and risks, including benefits from housing development. It is essential to evaluate the quality of available data and key data gaps, to establish the level of certainty of decision making.

**7. Analysis of Alternative routes and/ or other options to road development:** provide a summarised description and evaluation of the alternatives considered. This should include the rationale for selecting the proposed alternative, and analytical description of its impacts.

**8. Mitigation measures and Environmental Management Plan (EMP):** Options and recommendations to prevent, avoid, reduce, mitigate, eliminate, compensate for, or otherwise address any adverse impacts of the selected alternative. This includes the schedule, assignment of responsibility and budgets for the environmental and social impact management measures.

**9. Capacity Building:** Proposals for capacity building incorporated into the management plan when (or where) institutional capacity is not sufficient.

### **3.10.2 Submission of Reports**

As provided for under the EIA Regulations, and in accordance with the Rules of Disclosure for information on EIA, the road Agency is required to submit both hard copy and soft copy versions of the EIA report. The aim is to enable wider access to the EIA reports especially through web-based communication. This information will be available on the web-sites of REMA and the Ministry responsible for roads, in a format that is easily downloadable or otherwise user-friendly.

For hard copy submissions, the proponent or their EIA experts submit 3 hard copies of all reports including annexes and appendices like maps, and technical drawings.

For soft copies, they should be submitted in electronic files preferably on a CD or in WinZip format in floppy disks.

### **3.11 Approval or disapproval**

The decision to approve or disapprove the Road Scheme will be based on whether the terms and conditions of approval, pursuant to these and the General EIA Guidelines, are met. This implies that the EIA reports submitted (as per revisions if required) are approved and the certificate of approval is issued by the Authority.

## 4. ANNEXES

### Annex 1: Checklist for Environmental Screening for a Road Scheme/ Project

This checklist is designed to help users decide whether EIA is required based on the characteristics of a project and its environment. Answer the questions using Y/N for Yes or No.

|   |                             |  |
|---|-----------------------------|--|
| <b>A. Brief description of the project:</b>   |                             |  |
| (E.g. <i>Expansion and Re-construction of Huye – Rusizi Road</i> _  |                             |  |
| <b>B. Project Category:</b> B.1: New; B2. Existing (Modification/Expansion; C3 Existing (Modification/ No expansion)  |                             |  |
| <b>C. Key screening questions</b>   | <b>Yes/No/<br/>Not sure</b> | <b>Is this project likely to result in significant impact?</b> |
| 1. Will construction, operation or decommissioning of the project involve actions which will cause physical changes in the locality ( <i>topography, land use, changes in water bodies, etc.</i> )?   |                             |  |
| 2. Will construction or operation of the road use or limit the use of scarce or non renewable natural resources?  |                             |  |
| 3. Will the construction or operation of the road involve use, storage, transport, handling or production of harmful substances or raise concerns about actual or perceived risks to human health?  |                             |  |
| 4. Will the construction or operation of the road result in production of solid wastes? At what stage (during construction, operation or decommissioning)?  |                             |  |
| 5. Will the construction of road release pollutants or any hazardous, toxic, or noxious substances to air?  |                             |  |
| 6. Will the road cause noise and vibration or release of light, heat energy or electromagnetic radiation?   |                             |  |
| 7. Will the project lead to risks of contamination of land or water from releases of pollutants onto the ground, surface waters, ground waters, lake or river?  |                             |  |
| 8. Will there be any risk of accidents during construction or operation of the project which could affect human health or the environment?  |                             |  |
| 9. Will the road result in social changes e.g. demography, traditional lifestyles, employment?  |                             |  |
| 10. Are there any other factors that should be considered such as consequential development that could lead to environmental effects or the potential for cumulative impacts with other existing or planned activities in the locality?         |                             |  |
| 11. Are there any areas on/around the location which are protected under international or national or local legislation for the ecological, landscape, cultural or other value, which could be affected by the project?                         |                             |  |
| 12. Are there any other areas on/around the location which are important or sensitive for reasons of their ecology, e.g. wetlands, watercourses or other water bodies, mountains, forests or woodlands, which could be affected by the Project? |                             |  |
| 13. Are there any areas on/around the location which are used by protected , important or sensitive species of fauna or flora e.g. for breeding, nesting, foraging, resting, overwintering, migration, which could be affected by the project?  |                             |  |
| 14. Are there any inland, marine, or underground waters on or around the location which could be affected by the project?   |                             |  |
| 15. Are there any areas or features of high landscape or scenic value on or around the location which could be affected by the project?   |                             |  |
| 16. Are there any routes or facilities on/around the location used by the public for access to recreation or other facilities, which could be affected by the project?  |                             |  |

|   |  |  |
|---|--|--|
| 17. Are there any transport routes on/around the construction site or surrounding area, which are susceptible to congestion or which cause environmental problems, which could be affected by the project?  |  |  |
| 18. Is the project in a location where it is likely to be highly visible to many people?  |  |  |
| 19. Are there any areas or features of historic or cultural importance on or around the location which could be affected by the project?  |  |  |
| 20. Is the project located in a previously underdeveloped area where there will be loss of Greenfield land?   |  |  |
| 21. Are there existing land uses on/around the location e.g. homes, gardens, other private property, industry, commerce, recreation, public open space, community facilities, agriculture, forestry, tourism, mining or quarrying which could be affected by the project? |  |  |
| 22. Are there any plans for future land uses on/around the housing location which could be affected by the project?   |  |  |
| 23. Are there any areas on/around the location which are densely populated or built-up, which could be affected by the project?   |  |  |
| 24. Are there any areas on/around the location which are occupied by sensitive activities or infrastructures e.g. health centres, schools, places of worship or other community facilities, which could be affected by the project?                                       |  |  |
| 25. Are there any areas on/ around the location which contain important, high quality or scarce resources e.g. ground water, surface waters, forestry, agriculture, fisheries, tourism, minerals, which could be affected by the project?                                 |  |  |
| 26. Are there any areas on/around the location which are already subject to pollution or environmental damage e.g. where existing legal environmental standards are exceeded, which could be affected by the project?   |  |  |
| 27. Is the project location susceptible to erosion, earthquakes, subsidence, landslides, flooding, or extreme or adverse climatic conditions e.g. temperature inversions, fog, severe winds, which could result in environmental problems?                                |  |  |
| Summarise the Project characteristics justifying the need for EIA:  |  |  |
|   |  |  |

## **Annex 2: Key Information to be included in the Project Brief**

Key information that should appear in the project brief to be submitted to REMA, include:

