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EUCL
ENERGY UTILITY CORPORATION LIMITED

Rwanda Electricity Sector Strengthening Project (RESSP)

FINAL REPORT

CONTRACTOR ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP) FOR CONSTRUCTION AND REHABILITATION OF 11 SUBSTATIONS IN KIGALI CITY.

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EA	Environmental Audit
EDCL	Energy Development Corporation Limited
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EUCL	Energy Utility Corporation Limited
EARP	Electricity Access Roll-Out Program
IAPs	Interested and Affected Parties
IDA	International Development Association
LV	Low Voltage
MV	Medium Voltage
MINELA	Ministry of Environment
MININFRA	Ministry of Infrastructures
NDF	Nordic Development Fund
PPE	Personal Protective Equipment
PAPs	Project Affected Persons
RPF	Resettlement Policy Framework
REMA	Rwanda Environment Management Authority
KCC	Kigali City Council
REG	Rwanda Energy Group
WB	World Bank

CHAP 1. BACKGROUND

The Government of Rwanda, in its effort to sustain economic growth, has increased and stabilized the power production and distribution, hence reducing power shortages. The Government of Rwanda (GoR) also exercises a strong leadership role in donor coordination and has begun to work with donors on a clearer division of labour by identifying areas of individual donor comparative advantage. In connection with the mentioned strategy, the Government of Rwanda through Energy Utility Corporation Limited (EUCL) has embarked on a country-wide electricity distribution to realize the primary EDPRS target.

Due to the fast load growth and development of new infrastructures like building in Kigali City, the existing City electrical network has grown out of supply capacity. There is also no facility for remote switching of these substations, as they have manually operated linked switches, some without fuse. This causes longer down times before power can be restored.

The World Bank as a main donor founded the RESSP with the objective of increasing Access to Electricity Sector with an aim to improve the performance of the electricity sector institution. On the project, it is proposed to upgrade the 15KV Network in Kigali (Supply overheard lines and underground cables, rehabilitation, construction and upgrade of new or existing substations). However, those activities request an Environment, Social Impact Assessment (ESIA), where born this site specific ESMP for the component of construction, rehabilitation and upgrading of 11 substations of Kigali central network and proposed competent mitigation measures appropriate before project implementation. Actually, the project in on phase of construction of Substation/Cabins around Kigali City. Some are finished, others are ongoing and others are not constructed but the preparation of construction are planned.

Various development partners so far committed to support the program including World Bank, World Bank IDA, World Bank GEF/ESMAP CEIF, BADEA, OFID, Saudi Funds, Netherlands, Japan, and others.

This Environmental and Social Management Plan has been reviewed by the supervision firm (SABA Engineering) in order to fulfill the requirements of the World Bank while at the same time it satisfies the host government (Rwanda) regulations regarding Environmental Assessment and Management (EA&M) as stipulated in the Organic Law that established the Rwanda Environment Management Authority (REMA).

1.1 Objectives of the ESMP

The Environmental and Social Management Plan aims to bring the project into compliance with the Rwanda *organic law 04/2005 of 08/04/2005* determining the modalities of protection, conservation and promotion of the environment in Rwanda and the World Bank"s environmental and social operation policies.

Other objectives of the ESMP can be classified under into two categories which are:

1.1.1. Immediate objectives of ESMP

The immediate objectives of the Environmental and Social Management Plan are to:

- Improve the environmental design of the proposed projects;
- Ensure that resources are used appropriately and efficiently;

- Identify appropriate measures for mitigating the potential impacts of the proposed projects
- Identify potential negative and positive environmental impacts of the different alternatives considered.
- Facilitate informed decision making, including setting the environmental terms and conditions for implementing the projects.
- Prepare an environmental management plan (EMP) which includes: a mitigation program, monitoring plan, program of technical assistance; and describes institutional arrangements for the proposed project components

1.1.2. Long term objectives of ESMP:

The long term objectives of the Environmental and Social Management Plan are to:

- Protect human health and safety;
- Avoid irreversible changes and serious damage to the environment;
- Safeguard valued resources, natural areas and ecosystem components and
- Enhance the social aspects of the proposed projects

In addition to the above mentioned objectives, some benefits shall emanate from the ESMP. Those benefits are that it:

- Pro-actively informs the development of the project components;

- Identifies the opportunities and constraints which the environment places on development;
- Provides mitigation measures to ensure that development is within sustainable

1.2 Scope and methodology

1.2.1. Methodology

The following methodologies for collecting baseline information for the project components have been formulated on the basis of:

- Relevant documents, including guidelines of the Rwandan land administration, resettlement, cultural and environment sectors; WB directives, guidelines and other documents; relevant federal, regional and local legislation, policy and papers
- Available EUCL/RESSP preliminary designs, survey plans (complete with exact location of substation construction).
- The assessment also makes use of the socio-economic information collected during field visit,

Collection of baseline information relied on both primary and secondary sources, and included an environmental factors survey for discussion with few selected samples of local residents and project affected persons (PAPs) who have knowledge of the local ecosystem and its exploitation by traditional methods.

1.2.2 Baseline Assessment

Baseline data was first collected from secondary data however before undertaking field work to collect primary data. Data collected included information on; physical environment: geology; topography; soils;

climate and meteorology; surface and ground water hydrology; biological environment: flora; fauna; rare or endangered species; sensitive habitats, including significant natural sites etc.; species of commercial importance; species with potential to become nuisances, vectors or dangerous and socio-cultural environment: population, land use; planned development activities; community structure; employment; distribution of income, goods and services; recreation; public health and safety.

1.2.3 Project Alternatives

The assessment analysed the various project alternatives available to achieve this project"s objectives but with the least adverse environmental impacts. The alternatives considered included project site selection, alternative technology and the "No Project" alternative.

1.2.4 Public Consultation

During the scoping process, discussions were held with the identified Interested and Affected Parties (I&AP) to the project, local authorities and government authorities to seek for their views. It helped understand some socio-economic and environmental concerns and impacts that could arise from the project and was instrumental in helping to come up with feasible mitigation measures.

1.2.5 Impact Prediction and Evaluation

Various methods and techniques were applied in impact identification, prediction and evaluation. The assessment identified and analysed potential impacts linking these with specific project activities and phase. First the task was to consider both positive and negative impacts of the project. While considering the impacts, the study examined them in light of their characteristics i.e. nature (positive or negative), extent (spatial), occurrence (one-off, intermitted or constant), magnitude, whether reversible or irreversible, direct or indirect, probability of occurrence and significance with and without mitigation.

1.3. PROJECT DESCRIPTION

The project description consists of:

Table 1: Project Components and capacity

Components	Capacity
Procurement and Installation Work	
1. **15kv substations (upgrade 11cabins and SCADA)**	
(a) 20 MVA 15 KV/400 Transformers	2 units
(b) 15kV switchgear	11 set
(c) Control and supervisory facilities	11 set
Procurement Work	
2. Communication and protection Equipment of the Project	1 lot
3. Spare Parts for the Equipment of the Project	1 lot
Construction Work	
4. Foundation for the Equipment of the Project	1 lot
5. Building of the Project substations (some will be built others	11 building

upgrade and others will not change)	

Table 1:Project Components and capacity

1.3.1 Consideration of Alternatives

The selected line routes, location of substations was the most feasible in light of the existing electricity network in the area, most direct line of route, least expropriation effects and the positive project benefits. The alternative of "no-build" is not appealing since electricity is included as a measure of development in these urban areas and therefore is always given high priority in the list of developmental activities for Rwanda. While there will be no high environmental cost from these alternatives, with increasing population the demand for electricity connection increases and hence less power if these new networks are not constructed.

In conclusion, given the nature and location of the project, the potential impacts associated with the proposed electrification project development are of a nature and extent that can be reduced, limited and eliminated by the application of appropriate mitigation measures. Therefore, the compliance with the proposed mitigation measures and regular monitoring done as per this Environmental Management and Monitoring Plan (ESMP), the construction of substations is guaranteed to be performed in a sustainably effective style.

1.3.2 PROJECT OBJECTIVES

The main objective of the project being the increased electricity supply in Rwanda and upgrade 15kv distribution network particularly, Kigali City. This specific subproject is relaying to the following specific objective:

- To construction and/or rehabilitation and upgrading of 11 Cabins/Substations within the
- existing central Kigali city network as a supportive section to the rehabilitation of distribution network to be done in parallel with this one. (Another subproject)

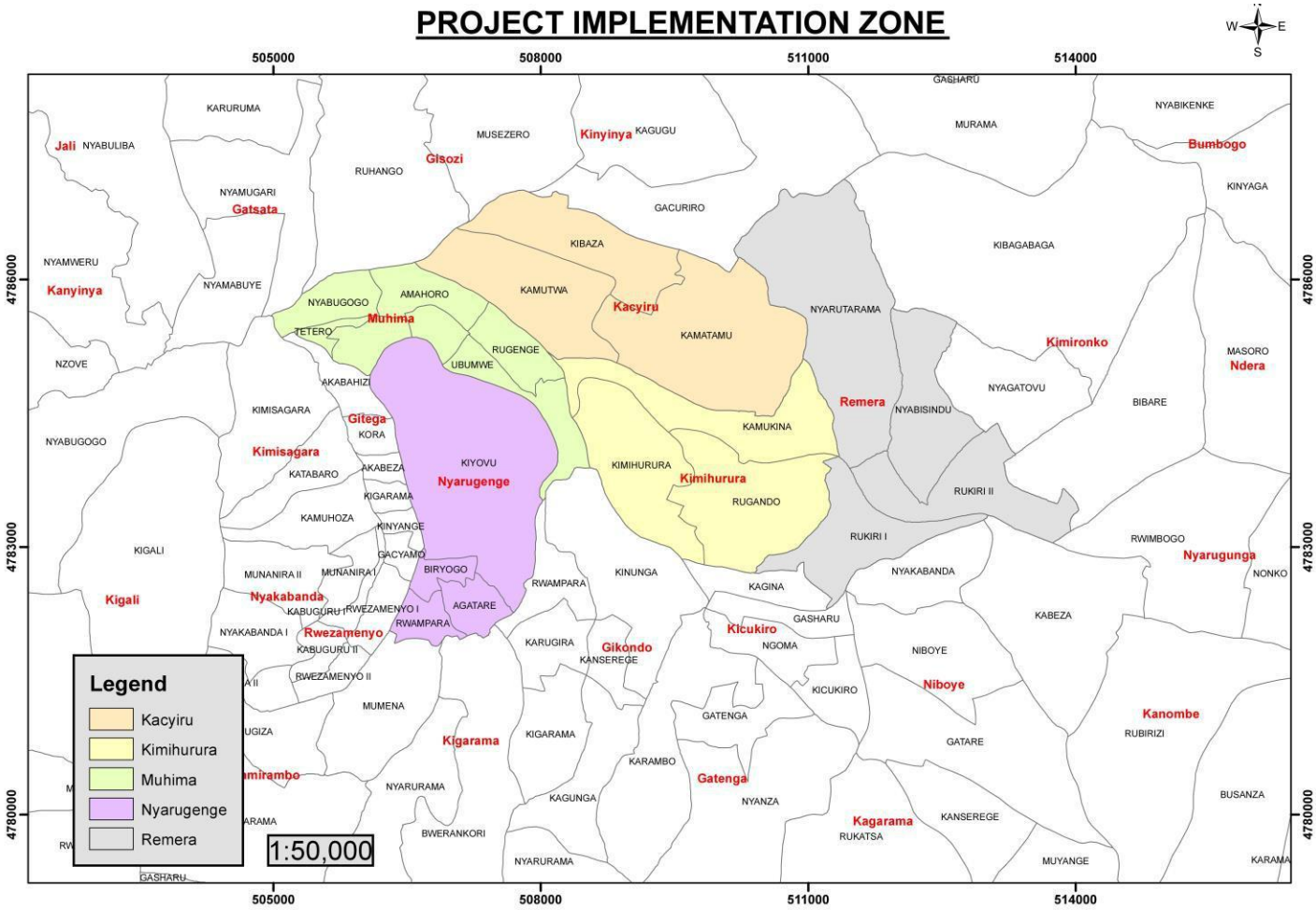
1.3.3 JUSTIFICATION

Justification for the proposal of this project can be discussed on the following terms:

i. The 15kV Strengthening Kigali networks were proposed to increase on the amount of power supplied to the Kigali Down Town.
ii. Upgrade and construct electricity substation in Kigali City was proposed to reduce on the strain on the existing line from KBC supplying to Christus supply and from Gikondo supply to Karamira supply , which currently has low voltage capacity.

In general, the purpose of the project is to increase amounts of power supplied to urban areas of Remera, Gikondo, Kacyiru and Nyarugenge in Kicukiro, Gasabo and Nyarugenge Districts.

Project implementation zone (Gikondo, Kacyiru, Kimihurura, Remera Muhima, and Nyarugenge Sectors of Kicukiro, Gasabo and Nyarugenge districts respectively)



Figur 1: Project implementation zone (Gikondo, Kacyiru, Kimihurura, Remera Muhima, and Nyarugenge Sectors of Kicukiro, Gasabo and Nyarugenge districts respectively)

1.3.4 PROJECT LOCATION

The Project area is located in **Gasabo**, **Nyarugenge**, and **Kicukiro** Districts of Kigali City. The following specific sectors and cells are covering present project component

Table 2: Project Administrative location in Kigali City.

Sectors	Cells
Remera	Nyarutarama
	Nyabisindu
Gikondo	Kinunga
Nyarugenge	Kiyovu
Kimihurura	Rugando
	Kamukina
	Kimihurura
Muhima	Ubumwe
	Rugenge

	Amahoro
Kacyiru	Kamatamu
	Kibaza

This project aiming strengthening distribution network expansion and provide sufficient capacity meet increased demand from new economic activities. Kigali city and its environment constitute the biggest load center in Rwanda currently consuming about 57 per cent of the total energy supplied to the national grid.
EUCL hired NR Electric Co.Ltd which is a Chinese Company specialized in design and manufactures electric protection and control systems for electric power generation, transmission, distribution and industrial customers worldwide. The company provides integrated secondary systems, protection and control, automation, substation, power stability control, measurement, recording and software hot product.

CHAP 2 : POLICY, LEGAL AND REGULATORY FRAMEWORK

2.1. Legislative and policy framework for environmental assessment in Rwanda

2.1.1 Constitution of the Republic of Rwanda

In consideration of the Constitution of the Republic of Rwanda of June 4, 2003 as amended to date, article 49 states that every citizen is entitled to a healthy and satisfying environment. Every person has the duty to protect, safeguard and promote the environment. The state shall protect the environment. The law determines the modalities for protecting, safeguarding and promoting the environment.

2.1.2 Rwanda Vision 2020

The vision 2020 of Rwanda gives strategic actions and inter alia institutes the principle of precaution to mitigate the negative effects caused to the environment by the socio-economic activities, to institute the "polluter pays" principle as well as preventive and penal measures to ensure the safeguard of the environment and to require the environmental impact study of any development project.

2.1.3 National Environmental Policy (NEP)

The overall objective of the Environmental Policy is the improvement of man"s wellbeing, the judicious utilization of natural resources and the protection and rational management of ecosystems for a sustainable and fair development.

The Policy seeks to achieve this through the following objectives:

i. To improve the health and the quality of life for every citizen and promote sustainable socio-economic development through a rational management and utilization of resources and environment;
ii. To integrate environmental aspects into all the development policies, planning and in all activities carried out at the national, provincial and local level, with the full participation of the population;
iii. To conserve, preserve and restore ecosystems and maintain ecological and systems functioning, which are life supports, particularly the conservation of national biological diversity;
iv. Optimum utilization of resources and attain a sustainable level of consumption of resources;
v. To create awareness among the public to understand and appreciate the relationship between environment and development;
vi. To ensure the participation of individuals and the community in the activities for the improvement of environment with special attention to women and the youth and
vii. To ensure the meeting of the basic needs of today"s population and those of future generations.

2.1.4 National Environmental Law

The Organic Law n° 04/2005 o f 08/04/2005 determining modalities of protection, conservation and promotion of environment in Rwanda regulates the Environmental impact Assessments. In its article 67: Every project shall be subjected to environmental impact assessment, before obtaining authorization for its implementation. This applies to programmes and policies that may affect the environment. Article 68 specifies the main points that an Environmental Impact Assessment must include. Article 69 stipulates that the environmental impact assessment shall be examined and approved by the Rwanda Environmental Management Authority or any other person given a written authorization by the Authority.

The environment impact assessment shall be carried out at the expense of the promoter. Article 70 states that an order of the Minister having environment in his attributions establishes the list of projects for which the public administration shall not warrant any authorization without an Environmental Impact Assessment describing direct and indirect consequences of the project to the environment.

2.1.5 Law N° 18/2007 of 19/04/2007 relating to expropriation in the public interest

The law defines the activities or projects that can be classified as public interest and process and requirements for expropriation activities as well as the cost for goods and other infrastructure to be expropriated. The law provides a window for appeal for somebody who is not satisfied by the cost of compensation.

2.1.6 Environmental Impact Assessment Regulations, 2006

REMA has now developed the EIA regulations which provide a guide and requirements for EIA in Rwanda. According to these new regulations, Article 1 makes it mandatory for all the projects listed under schedule I to be subjected to a full-scale EIA.

The Article further states that no environmental authorization shall be granted by the Authority for any project in Schedule I to these Regulations if no environmental impact assessment has been submitted to the Authority in accordance with the provisions of these Regulations. The Article states that any project listed under Impact Level III of Schedule I to these Regulations shall require a full environmental impact assessment by preparation of an environmental impact report, unless the Authority refuses permission.

2.1.7 Ministerial order N° 003/2008 of 15/08/2008 relating to the requirements and procedure for Environmental Impact Assessment

Article 1 stipulates that Environmental Impact study is a systematic way of identifying environmental, social and economic impacts of a project before a decision of its acceptance is made. In article 3, the developer submits an official application which includes a project brief of the proposed project to the authority. Article 4 specifies that within thirty (30) calendar days after receipt of the project brief and after its analysis, the Authority shall submit the Terms of reference to the developer for the Environmental impact study.

2.1.8 Energy Policy

The national policy goal is to meet the energy challenges and needs of the Rwandan population for economic and social development in an environmentally sound and sustainable manner.

Since 1994, the energy sector as well as the overall economy has gone through structural modifications, where the role of the Government has changed, markets have been liberalised and private sector initiatives encouraged. Hence, the energy policy document has to take into account structural changes in the economy and political transformations at national and international levels.

The national policy objective for the development of the energy sector is to provide an input in the development process by establishing an efficient energy production, procurement, transportation, distribution, and end-user systems in an environmentally sound manner.

The Energy Policy, therefore, focuses on market mechanisms and means to reach the objective, and achieve an efficient energy sector with a balance between national and commercial interests.

An interactive and participatory process between Government, other stakeholders and relevant groups has been necessary as part of the formulation process in order to incorporate views of market actors and energy consumers to address the complex nature of the sector.

Specifically, the energy policy takes into consideration the need to:

(a) Have affordable and reliable energy supplies country wide;
(b) Reform the market for energy services and establishes an adequate institutional framework, which facilitates investment, expansion of services, efficient pricing mechanisms and other financial incentives;
(c) Enhance the development and utilisation of indigenous and renewable energy sources and technologies,
(d) Adequately take into account environmental considerations for all energy activities,
(e) Increase energy efficiency and conservation in all sectors; and
(f) Increase energy education and build gender-balanced capacity in energy planning, implementation and monitoring.

Domestic energy demand has grown rapidly due to population growth and the increase in economic activities especially during the last ten years

The vision of the energy sector is to effectively contribute to the growth of the national economy and thereby improve the standard of living for the entire nation in a sustainable and environmentally sound manner. The mission of the energy sector is to create conditions for the provision of safe, reliable, efficient, cost-effective and environmentally appropriate energy services to all sectors on a sustainable basis. By fulfilling its vision and mission, the energy sector will contribute to social economic development, and in the long-term framework, poverty reduction.

The national energy policy objectives are to ensure availability of reliable and affordable energy supplies and their use in a rational and sustainable manner in order to support national development goals. The national energy policy, therefore, aims to establish an efficient energy production, procurement, transportation, distribution and end-use systems in an environmentally sound and sustainable manner.

Short and medium term priority policy actions

The priority for Rwanda is to implement projects now, to overcome the current electricity crisis, to prevent the next electricity crisis, to tackle proactively the wood crisis, to begin to provide greater access to modern energy and to reduce reliance on petroleum products due to the oil price crisis. Without implementation further capacity building and studies will have no value.

The management and institutional capacity has to continue to progress if these projects are to be delivered effectively and efficiently. This will require further external support and guidance.

Several policy actions will be implemented in order to achieve the broad and specific objectives of this energy policy. Strategic financial interventions required to move forward the policy priority actions are indicated alongside the proposed actions.

Below are the priority policy actions:

- Meet the crisis of blackouts caused by delayed investment and drought
- Provide economic power by developing the use of Lake Kivu methane, and by bringing on line more hydro power.
- Enhance overall electrical infrastructure to meet demand growth and supply quality needs – generation, transmission and major distribution construction and rehabilitation.
- Deliver a programme of rural electrification on the basis of enhanced distribution networks, micro hydro, and solar power.
- Implement a wood and charcoal efficiency and substitution strategy to counter the deforestation crisis.
- Continue steady progress to a viable electricity and gas sector, consistent with meeting social needs.
- Commence utilisation of Kivu gas for other than power generation.

2.1.9 Land Policy

Apart from a few scattered land regulations, most of which date back to the colonial period, Rwanda has never had a proper land policy nor has it ever had a land law, a situation that enhances the existing duality between the very restrictive written law and the widely practised customary law, giving rise to insecurity, instability and precariousness of land tenure.

The Rwandan Government, therefore, found it compelling and necessary to establish a national land policy that would guarantee a safe and stable form of land tenure, and bring about a rational and planned use of land while ensuring sound land management and an efficient land administration.