- a) *Narrative of who initiated the proposed road project, what are the likely sources of funds (whether conformed or not), the type of funding (whether local or foreign, grants or credit), and the local contribution (including the beneficiary communities especially if a local road);*
- b) *The type/ category of road to be constructed (whether asphalt, earth road,..; whether highway, national or local, inter-district road, access road,);*
- c) *The activities or traffic it will serve – whether international, national, regional or local (within district); and of what economic or social importance;*
- d) *A description of the spatial dimensions including length (in Km), areas where it will pass and which administrative units it passes through;*
- e) *Where the materials for construction will be sourced from- e.g. excavation of materials (soil/ earth, rock, tones, sand,..) from within what distance;*
- f) *Names and addresses of owners of land or property thereof where the road will pass and/ or where construction materials will be extracted. Present a summary description of the soil types and rock structure and grading in terms of suitability for road construction (indicate whether this is based on laboratory analysis or expert opinion);*
- g) *Numbers and if possible, Names and exact addresses of all parties who are likely to be affected by the project and the scale of effect. Provide information about land tenure/ ownership of the area affected(including those with and without title deeds) and whether public, institutional or individual private ownership;*
- h) *Description of the biophysical characteristics (including all species of flora, fauna) and legal status of the areas where the proposed road will be constructed. Indicate where there are physical or natural barriers like escarpments, Rocky Mountains, rivers, natural forests, permanent swamps. A map (may be a sketch not to exact scale) of the proposed road and shade the areas likely to be affected;*
- i) *Description of the social, cultural and economic activities of the areas where the proposed road will be constructed or will pass (including cultural sites, social investments like schools, human settlements, burial sites/ memorial grounds,..) economic activities like markets, commercial centres, industries or large scale commercial farms and/ or forest plantations; and other surface and aerial infrastructures like airfields, electricity and telecommunication lines, water supply and/ or sewage pipes;*
- j) *Projections of use (traffic volume) and estimated lifetime when the road will be decommissioned or require re-construction;*
- k) *Describe possible alternative sites/ routes considered for the same project and the comparative scores in terms of economic and financial viability, technical feasibility, social acceptability and/ ecological/ environmental sustainability;*
- l) *Overview of the governance arrangements including local administrative structures, policies strategies and plans of Government regarding land and natural resources management, infrastructure development, urban and rural development, conflict management;*

- m) Opinions of local political and civic leaders if preliminary consultations have been made or better still when and how the developer plans to do it;*
- n) For existing roads, the condition and history of the road including traffic and developments already realized, level of service, geometry and structural state of the road network, and road safety aspects (e.g. history of accidents) ;*
- o) Impacts of the proposed project on the traffic on the adjacent road network and on the development of the region;*
- p) Full contacts of the person responsible for the project (on behalf of the proponent: This is because EIA work involves decision making and accountability and there must be some specific and known person (or designate) to be held accountable. A question arises as to who should submit this brief for a public road. This question makes sense although seemingly obvious because of the tendency for project “owners” i.e. public road agencies to be in the background during the project design and construction, leaving most visible work in the hand of contractors. Well, for Roads under Central Government, the Ministry responsible for Roads should submit the brief) while for local government roads, it is the District Department of Infrastructure or the Executive Secretary’s office.*



### **Annex 3: Sample ToRs for Road Development Projects**

- 1. Introduction:** State the purpose of the ToRs, identify the road scheme/ project to be assessed, and explain the executing arrangements for the environmental assessment.
- 2. Background Information:** Describe the pertinent background issues. This should include a brief description of the major components of the proposed project, a statement of the need for the project, the objectives it is intended to meet, the implementing agency, a brief history of the project (including alternatives considered), its status and timetable, and a list any associated projects. If there are other projects in progress or planned within the region that may compete for the same resources, they should also be identified here.
- 3. Objectives:** Summarize the general scope of the environmental assessment and discuss its timing in relation to the project preparation, design, and execution processes.
- 4. Study Area:** Specify the boundaries of the study area for the assessment (e.g., water catchment area and land use), as well as any adjacent or remote areas that should be considered with respect to specific impacts (temporary infrastructure). The project could have different study areas corresponding to the level of impact.
- 5. Scope of Work:** Define the tasks. In some cases, the tasks to be carried out by a consultant will be known with sufficient certainty to be specified completely in the terms of reference. In other cases, specialised field studies or modelling activities will need to be performed to assess impacts. In that case, the consultant will define particular tasks in more detail after some period of assessment and will submit the detailed scope of work to the contracting agency for approval at a later date. Task 4 in the *Scope of Work* (below) is an example of the latter.

**Task 1: Describe the Proposed Project:** Provide a brief description of the relevant parts of the project using maps of appropriate scale where necessary and include the following information:

- Project justification;
- Location; General layout, size, and capacity;
- Pre-construction activities;
- Construction activities;
- Schedule of activities;
- Staffing and support;
- Facilities and services;
- Operation and maintenance activities;
- Required offsite investments;
- Life span.

[Note: specify any other type of information relevant to the description of the project category.]

#### **Task 2: Describe the Environment**

Assemble, evaluate, and present baseline data on the relevant environmental characteristics of the study area. Include information on any changes anticipated before the project commences.

Modify the list below to show critical project information (e.g., information relevant to the project category and other project-specific information). Avoid compiling irrelevant data. Present environmental characteristics of the study area on a map to facilitate the understanding.

**[a] Physical environment:** geology; topography; soils; climate and meteorology; ambient air quality; surface and groundwater hydrology; coastal and oceanic parameters; existing sources of air emissions; existing water pollution discharges; and receiving water quality.

**[b] Biological environment:** flora; fauna; rare or endangered species; ecologically important or sensitive habitats, including parks or reserves, and significant natural sites; species of commercial importance; and species with potential to become nuisances, vectors, or dangerous (of project site and potential area of influence of the project).

**[c] Socio-cultural environment:** population; land use; planned development activities; community structure; employment; distribution of income, goods and services; recreation; public health; cultural/ historic properties; tribal peoples; and customs, aspirations, and attitudes.

### **Task 3: Describe and analyse the legislative and regulatory framework and issues**

Describe the pertinent regulations and standards at international, national, regional and local levels that govern environmental quality, health and safety, protection of sensitive areas, protection of endangered species, siting, and land use control. ToRs should specify those that are known and should require the consultant to investigate for others.

Then review and analyse relevant laws, regulations and guidelines that govern the conduct of the assessment or specify the content of the report, including international treaties, national laws and/ or regulations and/ or guidelines on environmental reviews and impact assessments.