The following are the main obstacles that hinder the efficient management of land in Rwanda, necessitating the establishment of a national land policy that would guide the essential land reforms:

- Strong pressure on the already spatially limited land resources by a rapidly growing population;
- Domination of the agricultural sector which lacks any specialization in terms of human resources and equipment, and lack of alternative concrete and realistic options that would reduce the pressure on land resource;
- A land tenure system dominated by customary law which favours land fragmentation, a practice which reduces further the size of the family farms which are already below the threshold of the average surface area that is economically viable;
- A considerable number of landless persons who have to be resettled at all costs;
- Scattered farming plots that are difficult to manage due to the scattered mode of human settlement;
- Lack of a reliable land registration system that would guarantee the security of land tenure;
- Weak and inadequate existing methods of land-use planning and land improvement (outline of land potential, land use and land development; reliable methods of soil and water conservation);

- Disorderly and fraudulent land transactions, necessitating the establishment of regulations that would enable the authorities to give to the land a recognised market value that brings considerable profit to the Government Treasury;
- Unplanned use of marshlands which, in spite of their good agricultural soil, cannot be wholly recovered for agricultural purposes, in view of the following factors:
- Abundance of water which is necessary as a useful water reservoir;
- The soil make-up, which does not lend itself easily to the current cultivation methods;
- The biotic environment and biodiversity which should be protected at all costs;
- The obvious poor coordination among various institutions which use with land to support their activities;

Currently, the land tenure system in Rwanda operates in a dual legal system: On one hand, there is: the customary law, which governs almost all the rural land and promotes the excessive parcelling out of plots through the successive father-to-son inheritance system. And on the other, there is the written law, which mostly governs land in urban districts and some rural lands managed by churches and other natural and legal persons. This law confers several land tenure rights to individuals such as land tenancy, long term lease and title deeds (particularly in towns).

On the whole, Rwanda"s land tenure system requires comprehensive reforms, from the elaboration of a national land policy to the establishment of a land law and land code, which will guide the judicious use and management of the land resource for the economy to be able to take off in such a way that our country is freed from the grips of poverty.

In the perspective of the harmonious and sustainable development, the overall objective of the national land policy of Rwanda is to establish a land tenure system that guarantees tenure security for all Rwandans and give guidance to the necessary land reforms with a view to good management and rational use of national land resources.

In Rwanda, there are currently two modes of land acquisition, namely acquisition according to customary law or conceptions, and acquisition according to the rules of the written law.

According to custom, land ownership is held by whoever occupies the land first. This rule has always been respected in our society. However, in modern times, land acquisition by occupation has become obsolete since all vacant land belongs to the State. Likewise, the provisions of the decree-law No. 09/76 of 4th March 1976, article 1, stipulate that „all land not held under the written law and affected or not by customary law or land occupation belongs to the State".

Customarily, land rights are passed on from father to son through inheritance. Girls are excluded from inheritance of the family land from the father. Concerning inheritance rights of widows, the custom merely gives them the right to use the land that belonged to their deceased husbands.

In its original customary conception, land was owned collectively. Any disposal of land was therefore inconceivable, since such land was considered as family property that belonged to the ancestors, as well as to present and future generations.

With the introduction of the subdivision of land into individual plots due to successive inheritance procedures, each family owner of a plot of land was considered as the real owner of the plot, having the right to dispose of it as it wishes. However, Article 2 of the decree-law No. 09/76 of 4th March 1976 stipulates that nobody may sell off his land rights except with the written authorization of the Minister of Lands upon the recommendation of the Municipal Council where the land is located.

In actual fact, ownership through prescription originates from the written law since traditionally, title deeds were unheard of. Rwandans consider that once a right has been acquired or recognized, even customarily, it is indefeasible. This is why the many existing landless people, not having received any new land, continue to feel cheated and left out because they have no right over the land which they owned customarily over 30 years ago, since the law has fixed the time limit of acquisition by prescription to 10 years.

Tenancy contracts of plots for building purposes for a 3-year period in urban areas. Long lease contracts of land for agricultural purposes for a period of 15 years or more in rural areas. Free assignment contracts in both rural and urban areas to natural or legal persons for social activities with real impact on the welfare of the people. Sale contracts and title deeds for plots that are built in urban areas. This is a system of land tenure by urban residents who first lease plots with the contractual obligation of developing them. The Ministry of Lands delivers the title deeds after confirming that the plots have been developed. Right of access: mode of land acquisition which is common for public institutions.

Apart from the above-mentioned different modes of land acquisition and land ownership, there is the case of the landless people who live in rural areas and who must live from farming. These are mostly the refugees of 1959 who were forced into exile for political reasons and left their land behind. These same refugees have now returned to their country and find themselves landless. They cannot claim back their previously owned land which has been occupied by other Rwandans who remained in the country, because the Arusha Peace Accords fixed the time limit for acquisition by prescription to 10 years.

2.1.10 Organic Law on Environmental Protection and Management

The law sets out the general legal framework for environment protection and management in Rwanda. It also constitutes environment as a one of the priority concerns of the Government of Rwanda. Under the fundamental principle on national environmental protection policy develops national strategies, plans and programs, aiming at ensuring the conservation and use of sustainable environmental resources.

The law gives right to every natural or legal person in Rwanda to live in a healthy and balanced environment. They also have the obligation to contribute individually or collectively to safeguard country‟s natural, historical and socio-cultural heritage.

The framework of the law on the protection and management of natural resources centres on avoiding and reducing the disastrous consequences on environment. It measures result from an environmental evaluation of policies, programs and projects, aimed at preventing the consequences of such activities.

The principle of sustainability of environment and equity among generation emphasizes human beings at the core of sustainable development. They therefore, have a right to a healthy and productive life in harmony with nature. They must so as to equitably meet the needs of the present and future generation.

The protection and management of environment is currently registered in the environmental organic law that has been published in the official Rwanda newspaper in May 1st 2005.

MINITERE which is the ministry responsible for the environment under the article 65 puts the in place Rwanda Environment Management Authority (REMA) which is the institution now charged with the responsibility of ensuring environmental protection by demanding for EIA studies to be undertaken before projects are executed.
The present organic law has the following objectives:

- To protect human and natural environment;
- To establish fundamental principles of management and protection of environment against all forms of degradation so as to develop natural resources and to fight all kinds of pollutions and nuisances;
- To improve the living conditions of the population while preserving ecosystems and available resources;
- To ensure sustainable environment and resources as well as rational and sustainable use of resources, taking into account the equality between the present and future generations;
- To guarantee to all Rwandans an economically viable, ecologically rational and socially acceptable development;
- To establish the precaution principle in order to reduce the negative effects on Environment and ensure the rehabilitation of degraded areas.

2.1.11 International Legislations Relevant to the Sub-Project

Rwanda is a signatory to a number of conventions on sustainable development and is a member of various bilateral and multilateral organizations. Some of the relevant development partners in this project are the World Bank and a number of United Nations agencies.

2.1.12 World Bank Environment and Social Safeguards Policy

World Bank Operational Policies (OP) and Bank Procedures (BP) Environmental Assessment - BP4.01 and OP 4.01 (January 1999 all of which require environmental assessment of projects proposed for World Bank financing to help ensure that they are environmentally sound and sustainable.

The World Bank provides guidance on EIA requirements through the Environmental Assessment Sourcebook (World Bank 1994) which includes sectoral guidelines. The World Bank EIA process is implemented through a set of Operational Policies/Directives whose primary objective is to ensure that Bank operations do not cause adverse impacts and that they "do no harm". These safeguard policies are grouped into Environment, Rural Development, Social Development and International Law. The following safeguard policies have been considered in this EIA.

<u>Environment</u>

OP/BP 4.01 Environmental Assessment (January 1999)
Environmental Assessment is one of the 10 safeguard policies of the World Bank. The World Bank Environment and Social Safeguard Policy aims at improving decision making, to ensure that project options

under consideration are sound and sustainable, and that potentially affected people have been properly consulted.

The World Bank's environmental assessment policy and recommended processing are described in Operational Policy (OP)/Bank Procedure (BP) 4.01. The World Bank system assigns a project to one of three project categories, as defined below:

Category A: An EIA is normally required because the project may have diverse significant impacts (projects in this category are forestry, large industrial plants, irrigation and drainage, mineral development (including oil and gas), pipelines (oil, gas, and water), resettlement, rural roads, tourism, urban development, large transmission lines, etc.).

Category B: A limited environmental analysis is appropriate, as the project may have specific environmental impacts. Projects in this category include agro-industries (small scale), aquaculture & marine culture, small industries, mini-hydropower station, public facilities (hospitals, schools, housing complexes, rural electrification, telecommunications, small-scale tourism, rural water supply, etc.

Category C: Environmental analysis is normally unnecessary, as the project is unlikely to have significant environmental impacts. Projects in this category include education, family planning, nutrition, institutional development, technical assistance, etc.

OP/BP 4.04 Natural Habitats (June 2001)

Supports the conservation of natural habitats and the maintenance of ecological functions as a basis for sustainable development. The Bank does not support projects that involve the significant conversion or degradation of critical natural habitats.

Rural Development

OP 4.36 Forests (November 2002)

Aims to reduce deforestation and enhance, through sustainable economic development, the environmental and social contribution of forests. The Bank does not support projects which involve significant conversion or degradation of critical forest areas or related critical natural habitats.

Social Development

OP/BP 4.11 Physical Cultural Resource (July 2006).

Cultural property is defined to include both remains left by previous human inhabitants (e.g. middens, shrines) and unique natural environmental features such as canyons and waterfalls. The Bank does not support projects that will significantly damage non-replicable cultural property and assists only those projects that are sited or designed so as to prevent such damage.

OP 4.10 Indigenous Peoples (July 2005).

Indigenous peoples in particular geographical areas are identified by having: a close attachment to ancestral territories and to the natural resources in these areas; self-identification and identification by others as members of a distinct cultural group; an indigenous language, often different from the natural language; presence of customary social and political institutions; and primarily subsistence-oriented production.

The Bank"s objective is to ensure that indigenous peoples do not suffer adverse effects from Bank financed projects and that they receive culturally compatible social and economic benefits. Effectively the World Bank requires a project to develop a program for addressing issues based on the informed participation of the indigenous people themselves. Any project that affects indigenous peoples is expected to include components or provisions that incorporate an "Indigenous Peoples Development Plan".

OP/BP 4.12 Involuntary Resettlement (December 2001).

Details involuntary resettlement, emphasizing the severe economic, social and environmental risks, if unmitigated. It ensures that the population displaced by a project receives benefits from it and also covers those with usufruct or customary rights to land or other resources taken for the project. The Operational Policy is specifically inclusive, ensuring that all those affected both directly and indirectly by project developments are compensated as part of the project. Affected population, include those with income derived from informal sector and non-farm activities, and from common property resources. The absence of legal title does not limit rights to compensation.
The World Bank"s Policy objectives urge that involuntary resettlement be avoided whenever possible. If unavoidable, displaced persons need to:

Share in project benefits,

Participate in planning and implementation of resettlement programs, and
Be assisted in their efforts to improve their livelihoods or standard of livings or at least to restore them, in real terms, to pre-displacement levels or levels prevailing prior to the beginning of project implementation, whichever is higher.

OP 17.50 Disclosures

This Policy details the Banks requirements for making operational information available to the public. The Bank reaffirms its recognition and endorsement of the fundamental importance of transparency and accountability to the development process. In addition, timely dissemination of information to local groups affected by the projects and programs supported by the Bank, including nongovernmental organizations, is essential for the effective implementation and sustainability of projects.

Rwanda has ratified the following international conventions and protocols pertaining to the environment and which are of relevance to the Project:

- United Nations Framework Convention on Climate Change, 1992
- Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal adopted on 22 March 1989
- Bamako Convention on the Ban of the Import Into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa, adopted 30 January 1991
- Convention on Biological Diversity, 5 June 1992
- Convention on the Protection of World Cultural and Natural Heritage ratified 1997.
- Convention on the Means of Prohibiting and Preventing the Elicit, Import, Export and Transfer of Ownership of Cultural property ratified 2003.
- Ramsar (wetlands) Convention

CHAP 3: DESCRIPTION OF THE ENVIRONMENT AND BASELINE DATA IN PROJECT AREA

3.1 Description of the physical environment: meteorology, hydrography, geology, relief and biodiversity

This chapter gives background information of the sub-project area as a whole then narrows down to sub-project specific sites in terms of its location, administrative set-up, climate, settlement patterns, and the major environment attributes, which will play a crucial role in the identification and development of the sub-project.