### **Task 4: Determination of the Potential Impacts of the Proposed Project**

Distinguish between positive and negative impacts, direct and indirect impacts, and immediate and long-term impacts. Identify impacts that are unavoidable or irreversible. Wherever possible, describe impacts quantitatively, in terms of the affected environmental components (e.g., area, number) and environmental costs and benefits. Assign economic values when feasible. Characterise the extent and quality of available data, explaining significant information deficiencies and any uncertainties associated with the predicted impacts. If possible, develop ToRs to conduct research to obtain the missing information. Identify the types of special studies likely to be needed for this project category.

The engineering plans should reflect "best practice" in alignment and construction to ensure that potential negative environmental impacts are minimised (e.g., through measures to prevent soil erosion risk, ensure proper drainage, and provide for waste disposal, landfill material, and used oil).

### **Task 5: Analyse the Alternatives to the Proposed Project**

Describe alternatives that were examined in the course of developing the proposed project and identify other alternatives, which would achieve the same objectives. The concept of alternatives extends to siting, design, technology selection, construction techniques and phasing, and operating and maintenance procedures. Compare alternatives in terms of potential environmental

impacts; capital and operating costs; suitability under local conditions; and institutional, training, and monitoring requirements. When describing the impacts, indicate which are irreversible or unavoidable and which can be mitigated. Try to quantify the costs and benefits of each alternative, incorporating the estimated costs of any associated mitigating measures. Include the 'no project' alternative to demonstrate environmental conditions without the project.

### **Task 6: Develop the Management Plan to Mitigate Negative Impacts**

The Environmental Management Plan focuses on three generic areas: mitigation measures, institutional strengthening and training, and monitoring. The emphasis on each of these areas depends on the context-specific project needs.

**Mitigation of environmental impact:** Recommend feasible and cost-effective measures to prevent or reduce significant negative impacts to acceptable levels. Quantify the impacts and estimate the costs of the mitigation measures. Consider compensation to affected parties for impacts that 'cannot be mitigated. The plan should include proposed work programs, budget estimates, schedules, staffing and training requirements, and other necessary support services to implement the mitigation measures. Summarize the environmental impacts and mitigation measures using a map at the same scale as that of the road design.

**Institutional strengthening and training:** Identify institutional needs to implement environmental assessment recommendations. Review the authority and capability of institutions at local, provincial, regional, and national levels and recommend how to strengthen the capacity to implement the environmental management and monitoring plans. The recommendations may cover such diverse topics as new laws and regulations, new agencies or agency functions, inter-sectoral arrangements, management procedures, training, staffing, operation and maintenance training, budgeting, and financial support,

**Monitoring:** Prepare detailed arrangements to monitor the implementation of mitigation measures and the impacts of the project during construction and operation. Include in the plan an estimate of capital and operating costs and a description of other required inputs (e.g., training and institutional strengthening).

**Task 7: Organise and facilitate public consultations,** in accordance with the provisions of the General EIA guidelines and other attendant legislation. **Assist in Interagency**

**Task 8: Prepare the EIA Report:** The EIA report should be concise and limited to significant environmental issues. The main text should focus on findings, conclusions, and recommended actions supported by summaries of the data collected and citations for any references used in interpreting data. Detailed data should be presented in appendices or in a separate volume.

The EIA report according to the outline below:

- Executive Summary;
- Introduction
- Policy, Legal, and Administrative Framework;
- Description of the Proposed Project; "
- Description of the existing Environment;

- Significant Environmental Impacts and Mitigation Measures;
- Analysis of the Alternatives;
- Emergency Plan;
- Environmental Management Plan (including Monitoring Plan);
- Conclusion and recommendation
- List of References;
- Appendices:
  - Terms of reference;
  - List of the EIA team;
  - Records of Interagency and Public/ NGO Communications;
  - Data and Unpublished Reference Documents.

**8. Consulting Team:** Identify the expertise to include on the EIA team. Environmental assessment requires interdisciplinary analysis. Members of the team could consist of people with the following specializations: rural sociology (in the case of rural roads); human geography; and/or terrestrial ecology (e.g., wildlife, plant, and conservation ecology).

**9. Other Information:** List data sources, project background reports and studies, relevant publications, and other items to which the consultant's attention should be directed.

## **Annex 4: Checklist for Identification of Environmental Impacts**

### **1. Resource use and socio-economic impacts**

- Is the local population living a basically traditional lifestyle? If so, how will the road affect people's use of local resources?
- Will the project affect resources (e.g., drinking and washing water, marine or land food, fuel, medicines, building materials) that local people take from the natural environment?
- Will there be additional demands on local water supplies or other local resources as a result of the project?
- Will the project restrict people's access to natural resources at any time before, during, or after construction? If so, what plans are there to provide additional resources to meet increased permanent and-temporary needs?
- Will the project affect downstream users of resources, especially water resources? If so, how will those resources be protected?
- Are future natural-resource-use opportunities being cut off? If so, what compensation will be offered?
- Will the project affect land or water use, or require leases, or changes in tenure?
- Will the project require resettlement of any residents?
- Will the project result in construction workers or other people moving into or having access to the area? How many people? How will this affect the availability of local resources?
- Will the project create jobs locally? If so, will this include work for local women?
- Will the project provide safe reliable transport to and from the work place and a safe working environment?
- Can some project outputs be targeted to meet the needs of special groups in the community (e.g., women, youths, old, or infirm people)?
- Is the area culturally or archaeologically sensitive? Are rock shelters or caves present? Is the area named in stories? Is it a burial area?

### **2. Biophysical/ landscape impacts**

- Is the local vegetation mainly forest, mangroves, swamp vegetation, or farmland?
- Will the immediate or 'downstream' effects of the project change the vegetation cover?
- Will the project affect important species, habitats, or ecosystems in the area? Is the area environmentally sensitive or fragile? Check the list of environmentally sensitive environments for Tanzania?
- Can construction areas be located away from sensitive ecosystems and on flat to very-gently-sloping land?
- Are there areas of limestone karst or wetlands? If so, have special consideration been given to their management?
- Will vegetation be removed or any surface left bare? If so, what will be the impact of clearance? Will sediments be prevented from entering streams?
- Will the project affect coastal areas, wetlands, or swamps or have 'downstream' effects?
- Will slope or soil stability be affected by the project (e.g., by using heavy machinery)?
- Will a large land area or a high proportion of a community's land be affected?

- Will quarries or borrow pits-be developed or operated under the project?
- Will the present landscape be altered (e.g., by rock or soil removal, spoil dumping, or timber removal)?

### **3. For Roads cutting through or passing near forested areas**

- Is the local vegetation mainly savannah, savannah woodland, tropical forest, tropical rainforest, or mangrove forest?
- Are there important species, habitats, or ecosystems in the affected area (in the immediate area or off site) or is the area environmentally sensitive or fragile? (Check the environmental database if it is available.)
- Are forested areas used as locally-important hunting areas?
- Will vegetation be removed or any surface left bare? If so, what will be the impact of clearance and how will sediments be prevented from burying vegetation, entering streams, or reaching the shoreline?
- Can construction areas be located so as to avoid disturbing local habitats?
- Will the forest landscape be altered (e.g., by rock or soil removal, spoil dumping, or timber removal)?

### **4. Impacts on water and air quality**

- Will the project generate waste products (including increased sewage or solid wastes)? Will waste products be disposed of locally? How will sewage be treated?
- How will solid waste be treated? How will rock or soil waste be treated? there site-specific-erosion plans and sediment-control plans for the project area?
- Will the project or its waste disposal affect the quality of local streams or the groundwater? What steps are planned to minimise sedimentation in streams and contamination of groundwater?
- Will toxic chemicals (e.g., herbicides, tar, oils, paints, and other hazardous chemicals) be used or disposed of along the route of road construction?
- Will hazardous substances (e.g., large quantities of fuels) be used or stored in the project area? What plans are there to contain these substances? How will fuel, oil, or other hazardous chemicals be delivered, transferred, and stored to prevent leaks from contaminating the soil, streams or beaches?
- Will heavy machinery create dust or noise problems or reduce safety for pedestrians, including children and old people? What plans are there to separate heavy machinery from residential areas or to minimise these impacts?
- Will the batching areas (for concrete or bitumen) produce some waste and spillage? Will these and other construction sites be contained while in use and cleaned and rehabilitated after use?
- Will there be serious dust problems in settled areas during project operation? What measures will be taken to reduce this impact?

### **5. Environmental health, natural hazards, and construction hazards**

- Will there be a water logging problem at the site? What steps will be taken to control disease vectors, especially mosquitoes?
- Is the environment naturally unstable (i.e., in an area prone to coastal erosion, within a zone which would be affected by any rise in sea level, in an area of known earthquake or

landslip activity, in an area prone to severe storms, floods, or droughts)? What plans are there to protect the development against these natural hazards?

- Will the presence of the developments-cause- increased environmental damage should a natural hazardous event occur? If so, what environmental protection measures will be implemented?
- Are safety measures in place to protect the workforce? Do all workers have the necessary safety clothing and equipment? Have workers been trained in the use of safety equipment?
- Is there a contingency plan to deal with spills of hazardous chemicals (including oil products) in the project area?
- Are fire-fighting and spill-clean-up materials / chemicals available for use at the site (e.g., water, sand, detergent, acid, or alkali)?
- Are measures being taken to ensure safety to road users after project completion (e.g., speed bumps and adequate road furniture)?
- For Bridge Projects
- In addition to the impacts that are associated with other infrastructure projects, there are special issues to consider for bridges.

*(a) For single span no-pile bridges*

- Will bank vegetation, farmland, levee, or straight bank edges be disturbed? Identify bed and bank sediments clearly (e.g., as predominantly clay, sand or gravel).
- Are sediments likely to enter the stream system? Identify control methods.
- Will there be a need for an access road or a temporary diversion? Consider the physical impacts of these structures and propose methods of rehabilitation after use.
- Is there a risk of runoff draining onto farmland, resulting in flooding? If so, this should be addressed in the design.
- Will containment structures block existing watercourses to farmland? If so, the design should address this as well.
- Will there be temporary construction in or diversions of rivers? If so, all possible impacts in terms of bank erosion, sediment accumulation, and subsequent disposal of materials should be considered.

*(b) For longer bridges with piling*

- Will the bridge pilings cause turbulence, sediment movement, and deposition and consequent bank and streambed erosion? This should be taken' into account in planning.
- Is there a risk of bank instability? For piles near riverbanks, there should be controls on bank stability and an assessment of the upstream and downstream impacts of any proposed river retention structures.
- Will there be any temporary construction works in the river, such as drilling and pile-driving works? If so, what will be the impact of these works on flows and on potential erosion? What steps will be taken to rehabilitate the river section when the works are completed?
- Where are the sources of fill and concrete aggregate? These should also be assessed.
- Are there any issues of noise or safe pedestrian access across the bridge and along the bank?
- What type of wastes will be generated? For construction areas, all wastes should be controlled and contained (including sewage). Subsequently, the waste should be removed

to an appropriate disposal site, and the site should be rehabilitated. Methods to deal with any hazardous chemicals (including, fuel-and oils), the management of cement batching plants (including their location), and methods to control noise, dust, and runoff should be addressed.

- What is the main composition of the stream channel (i.e., clay, sand, or gravel)? If it is sandy or gravelly, describe methods that will be used to stabilise the bank at the construction site. If it is clayey, explain the methods that will be used to prevent bank erosion and .consequent downstream changes and explain the methods to minimise sediment-induced turbidity.
- Are there habitat corridors along the riverbank that need to be protected? What methods will be used to protect these ecosystems or habitats? What is the land- and water-use in the immediate area? What resources of local or traditional importance will be affected by the construction? What arrangements have or will be made with the local communities to manage the impacts on these resources?



## Annex 5: Checklist of Environmental Management Activities for Each Phase of a Road Scheme

| <b>PROJECT CYCLE PHASE</b>                        | <b>ENVIRONMENTAL MANAGEMENT ACTIVITY</b>   |
|---|--|
| Conceptual & Pre-feasibility Phase                | <ul style="list-style-type: none"> <li>• Registering the project: describing and classifying the project</li> <li>• Initial site inspection visit and coordinating with project team members;</li> <li>• Screening projects to identify salient environmental parameters of the proposed road works and to assess the sensitivity of the receiving environment;</li> <li>• Identifying alternatives to the proposed project;</li> <li>• Scoping the environmental study;</li> <li>• Developing terms of references for the EIA.</li> </ul>   |
| Feasibility Study/ Preliminary Design Phase       | <ul style="list-style-type: none"> <li>• Obtaining consulting, services for the Environmental Assessment (EIA);</li> <li>• Conducting and overseeing the EA;</li> <li>• Analysing for significant environmental impacts;</li> <li>• Conducting consultations with the public, as required;</li> <li>• Incorporating results of the EIA into the project design and implementation process through mitigation measures;</li> <li>• Designing mitigation measures.</li> </ul>  |
| Detailed Design Phase                             | <ul style="list-style-type: none"> <li>• Incorporating results of the EIA into the project design and implementation process through mitigation measures;</li> <li>• Submitting the EIA to the regulatory agency for review and approval;</li> <li>• Participating on the Technical Advisory Committee (EIA);</li> <li>• Designing mitigation measures;</li> <li>• Preparing a Resettlement Plan (RP), as needed;</li> <li>• Preparing an Emergency Plan;</li> <li>• Preparing an Environmental Management Plan (EMP);</li> <li>• Preparing a Project Monitoring Program;</li> <li>• Issuing the EIA certificate.</li> </ul> |
| Contract Preparation and Contract Tendering Phase | <ul style="list-style-type: none"> <li>• Integrating environmental considerations in contractual specifications/ conditions to implement environmental management procedures;</li> <li>• Reviewing tenders;</li> <li>• Performing an assessment of the institutional requirements of the EMP;</li> <li>• Strengthening stakeholder institutional capabilities to perform environmental management activities, as required.</li> </ul>  |
| Construction, Supervision, and Monitoring Phase   | <ul style="list-style-type: none"> <li>• Follow-up to ensure that mitigation measures, conditions and specifications are fully implemented during construction;</li> <li>• Monitoring effectiveness of mitigation measures on particular environmental impacts;</li> <li>• Resolving problems as encountered.</li> </ul>   |
| Traffic Operation and Road Maintenance Phase      | <ul style="list-style-type: none"> <li>• Evaluating and implementing remedial measures during road operation;</li> <li>• Conducting consultation with key stakeholders;</li> <li>• Incorporating lessons learned into future road project planning.</li> </ul>   |