The environmental components considered for this ESMP include physiography, geology, geomorphology, hydrogeology, climatology, meteorology, soil and water resources, land use, flora and fauna, socio-economic components including demography, settlement pattern, land and community structure, agricultural system and livestock, livelihoods and consumption patterns, education system, transportation networks and other infrastructure like water supply, medical facilities, public health issues, etc.

3.1.1 Nyarugenge district

a. Geographical Location and Biophysical environment

Nyarugenge District, with an area of 134.2km^2 is the smallest of the three districts and lies to the west of the City. The District is largely characterised by a very undulating topography with Mount Kigali, the highest point in the City located within Kigali Sector.69% of the District land lies in areas of natural constraints, either within steep slopes or covered by forest and wetlands.

In terms of environmental protection, Nyarugenge District has the most undulating terrain being made up of a series of ridges and valleys.15% of lands within the District falls within the wetlands boundary, as delineated by Rwanda Environment Management Authority (REMA). The wetlands has been encroached or built up for industrial, housing or agricultural uses.

Besides this, due to the undulating topography, there are numerous natural drainage channels and adjoining shrubbery which needs to be reserved and managed as part of the City‟s storm water management system. Despite the large-scale deforestation, with the City witnessed in the last few decades, there are still many pockets of dense and sparse forest identified with City.6% of land within Nyarugenge District is in the form of forest which needs to be preserve and revitalised.

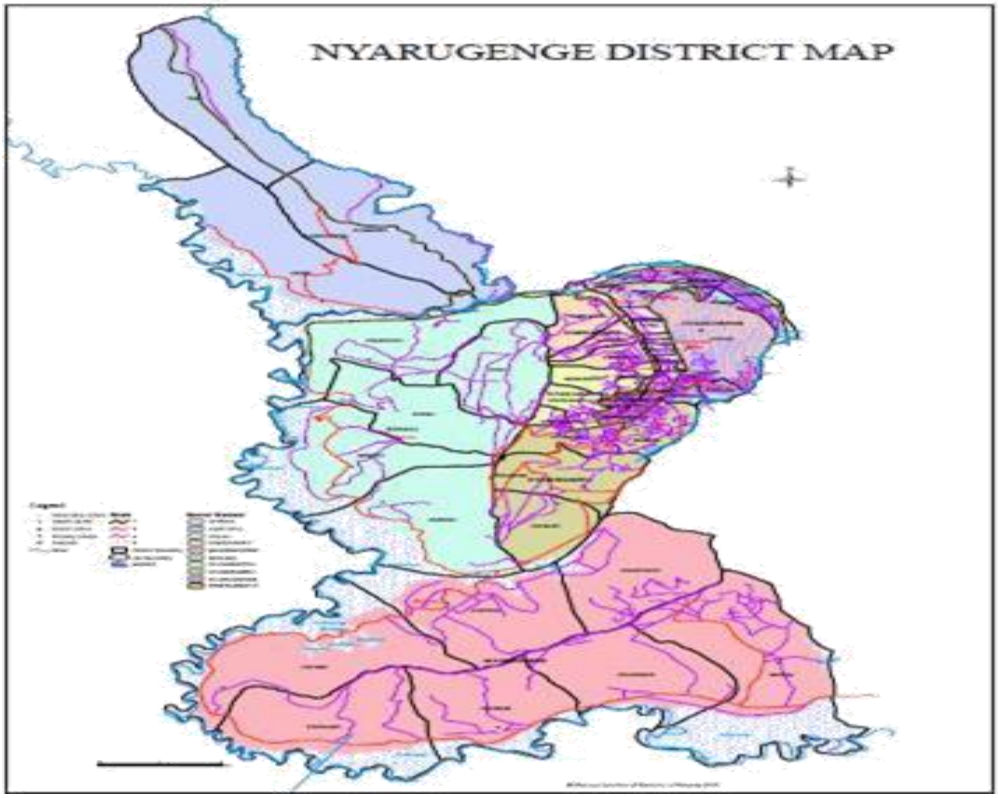


Photo 2:Administrative map of Nyarugenge District

3.1.2 Gasabo District

Gasabo District is one of three districts of Kigali City and forms one of 30 such entities that are in Rwanda after the administrative reform of February 2006. With 15 sectors, 73 cells and 501 villages (imidugudu). It is located northeast of the City of Kigali, the Rwandan capital. It is bounded on the south by the district Kicukiro; to the north by the district and Rulindo Gicumbi; to the east by the districts of Rwamagana and west by the district Nyarugenge. It has an area of 429.2066 km ², and currently has 410 485 inhabitants.

Due to this configuration, the District is a duality between rural and urban areas. The rural area accounts for more than 90% of the District, with a population representing 66%, which involves more effort in the field of urbanization and land use.

a.Relief

The terrain of Gasabo district is dominated by mountains of altitude (1800 m), especially in rural areas. Gasabo District is also surrounded by watersheds and valleys. The District has small rivers in the valleys of areas with high hills. The only river worth mentioning in name is the Nyabugogo River which has its source in Lake Muhazi and drains into the river Nyabarongo after crossing wetland valley approximately 50 kilometres long and 1000 m wide.

b.Flora and fauna

Natural vegetation is almost non-existent in Gasabo District. It was gradually replaced by artificial vegetation whose presence is the dominant eucalyptus tree species. However, some wild plants are found in the marshes

and in small corners of uncultivated land. Depressions are occupied by natural vegetation composed of *Typha fringe* of papyrus and *Cyperus latiforialius*.

In the hills, the natural vegetation there is especially herbs like *hyparenia spp* (imikenke) and *eragnostis* (inshinge). There are also various shrubs and savanna trees and the most dominant types are *Albizia gummifera* (imisebeya) *mimosacées*, including *Acacia abyssinica* (iminyinya).

As for wildlife, Gasabo district is characterized by a diversity of species of birds and small wild animals familiar to the type of vegetation in the District as well as fish species compatible with the aquatic environment of Lake Muhazi (tilapia, barbus, Clarias galiepunus, common carp, haprochromis,).

c.Climatic zones

Gasabo District has four seasons: two rainy seasons and two dry seasons alternately distributed as follows:

- A short dry season: December, January, February
- A great rainy season: March, April, May
- A long dry season: June, July, August, September
- A small rainy season: October, November

The four seasons are the common features of climate in the country. The seasons are irregular and hence the boundary cannot be correctly predicted. The rainy season may extend into the dry season and vice versa. The average temperature is 22 ° C and a rainfall between 900 and 1150 mm of annually is experienced.

d.Demographics

Table 3: Population of Gasabo District by sector

Number of sector	Population 2007	Area (Km2)	Density (Km²) 2007
Bumbogo	21289	60,0727	354
Gatsata	33515	6,0156	5571
Gikomero	16872	34,8095	485
Gisozi	18452	8,4834	2175
Jabana	27734	36,4359	761
Jali	26509	37,4999	707
Kacyiru	23648	5,8119	4069
Kimihurura	35741	4,8758	7330
Kimironko	44918	11,4356	3928
Kinyinya	39649	24,5943	1612
Ndera	23387	50,1650	466
Nduba	17983	46,7201	385
Remera	26925	7,0307	3830
Rusororo	30412	52,4736	580
Rutunga	23451	42,7826	548
Total	**410485**	**429,2066**	**957**

Source; District Development Plan, Gasabo

The Sectors of Gatsata, Kimirunko, Kimihurura and Kacyiru have a higher density compared to other sectors are those in both urban and predominantly spontaneous neighbourhood. Furthermore, data from the census and the Integrated Household Survey of the District show that the population is predominantly young Gasabo with a proportion of persons under 45 years is about 80% of this result that it is the younger who migrate to urban areas.

Photo 3:**Administrative map of Gasabo District**

e.Economic Activities

Agriculture

Agricultural activity is developed in the 8 rural areas of Gasabo. However with the expansion of the City there will be more and more loss in agricultural space. The land is relatively fertile and crops such as tomatoes, soybeans, sunflower, corn, coffee and vegetables have a comparative advantage for various reasons, including improved techniques for the production of tomato popularized by SORWATOM; proximity to the City of Kigali, which offers opportunities for vegetables; the proximity to factories washing coffee in Ndera. The priority crops are cassava, beans, sorghum and bananas. In small wetlands, there are vegetables such as cabbage, onions, tomatoes, eggplants and other legumes. The promotion of modern agriculture is not yet widespread in all sectors; only the introduction of radical terraces to prevent erosion is
in progress. People's participation in this activity is estimated at 75%. In the "Urban", there are small agricultural activities like growing vegetables carried by individuals in some portions of the wetlands. However, there are some marshes where you can organize and modernize agriculture with a few adjustments.

Energy

The main sources of energy used for cooking are: electricity gas, oil, firewood, charcoal and agricultural residues. Charcoal is the energy source most used in cooking in urban areas. This use is among the direct causes of environmental degradation in the country in general and the District of Gasabo in particular urging or forcing peasants to engage in disorderly exploitation of forests. For lighting, energy sources used are electricity, solar panels, generators, lamp oil, lanterns, candles and wood.

Photo 4: Electricity lines in Gasabo district

Housing and Settlement

The housing in the District of Gasabo is characterized by four different types: the well-developed urban area, urban areas in settlements, villages (imidugudu) in rural areas and houses scattered in rural areas.

Table 4: Housing Type

Housing Type	**Areas**		**Total**
	Urban	**Rural**	
Imidugudu (New Villages)	7%	8%	7%
Old villages	2%		1%
Dispersed Households	28%	89%	48%
Formal Settlements	7%	1%	5%
Informal Settlement	56%	1%	38%
Total	**100%**	**100%**	**100%**

Source: EICV 2015

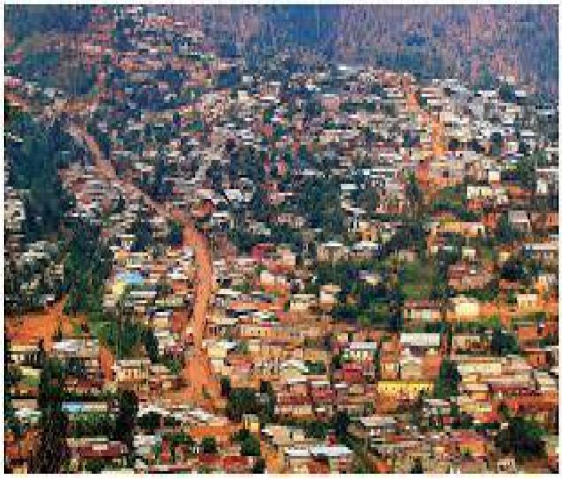



Photo 5: Type of settlements in sub-project areas (Part of Nyarugenge)

3.1.3 Kicukiro district

The district of Kicukiro is situated to the South of Kigali city, the capital of Rwanda. The district is delimited to the,

- South by the district of Bugesera, Eastern Province
- West by the district of Nyarugenge, Kigali City
- North by the district of Gasabo, Kigali City
- East by the district of Rwamagana, Eastern Province

a.Climate

The area has more or less constant temperatures throughout the year and the average temperature doesn‟t exceed 20C (16 – 17C in the high altitudes). The area experiences an equatorial-continental temperate type of climate classified. The country has four seasons which are determined by the variability of rainfall. Rainfall in the area ranges between 900mm and 1150mm annually.