### Annex 6: Evaluation Matrix of Impacts for Different Alternatives

| ENVIRONMENTAL RESOURCES | PHYSICAL RESOURCES     |       |                        | ECOLOGICAL RESOURCES |                         |                       | HUMAN AND DEVELOPMENT |                        |                 |       | ECONOMIC           |                            |                            | QUALITY OF LIFE VALUES |                         |           |              |                        |                             |                   |                   |                   |               |                        |                  |                      |                 |  |   |
|-------------------------|------------------------|-------|------------------------|----------------------|-------------------------|-----------------------|-----------------------|------------------------|-----------------|-------|--------------------|----------------------------|----------------------------|------------------------|-------------------------|-----------|--------------|------------------------|-----------------------------|-------------------|-------------------|-------------------|---------------|------------------------|------------------|----------------------|-----------------|--|---|
| PROJECT COMPONENTS      | Reference EIA Sections |       |                        |                      |                         |                       |                       |                        |                 |       |                    |                            |                            |                        |                         |           |              |                        |                             |                   |                   |                   |               |                        |                  |                      |                 |  |   |
|                         | Air                    | Soil  | Water                  |                      |                         |                       |                       |                        |                 |       |                    |                            |                            |                        |                         |           |              |                        |                             |                   |                   |                   |               |                        |                  |                      |                 |  |   |
|                         | Air Quality            | Noise | Erosion/ Sedimentation | Soil Quality         | Surface Water Hydrology | Surface Water Quality | Groundwater Quality   | Terrestrial Vegetation | Aquatic Biology | Fauna | Endangered Species | Population and Communities | Infrastructures Facilities | Industries             | Agricultural Activities | Fisheries | Institutions | Transportation (roads) | Transportation (navigation) | Land use planning | Tourism resources | Economic activity | Public health | Recreational resources | Aesthetic values | Historical treasures | Cultural values |  |   |
| <b>Alternative 1</b>    |                        |       |                        |                      |                         |                       |                       |                        |                 |       |                    |                            |                            |                        |                         |           |              |                        |                             |                   |                   |                   |               |                        |                  |                      |                 |  |   |
| <b>Alternative 2</b>    |                        |       |                        |                      |                         |                       |                       |                        |                 |       |                    |                            |                            |                        |                         |           |              |                        |                             |                   |                   |                   |               |                        |                  |                      |                 |  |   |
| <b>Alternative 3</b>    |                        |       |                        |                      | -                       |                       |                       |                        |                 |       |                    |                            |                            |                        |                         |           |              |                        |                             |                   |                   |                   | -             |                        |                  |                      |                 |  | 1 |

**NOTES:**

- a) Numerical value of 3 means MAJOR IMPACT, 2 INTERMEDIATE and 1 MINOR impact.
- b) Numbers with NEGATIVE SIGN represent NEGATIVE impacts.
- c) Numbers with POSITIVE SIGN represent POSITIVE impacts.
- d) Numbers in PLUS and MINUS SIGNS represent combination of POSITIVE and NEGATIVE impacts.

## **Annex 7: Key Content to be included in the EIA Report**

The EIA report should include:

- a) *who the road will serve – which areas it connects? Does it connect to major city or large administrative centre; major resource like industry or national park or fishery?*
- b) *Estimate of the total annual traffic volume for humans and goods (real or monetary terms);*
- c) *how the local population will benefit e.g. reduced costs and increased efficiency in transport to social centres, increased access to market and information;*
- d) *estimated total number of skilled and unskilled people employed in construction, operation and maintenance of the road and annual indirect jobs (if possible estimate total wages);*
- e) *an estimate of the expenditure to get the project into operation;*
- f) *an estimate of the total population displaced/ re-settled involuntarily and the estimated impact on social stability, community bonding or cultural heritage;*
- g) *an estimate of the total annual expenditure on operation and maintenance;*
- h) *an estimate of the total annual costs incurred or suffered as a result of the road (e.g. total number of accidents, incidences of floods or landslides attributed to the roads, crime cases attributed to the road,..);*
- i) *estimate of the multiplier effect on the local, regional and national economy;*
- j) *estimate of political and socio-cultural returns such as regional integration, reduced local conflicts, directly attributed to the road;*

### **Alternative routes or options**

In the EIA process, before an environmental management plan (EMP) is formulated, the Road Agency and their EIA expert teams should have analysed a series of alternatives and considered a few project alternatives and their likely impacts. This should be carefully documented and presented. Alternatives in project development use a series of permutations – which refer to a combination of factors. Such alternatives are likely to include: *site locations/ routes; land use options; size of roads (breadth, length, surface thickness,..); types of construction materials; source of construction materials; technology to be used in surveying, site preparation and/ or construction; mode or transportation of materials, personnel; housing sites; waste disposal sites; types and/ or source of power, water, other utilities and/ or their supply routes.*

Each of these alternatives should be analysed and scored on pre-set criteria that considers environmental sustainability in relation to other factors including economic viability or benefits, technical feasibility and social/ cultural acceptability.

This is an important piece of information for decision makers because it educates or guides policy makers on how to manage the balance between development and environment.