b.Topography

The project area is markedly hilly like most of Rwanda. The project has a substantial slope north westwards. The highest point which is on the northern border of the project site has an elevation of 1421m while the lowest which is on the western border is 1396m above sea level. The general terrain is generally hilly and the slope along the hills is generally steep at around 29%. The area based on the topography is susceptible to erosion.

c.Land Cover

The land cover in the surrounding of the project area is populated and no agriculture activities. The area is generally composed of grass and trees.

d.Geology and Soils

Like many regions of Rwanda the soils in the area are relatively young. The area consists of sandy loams characterized by large particles and gravel. The base rock in region is composed of the Granite series which form a small island and consist of patches of quartzite

e.Hydrology

The hydrography of Kicukiro District is mostly made up of brooks and rivers that are part of the Akagera river basin. There are many watercourses of low importance, but the main ones are Lake Muhazi, Akagera River, Nyabugogo River is an effluent of Nyabarongo River which runs in Kigali city from Lake Muhazi and ten small brooks that disappear on some kilometers in the wetlands. The immediate area within which the project is located, there is no water body or wetland nearby.

f.Fauna and Flora

The site is a populated land. The surrounding "natural vegetation" is now comprised of secondary disturbed vegetation, primarily shrubs, herbaceous plants and several species of grasses, including razor grass. There was no evidence of wildlife within and around the project site during the field visits. Dense population is a strong contributor to this state.

g.Sensitive Ecosystems

Sensitive ecosystem is defined in this study as fragile and rare ecosystem within the area including Nyabugogo, Gikondo and Nyandungu wet areas.

h.Demography

According to the 2011 Population and Habitat General Census, the Kicukiro district was 249,284 persons. Kicukiro District is an area encountering rapid population growth and this can be examined through the types of settlement in the area. The lower reaches of the district are marked by dense settlements. The sectors with less population are those in semi-rural areas. The repartition by sex is shown in the table below:

Table 5: Kicukiro District Demography

Age	Men	Women	Total
< 5 ans	8%	7%	15%
5 - 14 ans	12%	12%	24%
15 – 34 ans	21%	24%	45%
35 – 59 ans	8%	7%	14%
60 -	1%	1%	2%
Total	**49%**	**51%**	**100%**

Source: 2014 Census

i.Infrastructures

The infrastructure within the general project location is relatively established. There is a network of roads providing access to most regions. There is a main road providing the main access to the project site on the northern fringes. The main tarmac road on the northern part has storm drains and street lighting. At the project site there is electricity provided through the national grid. Water is available through the main water supply for Kigali. Telephony services are available through provision of landlines and a variety of wireless telephone networks such as MTN, Tigo and Airtel.

j.Land Use

There is remarkable growth in housing projects both in the project area as well as in Kigali in general.
Though there are exhibits of gardens around the project site, there is rapid shift towards housing schemes.

The main land use in the zone, in spatial terms, is settlement. Other types of land use in the project area are those commonly associated with residential communities such as schools, commercial offices, food and an entertainment establishment, and other services. The Project represents a significant addition to the land use pattern in the zone. The construction activity in the zone must be viewed as a microcosm of the driving elements in Kicukiro‟s long term development strategy.

k.Health

The Kicukiro district doesn‟t have a district hospital but hosts an hospital with national standards, the military hospital of Kanombe. Kicukiro district has six health centers located in only five sectors with one in Niboye sector (the Kicukiro Health center). The other five sectors don‟t have health centers and this is a problem in terms of accessing health service in Kicukiro district (in average one health center serves 29‟300 persons). However the lack of appropriate equipment, electric power, and communication facilities doesn‟t enable to provide health services in good conditions. The lack of qualified personnel is also a problem for providing better health services to the population. The main causes of morbidity, hospitalization and mortality are Malaria, all kinds of infections, HIV-AIDS.

l.Employment and Income

The active population is made up of persons aged from 10 years old to 65 years old, with or without occupation. The non-active population is made up of persons over aged, children of less than 10 years old and handicapped people. The economic occupation rate is still low and the rest of the population constitutes the dependant category, even those who have a job, the low revenues regarding the charges and the expenses of the family. The agriculture occupies more than 90% of the rural population, and others (in the urban area) are employed in services operating in the district and elsewhere.

m.Education

According to the District Development Plan, Kicukiro district has now four levels of teaching facilities including pre-education teaching, primary education teaching, secondary education teaching and higher education teaching. The pre-education teaching has now 54 kindergartens distributed in several sectors of the district.. The number of these schools is still insufficient based on the number of kids who were supposed to go to schools. These schools don‟t have enough school furniture, appropriate didactic material and lack of revenues for the parents to take care of relevant costs. Primary schools are currently 45 in number while secondary schools are 21 all these distributed in the various sectors. The Kicukiro district counts 5 vocational and professional institutes that take care of young people who failed to continue the secondary school.

n.Transportation and Traffic

The public transit system serving the zone is characterized by both a formal and informal system of carriers. These range from registered minibuses and cars to unregistered cars. Minibuses and taxis commute between outlying districts within the city as well as between Regions. The public transport system is regarded as being regulated.

The problem is exacerbated by the need to meet the significant demand of work force commuters who travel within Kicukiro and neighbouring areas. However a primary and secondary road network facilitates movement of private and commercial traffic throughout the city and from surrounding areas.

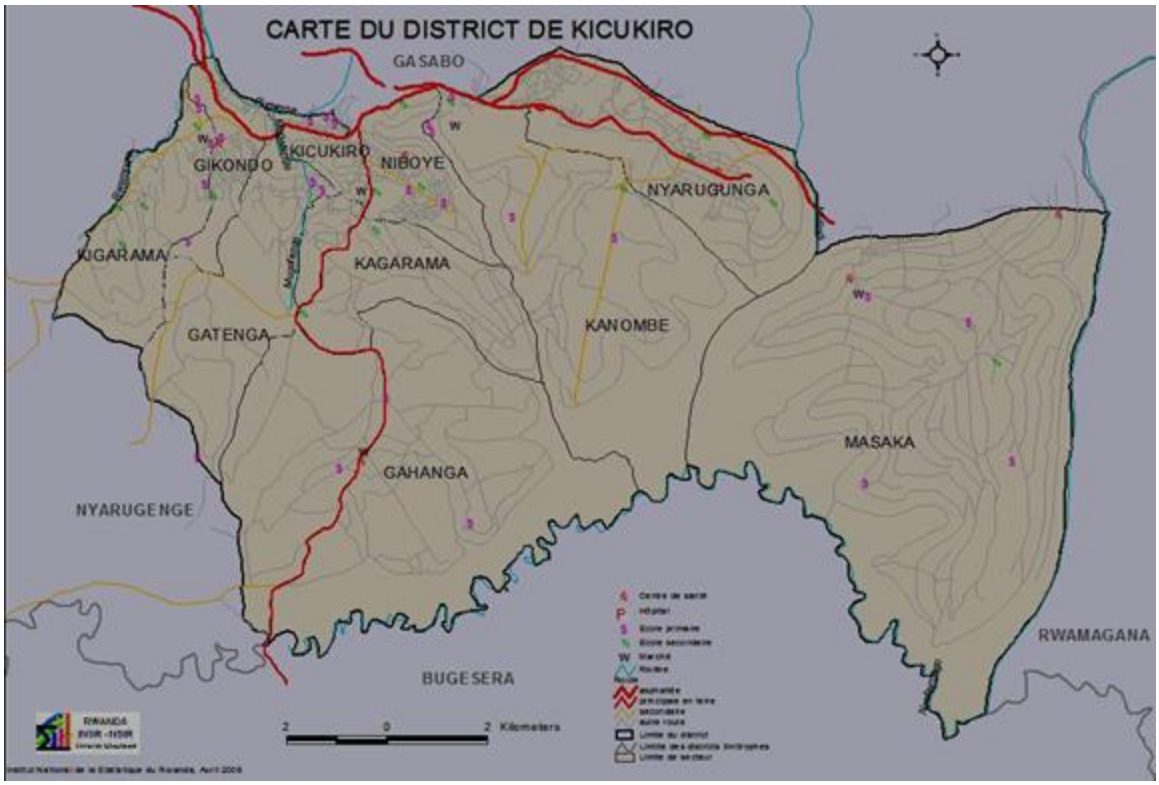


Photo 6: Administrative map of Kicukiro District

Source: District Development Plan of Kicukiro District

3.2 Description of the socio-economic environment

The majority of the population in Kigali City especially in Gasabo, Nyarugenge and Kicukiro Districts are occupied in trade, retail, construction, hospitality, tourism or small scale manufacturing. Meanwhile, in the newly include sectors; agriculture and livestock farming are the predominant occupation. A small amount of the Districts population is also working in industries and in the arts and crafts sectors.

Kigali City has an important role to play in developing the sustainable environment. Most environment degradation is a result of industrial development with naturally occurs in the urban centers first before they permeate into the rural.

Photo 7: Kigali city Master plan requiring stable and efficient electricity capacity

The following challenges have been identified in this sector: Depletion of forests covers through human settlements and other economic activities.

City of Kigali forest land has not been spared by the infrastructure development in the area. Periodic floods and droughts already cause major socio-economic impacts and reduce economic growth in Rwanda and in particular, City of Kigali.

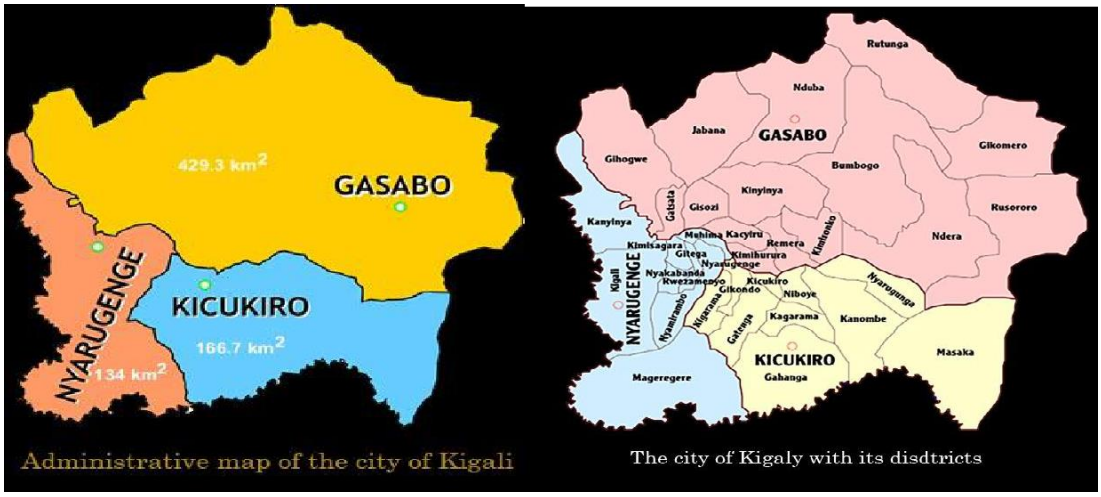


Photo 8: Kigali City map and districts delimitation Areas and surface

CHAP 4: ANALYSIS OF ALTERNATIVES

4.1 Project site location

An analysis of alternative location was undertaken through mapping and involvement of all the stakeholders in this selection process. At the end of this process, alternative location of the substations were selected among the possible ones, based on the following general sitting criteria (which are related to economic and environmental values):

- Proximity to the existing substation for Rulindo substation
- The Gifurwe substation was kept at the same site due to the fact that its rehabilitation has no effects on the surrounding environment
- Avoidance of restricted zones such as forests, wetlands;
- Minimisation of infrastructure destruction.

4.2 Alternative technologies

The new substations shall have upgraded modern equipments in comparison to the existing ones. The technology adopted shall have outdoor 110kV Switchyard, Indoor MT 30kV Switchgear as well as the Protection, Control and Command system instead of the old equipments and systems which are modern and are environmentally friendly.

This alternative will enhance the upgrade of the capacity of the substation and support and enhance the expansion of distribution network for the electrification of new towns and villages.

4.3 No Project Alternative

A No Project alternative would primarily mean that the status quo will be maintained and, in a sense, the environmental impacts (adverse) will not occur if the existing old substation is maintained. However, the positive benefits will be forgone in terms of providing more access to electricity to the populace of the project area which would have in turn spurred and contributed to economic growth.

4.4 Comparison of alternatives

The two alternatives "project site location" and "Technology alternative" are found most feasible for these types of projects considering the positive socio-economic and environmental benefits and most importantly providing more access to electricity to the populace of the project area and its surroundings.

The third alternative of "No Project" is not feasible because the benefits mentioned would be lost and that would hinder the development in the project area. While there will be no environmental cost from this alternative, with increasing population it is expected that the demand for fuel wood will increase each year, putting very heavy pressure on the already dwindling forest resource.

CHAP 5: ANTICIPATED ENVIRONMENTAL AND SOCIAL IMPACTS AND MITIGATION MEASURES

The project being a national development agenda in the energy sector has immense benefits that could save the country losses in terms of power rationing and frequent outages. However poor planning of the project could also affect the environment that supports a significant number of Rwandese through the project potential hazards that the project could pose to the public, pollution of water resources and atmospheric resources.

5.1 Positive impacts

Positive impacts of this project are various and diverse in nature. They range from employment opportunities, to wealth creation, industrialization, improvement in service delivery to technology transfer and capacity building.

5.2 Socio-economic benefits

The positive impacts are numerous and wide-ranging. The benefits of the project for domestic supply and use in small-scale businesses and in access to electric power for schools and public services are evident.
In the construction and rehabilitation phases there will be temporary employment opportunities for local contractors and those who will be employed or supply services and provisions for workers and to contractors. Within the project area there will be opportunities for petty trading and small business service provision near the substations at Gifurwe and Rulindo.

Significant social benefit will come through employment generation and safer more efficient operation of key services, through provision of electricity access to the villages and public institutions served by the project. Potential beneficiary enterprises affected by and contributing to regional socio-economic transformation will be small industries and other agricultural processing businesses which need electricity.
The long-term direct positive impact is therefore in access to reliable new electricity supplies, which will lead to better provision and easier management of goods and services, and enable new facilities for processing and storage. There will be better availability and supply of safe and clean water (which needs pumping); data management with computers is made possible and communication facilities like internet will be increased, as also charging for mobile phones; also, electric lighting adds to security at night and enables extended opportunities for work and study.

As a consequence the quality of life and extent of economic opportunity will be changed for the better. Social and environmental costs associated with the use of firewood and others means of lighting will be reduced and there may be a more limited requirement for firewood cutting and collection.

On employment the project expects to employ local casual and skilled labor on-site. This is exclusive of indirectly employed people who will provide support and related services including those trading in foodstuff for the workers on site and construction personnel during the site preparation phase of the project. At this point, the number of women workers or those directly affected by the project who could be employed is unknown but EUCL/RESSP will advise that this group of persons be given priority and monthly records be reported.

5.3 Environmental Benefits

Increased distribution of electricity to the project area population will ease the pressure on the use of fuel wood that is rampant in the area and in effect would help to conserve the fragile and diminishing forest cover of the country by providing an alternative source of energy.

5.4 Potential environmental impacts and mitigation measures.

Adverse impacts of the proposed rehabilitation Gifurwe substation and construction of the new substation at Rulindo are those unintended effects of the project that have negative to sustainable development and the environment. The following adverse impacts are anticipated to occur during the design/planning and construction/rehabilitation phases of the project.

5.4.1 Loss of land/Land acquisition

The will not be a loss of land due to the fact that all substations to be constructed and/ or rehabilitated are existing and the plots they are sitting on belongs already to REG/EUCL. For this project, there is no loss of land or land acquisition because of a common understanding of this project par different Government institutions.

5.4.2 Permanent Minor Loss and Destruction of vegetation cover/crops

The site for the substation/Cabin is generally agricultural land where the following variety of crops including Avocado trees, Grevillea, Pepper, Ficus Trees, Eucalyptus Trees, potatoes and beans. These crops and trees will inevitably have to be removed to pave way for the construction of the substation.

For this project, there is no loss and destruction of vegetation/crops. Government gave a piece of land near their institution without land vegetation.

Mitigation Measures

For this impact, the mitigation measures is minor because of there is no loss and destruction of vegetation cover/crops and the compensation is not huge may be one or to two houses will destroy around KIMIHURURA Cabin. So, there no resettlement process and the preparation of ARAP.

5.5 Disruption in Daily Living and Movement Patterns

It is anticipated that the construction activities will result in some intrusions and disruptions in the daily living and movement patterns of the property owners. Such disruptions are anticipated to be of high significance, but of a short-term nature, and could be caused by the movement of construction vehicles and frequent entries to the properties as a result of the construction activities.

Mitigation Measures

The negative social impacts on the living and movement patterns of the property owners during the operation phase of the project are anticipated to be of low significance and of a short duration as maintenance would not be undertaken on a daily basis.

5.6 Aesthetics and visual related impacts- visual intrusion on the landscape

Construction works are likely to cause visual related impacts mainly by having activities out of touch with the natural environment in some cases. The substation/Cabin is regarded as being the most visually intrusive component. It is anticipated that the construction of the proposed substation will impose a visual impact on the immediate surrounding area.

Mitigation Measures

The substation shall present a low degree of view obstruction as a result of being on a hilly area, and allows for blending with background colour/patterns of most landscapes.

5.7 Water Resources

The construction of substation/Cabin may interfere with the natural drainage systems and modify flow of surface water, and these changes can contribute to soil erosion, flooding, channel modification, downstream scouring and sedimentation in streams and other drainage channels.

5.8 Disruption of Infrastructure and Services

Without the implementation of appropriate management measures, general services (such as underground pipes, existing distribution lines) could be damaged during the construction/ rehabilitation periods. Any disruption in the services (especially in the local electricity supply should distribution lines be damaged) could potentially have a negative impact on local enterprises (e.g. businesses activities). The nature and extent of the impact will depend on the length of the interruption in general services. The contractor is expected to undertake the construction works and construction works sometimes in the vicinity of energized lines. This could lead to frequent power interruptions and black outs or even de-energisation of lines.

Mitigation Measures

- The contractor should establish whether there is any infrastructure located near or inside the substation site and premises in order to avoid any damage to these during the construction/rehabilitation phase.
- Discussions should be held with the relevant parties whose infrastructure could be negatively affected.
- The Local Authorities should be informed of the construction/ rehabilitation schedules to ensure the minimum disruption of such infrastructure.
- The contractor shall make sure that the Time Schedule provides for adequate advance notice to the Employer as to when shut-downs and/or partial de-energizing of existing equipment are required. The Contractor shall make provisions to be able to shift teams and equipment in order to continue work at other sites if the shut-down cannot be granted for the requested period at the requested dates. He shall be able to resume the works scheduled during shut-downs when they are granted, with a reasonable advance notice. The required interruptions shall be kept to a minimum in terms of length of the shut-down.
- Property owners and nearby communities should be informed well in advance of the construction/ rehabilitation schedule and any changes to this work schedule.
- Heavy vehicles should make use of the existing access roads on private properties as far as possible. In cases where private roads are to be used, this should be negotiated with the property owner before the construction period commences.
- Construction vehicles should keep to the speed limit and should avoid busy roads, as far as possible.
- Construction/rehabilitation activities should not be undertaken after-hours or over weekends.
- Construction should preferably not take place during the harvesting season.

5.9 Temporary /Limited Fugitive Dust and Noise

Noise resulting from access road and substation/Cabin construction/ rehabilitation may disturb neighbouring communities and local fauna. This impact will be of a temporary nature only and can be minimised by adopting appropriate mitigation measures including maintaining equipment and vehicles to manufacturers‟ standards and limiting operating times to daylight hours.

Dust will be an issue during the construction of access roads and clearing of vegetation since it is recommended that construction/rehabilitation take place during the dry season.

Fugitive dust will be localised and may be emitted from construction/rehabilitation works e.g., excavations and stock piles of materials including machinery as well as from truck traffic during the construction rehabilitation phase and construction of access roads. This could cause health related impacts to the communities around and workers in the project site. Dust impacts will be localised and experienced only in the specific areas where the excavation for substation construction will occur.

Vehicular movement on gravel roads could lead to dust pollution in some areas during dry conditions. This impact would be of a short duration during the construction /rehabilitation phase. This impact will be localized and of a short duration, and is anticipated to be of low significance.

Mitigation Measures

- The dirt roads and exposed construction areas should be moisturised during the dry season to prevent or minimise the fugitive dust emissions.
- Proper location of material stockpiles, especially sand and soil downwind from the commercial, residential and other establishments will be required; Frequent wetting of the stockpile and working area; screening of or providing wind breaks for stockpiles;
- Workers in the project site must be equipped with the necessary and required Personal Protective Equipment (PPE) prescribed by the construction industry to mitigate dust impacts and other accidents;
- The construction / rehabilitation schedule should be communicated with potentially affected parties.
- Construction / rehabilitation timeframes should be discussed with property owners and project neighbors;.
- Dust-suppression techniques should be used along gravel roads, when required.

5.10 Wildlife

There are no protected wildlife conservation areas in or near the proposed project site so there is likely to be only minor impacts on wildlife during the construction/ rehabilitation phases as a result of disturbance from movement of people and machinery and loss of habitat from the construction and rehabilitation of the substations.

5.11 Soil Erosion

During the construction phase, activities involving preparation, stripping, grading, soil removal, backfilling, compacting, disposal of surplus and excavation of the earth surface to pave way for the installation of the "substations" will lead to localized soil erosion and run off when rains are experienced.

The building of foundations can potentially exacerbate soil erosion. In addition to the loss of productive land due to soil erosion and land acquisition for substation construction and rehabilitation, soils can be impacted as a result of disposal of waste materials, and compaction with heavy machinery used for the construction/rehabilitation of the substation.

This impact is only expected to occur in the areas where excavation works will be carried out during rehabilitation and construction of the substations. These impacts can be managed by restricting the use of

heavy machinery and vehicles to designated work areas and installing soil protection works in areas sensitive to erosion prior to construction/rehabilitation.

Mitigation Measures

- To prevent soil erosion during site preparation, disturbed soils should be compacted immediately.
- Windblown erosion is to be prevented by soil compaction and wetting the ground to prevent rising of soil particles.
- The final site grade of the substations should include an adequate drainage channel that should facilitate drainage and avoid flooding and pooling. A site drainage plan should be developed to protect against erosion. Protecting stockpiles through the use of silt fencing and reduced slope angles should be used to minimize soil erosion during construction and rehabilitation.