### **Description of the environment**

The logic here is that before the impacts of a project are estimated, there needs to be thorough understanding of what exists in the pre-project situation. A detailed inventory of biotic and abiotic environment and associated socioeconomic phenomena is important. For road projects, the most important information required is summarized in the proceeding sections:

### **Description of the Biophysical Environment**

Describe the geology and geophysical characteristics:

- Geology and geological formations of the regions, district and project area, and in sufficient detail the geological features – including geological structures, formation and mineralogical characteristics- of the project area right down to sites (routes where the road will pass);
- Surface material and bedrock characteristics of the proposed project area; isolate and categorise overburden material that will be disturbed and which, once disturbed, may adversely affect water quality in the area or neighbourhood;
- Presence of sills and faults that cut across or extend through the planned project area according to the plan/ technical drawings); and alternative route;

**Climate:** Climatic factors are important features in the planning, design and construction of roads and influence the impact of road projects on the area. Detailed information required includes:

- ✓ *a brief and analytical description of the regional and local climate; where possible give recent trends and projections. More specifically,*
- ✓ *mean monthly and annual rainfall for the site and number of days per month with measurable precipitation. For accuracy purposes, indicate the nearest weather station;*
- ✓ *maximum rainfall intensities per month – 60 min, 24 hrs, 24hrs/ 50yr and 24hrs/100 yr storm events for the previous 5-10 years;*
- ✓ *mean monthly, max and mini temperatures for the past 3-5 years;*
- ✓ *monthly mean wind direction and speed – where appropriate hourly wind direction and speed, with the maximum one minute speed in each hour for the past 3-5 years may be required. If this is hard to get for the specific area, extrapolate from the nearby station;*
- ✓ *mean monthly evaporation for the previous 5 years;*
- ✓ *record of incidences of extreme weather conditions – e.g. hail, severe or prolonged drought, high winds, volcanic eruptions or massive landslides, extraordinary heavy rainfall or flooding, for the previous 5 years.*

The data from the weather stations may be supplemented by collecting data from communities using techniques such as historical profiling which documents historical events. It is essential that precipitation, temperature and other climatic parameters be presented in form of maps and showing comparisons with other areas of the country.

**Topography:** The most suitable representation of the topography is the topographical map of the area. This should be current and to appropriate scale. A range of scales

should be used depending on the size of the area to be mapped. Scales of 1: 10,000 and 1: 100,000 (for comparison with national level, may be appropriate. Surface contours should be delineated to appropriate intervals and describe topographic patterns and landforms with regard to parameters such as elevation, relief and aspect (slope orientation/direction).

**Soil characteristics:** A description of the soil types to be disturbed by the road project, their fertility, erodibility and depth should be provided and the soils should be mapped according to a recognized soil classification system.

### **Land capability and land use before the road project**

*Land capability:* Inventories and evaluations of land capabilities in the proposed area (all land where expropriation is expected for purposes of the road project). For the various land capabilities described, document the area and location of the capacity classes to be disturbed by the project.

*Land use within 100 Km (i.e. 50 Km on either side) of the proposed road. Please attach the plan or technical drawings and the map:*

- Pre-road design land use;
- Historical production of agriculture, forestry, mining, conservation;
- historical pattern of settlements (although these could appear in the socioeconomic component – just describe the building structures as land use/cover);
- any evidence of misuse e.g. overexploitation, extensive deforestation, abandonment,...;
- existing structures;

*Likely post-project land use capability:* record any anticipation of land use change;

**Ecology:** the natural vegetation/ plant life within 100 Km (50 Km on either side) of the proposed road area. Please, not the level of diversity. This should include: *dominant species; endangered, rare or threatened species; exotic or invasive species and how they were introduced. Indicate the location and documentation of the area of the various vegetation and forest types that is likely to be directly or indirectly disturbed by the road project.* It may be important to prepare and submit a vegetation map for the pre-project area.

**Wildlife resources:** include parameters as species composition, distribution, abundance; *Rare, endangered or threatened species; migration route and staging areas; Habitat evaluation, distribution and utilization; critical habitat; regional and local significance of populations; Sensitivity to disturbance.*

Document the type, location, quantity/ numbers and capability of habitat (carrying capacity) that is likely to be disturbed or lost as a result of the project.

**Water resources:** All water catchment and water courses, streams, rivers and dams; Pans; Position of the estimated maximum flood-line for the 1 in 50 year flood event; Water rights and water use in the affected area. The scope should be up to the point where the affected catchment discharges into the receiving water body. This description should include:

- i) *A map indicating the catchment boundaries, boundaries of the sub-catchment occupied by the proposed road and the water course which would be followed by water emanating or passing through or under the road or including other water courses likely to be affected).*
- ii) *The mean annual runoff from the catchment upstream, of the point of discharge to the receiving water body and from the sub-catchment upstream (side) of the road.*
- iii) *Normal dry weather flow in the affected watercourse.*
- iv) *Floods peaks and volumes for recurrence intervals of 1:20 and 1: 50 years and the regional maximum flood.*
- v) *For river diversions only.*

In addition, an estimate of the contribution of the mean annual runoff normally entering the river over the affected section and the total mean annual runoff entering upstream of the proposed diversion.

**Surface water quality:** an analysis of surface water samples must be done in sufficient detail to characterize the water quality in the affected water course(s);

**Drainage density of areas to be disturbed/ affected:** make a record in Kilometres of drainage path per square Kilometre of land area.

**Surface water use:** identify who uses the surface water along the affected water courses, down to the receiving water body, for what purpose and how much in cubic metres per day.

**Ground Water:** information required includes:

- *Depth of the water table(s);*
- *Presence of water boreholes and springs and their estimated yields;*
- *Ground water quality – the EIA experts must analyse water in boreholes and springs in the affected zone so as to be able to characterise the water quality;*
- *Ground water use- identify, where possible, ground water and spring water users in the study area and the quantities used;*
- *Ground water zone - Identify the groundwater zone which is likely to be affected the construction or operation of the road. Its importance as national, regional or international resource (e.g. where transboundary water resources are affected) should be described. If available, maps at appropriate scales should be provided indicating the ground water zone boundaries. Stratigraphic sections, in sufficient detail to indicate the conceptual ground water model, the nature and location of significant aquifers and aquacultures and relevant physical properties, should be provided.*

Where construction of bridges and roads is likely to result in river diversion, the EIA report should provide an estimate of the contribution of the stream or river to ground water recharge and an estimate of the contribution of ground water to surface water over the diverted section.

**Wetlands:** information that should be documented include location of wetlands on, along, around or in position to the road; the extent thereof and an indication of the significance in terms of ecological functioning and socioeconomic services; the biodiversity of the wetlands.