5.12 Accidents/Hazards

As a result of the operation of equipment and machinery during construction/rehabilitation, there is a likelihood of accidents occurring especially to the workers.

Mitigation Measures

- All workers need to be provided with the recognised and appropriate Personal Protective Equipment while at the construction site including gloves, dust masks, boots, goggles, and overalls among others.
- ONLY competent workers and staff should be allowed to operate any machinery and equipment to reduce the incidents of accidents.
- During the construction the project sites should be completely sealed off and warning signs erected informing the general public to keep off the construction site
- Personal protection gear must be provided and its use made compulsory to all.

5.13 Storage and Management of solid waste

Solid waste materials during the construction/rehabilitation include paper wrapping, scrap metal, excavated soils, polythene, plastic and metal will cause pollution and littering of the immediate and localized environment. After the construction of Cabins, there is a problem of handling of solid waste to the site.

Mitigation Measures

- The contractor should engage a refuse handling company to remove the wastes from the site to the recommended dumping site.
- Warning signs against littering and dumping within the construction site should be erected by the contactor.
- Excavated top soil should be used as backfill

5.14 Adverse impacts during operation and maintenance phase

The following adverse impacts are anticipated to occur during the operation and maintenance phase of the project.

5.14.1 Accidents at the work place from operating of machineries and equipment by workers

The potential for accidents and hazards occurring in the “substations” during the operation of the equipment is a likely adverse impact that could lead to loss of life or injury to the workers.

5.14.2 Maintaining Access Roads

The maintenance of access roads can impact the environment through vegetation clearance and compaction of land and a permanent loss of land. Provided temporary access roads are rehabilitated and existing roads/tracks are used for access to minimise the number of new roads required, the impact is not expected to be significant.

Mitigation Measures

- Use existing access roads and tracks wherever available.
- Decommission and rehabilitate excess temporary access tracks as soon as they are no longer required.
- Where access is required across agricultural lands use temporary access paths during the dry season involving placement of geo-textile over aggregates where necessary.
- Minimise the need for access tracks whenever possible.

5.14.3 Fire risk

The risk of fire outbreaks during bad weather e.g. storms, winds etc cannot be overruled especially when the towers crash or if electrical faults occur in the substations.

Mitigation Measures

- A robust fire prevention program and fire suppression system should be developed by the contactor for use in the substations.
- All of the cabins site must contain fire fighting equipments of recommended standards and in key strategic points. This should include at least, Carbon dioxide systems, Detection/alarm systems and portable fire extinguishers among others.
- A fire evacuation plan must be posted in various points of the cabins including procedures to take when a fire is reported.

5.15 Project decommissioning

Decommissioning of the subproject will involve dismantling and removing all the structures of the substation sites, dismantling the supporting infrastructure (towers) and all those structures that were associated with this subproject implementation. Some of the impacts of this subproject phase are similar to those that have been discussed during construction and operational phase.

But there are those impacts that are specific to project decommissioning after the project life is over. After the project decommissioning, the proponent will be required to rehabilitate the site to its former status or near what it was before the project was commissioned. EUCL will be responsible for preparing the decommissioning plan because it is the proponent and as specified by the Organic Law, the project proponent remains responsible for this.

CHAP 6: ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

An Environmental Management Plan (EMP) has been developed for this project and will be implemented by the contractor, EUCL and the relevant Close implementing agencies namely Ministry of Infrastructure (MININFRA), Rwanda Environmental Management Authority (REMA) and Rwanda Utility Regulatory Agency (RURA).

This ESMP defines the measures needed to prevent, minimize, mitigate, or compensate for adverse impacts, and to improve environmental performance while ensuring compliance with applicable environmental standards during the planning and design phase, construction and operation and eventual decommissioning of the project.

In order to develop institutional capacity in implementing and enforcing the EMP, training should be provided with adequate budgets to ensure satisfactory achievement of sound environmental performance. The training proposed here should include capacity building and training in environmental assessment, environmental mitigation plans, and environmental monitoring. In some cases, it may be appropriate to include the staff from the environmental implementation agencies, such as REMA, and other relevant ministries involved in the implementation of the RESSP.

Training and capacity building will be vital in implementing the ESMP especially EUCL staff who will be responsible for primarily ensuring that mitigation and monitoring of the key activities are followed and ensure an internal self-environmental audit.

All the potential adverse impacts of the sub-project have been identified and discussed in the previous chapter. The ESMP table below outlines potential environmental impacts and mitigation measures proposed to reduce these impacts to acceptable levels. It also identifies the agency responsible for planning and implementation as well as supervision and monitoring, for each phase of the project.

6.1 Environmental and Social Management Plan (EMP) for pre-construction phase

Project Activity	Potential Environmental issues	Management/Mitigation Measures	Responsibility	
			Planning and Implementation	Supervision and Monitoring
Pre-construction Stage				
Design and location of the substations/cabin	Impact due to location of site close to sensitive ecosystems	1.Site selection in close consultation with MINIRENA, MININFRA, District and EUCL field staff to avoid sensitive areas; 2.Site location selection approved by RDB and District Authorities 3. Site selection where there will involve minimum tree felling to minimize design	RDB, District authorities EUCL	a. Requires „No Objection" Clearance from RDB and districts

Table 2: Environmental and Social Management Plan (EMP) for pre-construction phase

6.2 Environmental and Social management plan for construction phase

Project Activity	Potential Environmental issues	Management/Mitigation Measures	Responsibility	
			Planning and Implementation	Supervision and Monitoring
Construction Stage				
Clearing of vegetation on the project site	Removal of forest cover in biological corridor	1.Ensure that only those trees marked by the forestry staff are felled 2.Follow standard EUCL procedures and practices in clearing vegetation 3.Reforestation or afforestation to make up for forest cover loss	Contractor, RDB, EUCL	Environmental Officer of EUCL District Environmental officer. Officer RDB
	Workers could damage species & Habitats outside the project area	1. Only fell trees that have been marked by Forestry staff; 2.Train workers in importance of wildlife and habitats; 3.Locate labor camps where no forest clearance is needed;	Contractor	Environmental Officer, EUCL
	Risk of forest fires if cut vegetation is burnt	1.Leave cut material to rot down in situ and do not burn; 2.Leave a covering of grass where possible 3.Dispose of trees as required by Department of Forestry	Contractor	Environmental Officer, EUCL
Delivery of RE materials to drop off	Air pollution from vehicular movement	Minimize number of deliveries through timely scheduling	Contractor	Environmental Officer, EUCL

points	**Carriage of materials to site could block access**	Consult farmers when transporting material	Contractor	Environmental Officer, EUCL
Excavation for foundation of the substations/cabin	Dust may blow from cleared areas	Avoid using large machinery, Manual excavated at project sites and minimize disturbance at excavated sites,		
	Excavation for foundation	Consult community to identify and avoid infrastructure	Contractor	Environmental Officer
	Work in villages may create noise, dust & impede access	1.Inform communities of work in advance; 2.Identify sites of local significance; locate no poles nearby; 3.Consult custodians of facilities (monasteries, nunneries, schools, clinics, etc) and avoid working at sensitive and religious times;	Contractor	Environmental Officer, EUCL
Social and cultural impacts	Economic benefits if local people are employed	Employ as many local residents as possible in workforce	Contractor	Environmental Officer, EUCL
	Importing foreign workers can cause environmental and social problems at labour camps and in host community	1. Ensure imported workers are provided with housing that has ample toilets, proper drainage and treatment for sewage. 2. Collect solid waste weekly and bury offsite. 3. Instruct workers on required behaviour in host community and prohibit them from hunting and fishing. 4.Camps must be cleaned up and restored after	Contractor	Environmental Officer

		project is completed		
	Diseases can be introduced into host communities from social and sexual contact with imported workers	1.Initial screening of workers for HIV/AIDS, TB, malaria, swine flu, etc.; 2.Facilitate access to the nearest Health facility for check up; 3.Raise worker/community awareness of risks of socially & sexually transmitted diseases; 4.Practical measures, e.g. free condoms for workers;	Contractor	Environmental Officer
	Workers and communities are at risk from accidents on site	Prepare and implement a site Health and safety plan that includes measures to: -Exclude the public from all construction"s sites; -Ensure that workers use personal protection equipment; -Provide Health & Safety training for all personnel; -Follow documented procedures for all site activities; -Keep accident reports and records; -Inform local communities about the work and dangers	Contractor	Environmental Officer
	Impact on private land and infrastructure	Conduct awareness programs/meetings Grievance redress mechanism in place	EUCL	Environmental Officer

Table 3: Environmental and Social management plan for construction phase

6.4 Environmental and social management plan for operation and maintenance phase

Project Activity	Potential Environmental issues	Management/Mitigation Measures	Responsibility	
Operation and Maintenance				
Provision, Operation and maintenance	People cannot use new electrical machines during power cuts so income may suffer	Field personnel should report power outages to the ESD and repair faults quickly and effectively	RESSP/EUCL	EUCL
	Consumers are at risk of electrocution if they do not understand the dangers of electricity	1.Train and supervise EUCL operatives to ensure that they check house wiring carefully and reject if deficient; 2. Public education to raise villagers" awareness of dangers of electricity and how to utilize the system safely.	RESSP/EUCL	EUCL
	EUCL workers are at risk if they do not follow EUCL procedures when clearing the site or repairing faults	1.Follow EUCL O&M and H&S manuals and revise these manuals if necessary to increase safety of workers; 2.Regular training of EUCL workers to raise awareness of dangers and working procedures to be followed; 3.Improve supervision of field workers; 4. Regular management reviews of safety record, with remedial action where necessary.	RESSP/EUCL	EUCL
	People will not be very tolerant of power cuts once they become used to the benefits of electricity	1.As above: repair faults quickly and affectively; 2.Conduct system maintenance regularly and diligently	RESSP/EUCL	EUCL

Table 4: Environmental and social management plan for operation and maintenance phase

CHAP 7: MONITORING PROGRAMME

A detailed environmental monitoring plan is aimed at developing to verify that predictions of environmental impacts are accurate and that unforeseen impacts are detected at an early stage and allow corrective measures to be implemented, if needed. During the construction phase the plan provides for dust, noise, visual impacts, service disruption and safety monitoring.

During the operation period, monitoring is planned in terms of routine inspection of the health and safety of the workers, disruption impacts during maintenance of substations, fire hazards. The Monitoring Plan developed is presented at the end of this report as part of the EMP.

Environmental monitoring is an essential component of project implementation. It facilitates and ensures the follow-up of the implementation of the proposed mitigation measures, as they are required. It helps to anticipate possible environmental hazards and/or detect unpredicted impacts over time. Monitoring includes:

- Visual observations;
- Selection of environmental parameters at specific locations;
- Sampling and regular testing of these parameters.

Monitoring should be undertaken at a number of levels.
Firstly, it should be undertaken by the Contractor at work sites during construction/ rehabilitation, under the direction and guidance of the Supervision Consultant who is responsible for reporting the monitoring to the implementing agency, EUCL.

RESSP/EUCL in turn undertakes independent monitoring of selected parameters to verify the results of the Contractor and to audit direct implementation of environmental mitigation measures contained in the EMP and construction contract clauses for the Project.

RESSP/EUCL also have the direct responsibility to implement and monitor land acquisition and compensation issues as outlined in the ARAP. Their Project teams should include an environmental monitoring and management specialist as well as a sociologist experienced in land acquisition and compensation issues. For this project, there is no land acquisition and the compensation is not considering.