**Air Quality:** A survey of the air quality and existing sources of air pollution in the area should be made including fallout dust, suspended dust and gaseous emissions (only if the project include a scheduled process as defined in the relevant provisions of Environmental laws).

**Noise and Vibration:** Existing noise levels on and around the property should be identified as well as potential noise impact sites. If the potential impacts warrant it, pre-road construction noise levels may be required. Similar exercises should be done for vibration.

**Archaeological and Cultural Aspects:** The EIA team needs to:

- conduct a baseline survey to identify and describe archaeological sites in the study area;
- examine monuments and site records held by National Museums of Rwanda, Monuments (in Huye and elsewhere), Art Galleries and other areas with custody of historical records;
- document and provide sites of recognised archaeological and cultural interest should be described and shown on a plan, which should could be provided.

**Sensitive Landscapes and Protected Areas:** Sensitive landscapes should be described and if possible, should be indicated on the technical drawings and how they will be protected. Indicate which ones have statutory protection (by local byelaws or national legislation).

**Visual Aspects:** Describe the visibility of the project site from scenic views, tourist routes and existing residential areas. This should include the visibility of dust and other air-borne pollutants.

**Local socioeconomic and cultural characteristics:** *Include, social and economic infrastructure; people and their and cultures and norms; and the governance features;*

- population density, growth and location;
- unemployment estimate for the area
- housing- demand, availability
- Social infrastructure – schools, hospitals, sporting and recreational facilities, shops, police, civil administration
- Water supply/ distribution, access and use
- Power supply
- Telecommunication lines/ use
- demographic and human settlement patterns
- describe old and current road networks, including closed roads and their categories and when they were constructed and de-commissioned;

### **Description of the Project Alternatives**

This section identifies potential alternatives and selects the most optimal alternative(s). Multi-criteria analysis (MCA) may be used to identify, score and rank alternatives in a feasibility study. The feasibility study phase of the project cycle is, thus very important for environmental assessment. Analysis of alternatives very often involves comparing impacts that are not easily quantifiable and/ or those that vary in time and space. Some qualitative measures for analysing biophysical and socio-economic parameters that represent visual or other forms of expressing relative magnitudes may be used e.g., histograms that vary in size or relative scores. A common method is weighting and ranking of the impacts (based on stakeholder

perceptions) and then aggregate the resulting scores. Each alternative is then compared on the basis of a single overall measure of impacts.

**Proposed Activities and Developments at different levels**

The proposed major surface infrastructure required for the road project should be described briefly and illustrated clearly on a topographical map or technical drawings.

This should include:

- 1) Other infrastructure e.g. electric power lines, industries, housing, recreation facilities;
- 2) Waterways, drainage systems (whether natural or man-made) and water pollution management systems; pollution control dams, etc;
- 3) Industrial, municipal and other waste disposal sites (landfills, mine residue disposal sites);
- 4) Production facilities such as mining plant (and direction of location, level and machinery);
- 5) Sources of water, earth/ soil, stones, sand and other local materials; indicate how pollution of existing natural water sources would be prevented and information on water balance;
- 6) On-site project offices (administration) and workshops (Project ,
- 7) Disturbance of water courses: detail how the road layout will disturb the natural water courses. Indicate measures for storm water diversion and how it will protect the road and other infrastructure e.g. residential houses.



## Annex 8: Format of a typical EMP

An **Emergency Plan** describing any actions foreseen in case of accidents or emergencies and mechanisms to sound the alarm should be included. This emergency plan should, in general, include:

- A description of the different potential situations;
- Pertinent information in case of emergency (e.g. coordinates 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,
- Deviation of the traffic, road signs, and methods of evacuation); Methods to update and reassess the emergency measures.

**Operational and Maintenance Phase:** Operation here implies the period during which the road is open to traffic. The EMP should describe how the significant impacts, identified in construction phase, will be managed during the period when the road is in use, including what will be done to manage the traffic when undertaking minor repairs. The checklist below should provide the guide:

1. Geology of the area and surrounding parts.
2. Topography: here, a plan of anticipated post-road construction (during operational phase) topography is required.
3. Soils: include depth of soil that will be used and how fertility and erosion will be managed;
4. Land capability: indicate anticipated land capability during post-construction/ operational phase, and a plan to restore or improve land capability;
5. Land use: Include what type of land use is planned.
6. Natural vegetation/ plant life;
7. Animal life: For river diversions, the EIA team should emphasise how aquatic fauna life will be maintained or restored;
8. **Surface water:** water is a known enemy/ destroyer of infrastructure and very often construction work tends to divert or block natural water flow. Indicate the strategies for managing the following:
  - i) water balance previously described in parts 3 and 4;
  - ii) storm water
  - iii) surface rehabilitation (in so far as this affects surface water);
  - iv) the legitimate requirements of surface water users on the affected watercourse;
  - v) In the case of river or stream flow diversions, the EMP should indicate how the significant impacts identified in parts 3 and 4 will be managed paying particular attention to erosion control, structural stability and surface drainage into and out of the diverted section.

9. **Ground water:** the EMP should: i) indicate the strategies to be undertaken for:

- i) Optimising surface rehabilitation in order to minimise adverse groundwater impacts;

ii) Meeting the requirements of legitimate ground water users in the affected zone.

iii) In case of river or stream diversions, the control of seepage into and out of the diverted sections of the river or streams should be highlighted;

**10. Air quality:** Include an air pollution control plan if the assessment reveals significant impacts on air quality at potential impact sites (e.g. where the road passes through a busy commercial centre).

**11. Noise:** Include a noise reduction plan if significant impacts are expected at any parts of the road (e.g. junctions), highways may require noise screen, etc.

12. Sensitive landscapes;

13. Visual aspects;

14. Regional socioeconomic structure

15. Who and where are interested and affected parties

16. Submission of information: The proponent will determine which information is required by statutory instruments before submission.

17. **Maintenance:** some of the measures described in this part will require maintenance after they have been implemented and up to the decommissioning period. Again, this will be site-specific but the proponent should consider where appropriate, the maintenance of at least the following:

a. Rehabilitated land by planting trees, stabilising vegetation on slopes and exposed surfaces. Ensure that use of herbicides and other polluting substances is prohibited.

b. Water pollution control structures - maintaining flow-speed-reduction devices in drains, and remove waste materials;

c. Rehabilitated residue deposits;

d. Bridges and destroyed infrastructure along the road;

18. Climate- including temperature, precipitation, humidity;

**In general**, the most critical project elements to be monitored include:

- Implementation and effectiveness of erosion and sedimentation control measures (e.g. re-planting of vegetation in disturbed areas or erodible areas);
- Water management issues (e.g., water logging, flooding, and drainage issues);
- Waste disposal issues (e.g., used oil, old tyres, and scrap metal, and the management of liquid and solid wastes from construction camps);
- Management and reclamation of excavation pits and quarries;
- Social impacts (e.g., related to compensation issues, resource use conflicts, and communicable diseases);
- Road safety (e.g., accidents and accident risks during construction);
- Occupational health and safety (e.g., the safe handling, and storage of materials and safe operating procedures). Occupational health and safety risks could be minimized by defining procedures for handling materials, conducting tests, paving, operating heavy equipment, and constructing trenches.
- Timely maintenance to prevent/ minimize road degradation, flooding, road accidents, traffic noise, and landscape degradation;

**Monitoring** by the Authority and the Roads Agency during construction is important, to ensure strict compliance with contract specifications. The construction site should receive the most attention, but other sites and associated activities must also be considered, such as: *Source of water supply; Construction base camp; Quarry and mineral extraction sites; Spoil deposit sites; Asphalt mixing plant and cement batching plant; Construction traffic between all sites; and Occupational health and safety.*

**Decommissioning phase:** This part should briefly describe when and how the road will be decommissioned. Every effort should be made during the life of the road to minimise the cost and amount of work required in this phase. *And for a particular road project, what decommissioning means (is it complete and permanent closure; temporary closure for reconstruction or part closure/ limited use for rehabilitation).* The proponent or their EIA experts should address the management of potentially significant impacts identified in earlier project phases. The outline should include:

- 1) What are the closure objectives? In the rare situation, a road could be closed or redesigned due to developments e.g. population density suddenly increases and a highway is considered risky and unsuitable in an area. Indicate if this was/wasn't anticipated;
- 2) Infrastructures areas – demolition or disposal of structures, buildings and bridges, removal of foundations and debris and rehabilitation of the surface subject to the Environmental Law and other relevant legislations at the time.
- 3) Mines, oils and other material residues deposited in the area
- 4) Sealing of underground workings and rehabilitation of dangerous excavations
- 5) Rehabilitation of access roads, bridges, ramps, and restoration of water ways, opening of barricades, etc.
- 6) Submission of information
- 7) Maintenance – of aspects of the decommissioned site requires maintenance up to the time that closure is approved, these should be described as well.

## Annex 9. Key Institutions in EIA for Road Development Projects in Rwanda

|    | Institution/ Agency   | Key interests and responsibilities  |
|----|---|---|
| 1  | Ministry of Infrastructures (MININFRA)                                    | Formulating policies, laws and standards for roads development in the country. Is also responsible for national roads, highways and bridges and overseeing local roads development.   |
| 2  | Road Maintenance Fund ( <i>Font d'Entretien Routier</i> (FER))            | Mobilising financing and technical resources for regular maintenance of highways and other national roads. Ensuring that road infrastructures are maintained to the required standards through proper procurement.  |
| 3  | Rwanda Transport Board (RTB)  | Oversees the implementation of the transport policy, including management of roads; initiating public investment in transport services like licensing of public transport service providers; rail, water and air transport.   |
| 4  | Ministry of Natural Resources (MINIRENA)                                  | Formulating policies, laws and standards for land administration and land use planning; environmental protection and natural resources utilisation. In roads development, a major responsibility is to determine compensation and provide land for re-settlement of displaced people.               |
| 5  | Ministry of Local Government (MINALOC).                                   | National policies and laws on decentralisation and local governance – supervising local government authorities which are responsible for district, local and community roads.   |
| 6  | Rwanda Environmental Management Authority (REMA)                          | National authority responsible for environmental regulations and standards setting, and overseeing the implementation of EIA guidelines. REMA will also be responsible for mobilising, educating and sensitising stakeholders to follow or participate in the implementation of the EIA guidelines. |
| 7  | Ministry of Commerce, Trade, Industry, Cooperatives and Tourism (MINICOM) | Policies and laws relating to licensing of commercial and industrial activities including premises.   |
| 8  | City Council of Kigali  | Responsible for design and implementation of all urban infrastructures in the city, including inter-district roads; Providing and enforcing guidelines for construction work within the city of Kigali city.  |
| 9  | District Local Governments  | Districts are responsible for planning and execution of road construction and maintenance within the district,  |
| 10 | Rwanda Bureau of Standards (RBS)  | Imposition of regulations and standards on public utilities associated with housing/ building i.e. water, electricity, and telecommunications. This includes the quality of service provision including tariff setting.   |
| 11 | National Land Centre (NLC)  | Land registration and land use planning throughout the country. Compensation and resettlement will depend on legal ownership.   |
| 12 | Electrogaz  | National agency responsible for provision of water and electricity utilities. In road development, Electrogaz' major stake in roads   |

|    |   |  |
|----|---|--|
|    |   | development is servicing road construction with water and power. It also has a major stake to reach its facilities.  |
|    | Rwanda Investment and Export Promotion Agency (RIEPA)   | Investment advisory and support especially for construction companies, but is also interested in roads a major infrastructure in attracting investors.   |
|    | Rwanda National Police  | The National police have statutory responsibility for law enforcement including ensuring that road traffic laws are observed; and therefore all roads are constructed in conform to appropriate legislations. They also have to provide security to road construction facilities.                |
|    | Private Sector Federation   | Mobilising and sensitising members involved in the construction and real estate sector to appreciate and follow the Housing EIA guidelines.  |
| 13 | Common Development Fund (CDF)   | Basket Fund for local development projects including roads, markets and other infrastructures. It's managed under the Ministry of Local Government.  |
|    | ASSETP (Public Works Contract Management Agency)  | Planning, design and supervision of roads and other large scale infrastructures.   |
|    | PIGU, Projet d'Infrastructure et de gestion urbain)   | World Bank-funded Project developing institutional capacity and supporting physical investments in the planning and construction of urban roads and drainage infrastructure in Kigali city and other selected urban areas. The project has, among others, provided some training in SEA and EIA. |
|    | Travaux des Interets General (TIG) Secretariat  | TIG refers to Community Work as Alternative to Imprisonment  |
|    | Major Road Construction companies   | Service providers/ contractors who undertake actual construction and/ or deal in real estate. These are the direct implementers of the laws & regulations/ guidelines relating housing EIA.  |
| 14 | Civil society (including Private sector & NGOs)   | Civil society and interested private entities have advocacy roles to ensure that all actors follow the housing EIA guidelines and other building best practices.   |
| 15 | International Financing Agencies (especially the European Union, World Bank & African Development Bank) | Loan and grant financing for road construction. These have their own EIA procedures and guidelines but they need to be compatible with national guidelines and regulations.  |

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