REMA has the overall responsibility for issuing approval for the Project and ensuring that their environmental guidelines are followed during Project implementation.
Their role therefore is to review environmental monitoring and environmental compliance documentation submitted by the implementing authorities and they would

not normally be directly involved in monitoring the Project unless some specific major environmental issue arose.

7.1 Environmental monitoring parameters

The parameters below are recommended as a minimum for substation construction and rehabilitation:

7.1.1 Noise Levels Monitoring

Although noise during construction/rehabilitation of the substations is not expected to be a problem with the Project, periodic sampling of Contractor equipment and at work sites should be undertaken to confirm that it is not an issue. Noise level monitoring could be supplemented by consulting with Project Affected People in the first instance to identify the level of monitoring required.

7.1.2 Soil Erosion Monitoring

The excavation of earth for the establishment of towers, temporary and permanent access roads, and storage facilities will exacerbate soil erosion. It will, therefore, be the responsibility of the Contractor‟s environmental inspectors to ensure the implementation and effectiveness of erosion control measures. Focus should be given to work sites where soil is disturbed and after vegetation clearing.

7.1.3 Monitoring of Vegetation Clearing

Unique stands of indigenous trees should not be removed for the construction and rehabilitations activities.

7.1.4 Monitoring Rehabilitation of Work Sites

The Contractor‟s environmental inspectors should ensure that areas used as temporary campsites for workers are progressively rehabilitated as they are no longer required. Once a site is rehabilitated it should be "signed off" by either EUCL/RESSP environmental staff.

7.1.5 Monitoring of Accidents/Health

The Contractor‟s environmental inspectors must make sure that appropriate signs are posted at appropriate locations/positions to minimise/eliminate risk of electrocutions. In addition the environmental inspectors should make sure that:

- RESSP/EUCL will have overall responsibility to oversee that all environmental measures are put in place and that regulations are enforced. The construction supervision consultant should assist
- RESSP/EUCL in this process in order to make sure that contractors fulfil the environmental requirements.

The following parameters could be used as indicators:

- Presence of posted visible signs on fences and towers, etc.;

- Level of awareness of communities pertaining to dangers/risks associated with power lines;
- Presence/absence of unique stands of indigenous trees around the substations; and
- Accident reports. Records on actual accidents associated with the establishment of the transmission line could be compiled with the help of local peasant association officials, teachers/students of local schools.

7.2 Environmental and Social Management and Monitoring Plan (Detailed ESMMP)

Potential impacts	Mitigation measure	Parameters to be monitored	Location	Method	Monitoring Frequency	Responsibility	Cost
9.1.1 Pre-construction							
Impact due to location of new substations	Substation sites belongs to REG/EUCL	Complaints from any other land owner	Existing substation location	Field investigation by Safeguards staff	Before construction	EUCL/RESSP/SUPERVISOR SAFEGUARDS	N/A
9.1.2 Construction							
Removal of forest cover in protected area	1.Ensure that only those trees marked by the forestry staff are felled 2. Follow standards, EUCL procedures and practices in clearing sites.	Number of violations	New and existing substation	Site Observations	Two weeks	EUCL/RESSP/SUPERVISOR SAFEGUARDS	EPC
	Explore possibility of planting low growing vegetation below the towers	Re-vegetation	New and existing substation	Site Observations	Two weeks	EUCL/RESSP/SUPERVISOR SAFEGUARDS	EPC
Workers could damage species & habitats outside project site	1Mark site boundary & prohibit cutting outside the site marked by forestry staff;	Number of violations	New and existing substation	Site Observations	Two weeks	EUCL/RESSP/SUPERVISOR SAFEGUARDS	EPC
	3.Prohibit hunting or fishing by workers and enforce strictly	Number of illegal reports	Camp sites	Site Observations surveys	Monthly	EUCL/RESSP/SUPERVISOR SAFEGUARDS	EPC
		Number of illegal reports	Labour camps	Contractor records and sites	Monthly	EUCL/RESSP/SUPERVISOR SAFEGUARDS	EPC

				observation			
	5.Locate labour camps where no forest clearance is needed;	Number of illegal reports	Labour camps	Site Observations	Monthly	EUCL/RESSP/SUPERVISOR SAFEGUARDS	EPC
	6.Provide adequate food supply so workers do not need to hunt or fish	Illegal activities	Labour camps	Site Observations	Monthly	EUCL/RESSP/SUPERVISOR SAFEGUARDS	EPC
Delivery of materials to drop off points - Air pollution from vehicular movement	Minimize number of deliveries through timely scheduling	Number of deliveries	Drop off points	Site Observations	Monthly	EUCL/RESSP/SUPERVISOR SAFEGUARDS	EPC
Carriage of materials to site could block access	Consult farmers when transporting material	Number of consultations	New and existing substation	Site Observations; Village survey	Monthly	EUCL/RESSP/SUPERVISOR SAFEGUARDS	EPC
Excavation of foundation-dust may blow from cleared areas	Avoid using large machinery, manual excavation and minimize disturbance at excavated sites,	Site Observations	New and existing substation	Site Observations	Monthly	EUCL/RESSP/SUPERVISOR SAFEGUARDS	EPC
Effect on local drainage and soil erosion	construct station on stable ground		New and existing substation	Site Observations	Monthly	EUCL/RESSP/SUPERVISOR SAFEGUARDS	EPC
Works may create noise, dust & impede	1.Inform communities of work in advance;		New and existing substation	Site Observations; Village survey	Monthly	EUCL/RESSP/SUPERVISOR SAFEGUARDS	EPC

access	2.Identity sites of local significance; locate no activities nearby;		New and existing substation	Site Observations; Village survey	Monthly	EUCL/RESSP/SUPERVISOR SAFEGUARDS	EPC
	3.Consult custodians of facilities (monasteries, nunneries, schools, clinics, etc) and avoid working at sensitive and religious times;		New and existing substation	Site Observations; Village survey	Monthly	EUCL/RESSP/SUPERVISOR SAFEGUARDS	EPC
Economic benefits if local people are employed in contractor's workforce	Employ as many local residents as possible in workforce	Number of locals employed	New and existing substation	Site Observations; worker survey	Monthly	EUCL/RESSP/SUPERVISOR SAFEGUARDS	EPC
Importing foreign workers can cause environmental and social problems at labor camps and in host community	1. Ensure imported workers are provided with housing that has ample toilets, proper drainage and treatment for sewage.	Number of observations from camp site	New and existing substation	Site Observations; worker survey	Monthly	EUCL/RESSP/SUPERVISOR SAFEGUARDS	EPC
	2. Collect solid waste weekly and bury offsite.		New and existing substation	Site Observations	Monthly	EUCL/RESSP/SUPERVISOR SAFEGUARDS	
	3. Instruct workers on required behaviour in host community and prohibit them hunting and fishing.		New and existing substation	Site Observations; worker survey	Monthly	EUCL/RESSP/SUPERVISOR SAFEGUARDS	
	4. Camps must be cleaned up and restored after project is completed.		Labour camps	Site Observations; worker survey	Monthly	EUCL/RESSP/SUPERVISOR SAFEGUARDS	
Diseases can be introduced into host communities	1.Initial screening of workers for HIV/AIDS, TB, malaria, swine flu, etc.;	Contractors record on Health issues	Labour camps	Site Observations; worker survey	Monthly	EUCL/RESSP/SUPERVISOR SAFEGUARDS	EPC
	2.Facilitate access to the nearest Health facility		Labour	Site	Monthly	EUCL/RESSP/S	

from social and sexual contact with imported workers	for check-up;		camps	Observations; worker survey		UPERVISOR SAFEGUARDS	
	3.Raise worker/community awareness of risks of socially & sexually transmitted disease;		Labour camps	Site Observations; worker survey	Monthly	EUCL/RESSP/S UPERVISOR SAFEGUARDS	
	4.Practical measures, e.g. free condoms for workers;		Labour camps	Site Observations; worker survey	Monthly	EUCL/RESSP/S UPERVISOR SAFEGUARDS	
Workers and villagers are at risk from accidents on site	Implement Health and safety plan that includes measures to: -Exclude the public from all construction sites; -Ensure that workers use personal protective equipment and Provide Health & safety training for all personnel; -Follow documented procedures for all site activities and Keep accident reports and records; -Inform local communities about the work and dangers	Health and safety mgt. plan	Labour camps	Site Observations	Monthly	EUCL/RESSP/S UPERVISOR SAFEGUARDS	EPC
9.1.3 Operation and Maintenance							
Provision, operation and maintenance of new system	Field personnel should report power outages to the EUCL and repair faults quickly and effectively	# reports and repairs	New and existing substation	Reports observations	Monthly	EUCL/RESSP/S UPERVISOR SAFEGUARDS	EPC
	Public education to raise villagers‟ awareness of dangers of electricity and how to utilize the system safety.	Training and awareness reports	All sites	Reports observations	Monthly	EUCL/RESSP/S UPERVISOR SAFEGUARDS	EPC
	1.Follow EUCL O&M and H&S manuals and revise these manuals if necessary to increase	Training and supervision	All sites	Reports observations	Monthly	EUCL/RESSP/S UPERVISOR	EPC

	safety of workers; 2.Regular training of RESSP/EUCL workers to raise awareness of dangers and working procedures to be followed 3. Improve supervision of field workers; 4. Regular management reviews of safety record, with remedial action where necessary	reports				SAFEGUARDS	
	As above: repair faults quickly and effectively Conduct system maintenance regularly and diligently	Repair and maintenance reports	All sites	Reports Observations	Monthly	EUCL/RESSP/SUPERVISOR SAFEGUARDS	EPC

CB: Capacity Building**; O&P:** Operation& Maintenance; **RDB/EC:** Rwanda Development Board/Environmental Compliance**. EPC:** Engineering Procurement Construction

Table 5: Environmental and Social Management and Monitoring Plan (Detailed ESMMP)

7.3 Environmental Management and Monitoring Costs

The table below provides a summary of the capital (one off) costs that will be incurred by either the contractor or RESSP/EUCL during monitoring. The costs to be met by the contractor in ensuring mitigation will be contained in the final bid document and for this reason cannot be reflected in this table at this point in time. The costs for resettling and compensating the PAPs will be met by (appendix 2) and is contained in the separate Abbreviated Resettlement Acton Plan already developed as a separate document.

Table 6: Environmental Management and Monitoring Costs

Activity	**Estimated Cost in (USD)**	**Cost to be met by**
Mitigating Impacts of civil construction related works	Within Contractor"s Budget. The costs associated to mitigating the impacts of the construction activities will be met by the contractor.	Contractor/EPC
TOTAL CAPITAL COSTS	**EPC**	**EPC**

Recurring costs imply costs that will be met by the contractor- NR Electric either on annual or monthly basis. At this point in time, the costs related to replacement of new PPE will largely depend on the rate of wear and tear, however and is part of the overall bidding cost by contractors. Cost related to maintenance of the fire equipment will be met biannually and costs towards solid waste disposal will be monthly throughout the project life cycle:

Table 7: Recurring costs

Activity	Estimated Cost in (USD)	Cost to be met by
Procurement of PPE for staff	Costs to be incurred depending on the rate of wear and tear of the PPE.	Contractor/ EPC
Regular Maintenance of Fire Equipment	Tobeincludedinthe maintenance budget of EUCL and has to be available after every 6 months Per Cabin	EUCL/RESSP
TOTAL RECURRING COSTS	**As per EPC**	**As per EPC**

CHAP 8: MONITORING AND EVALUATION

Monitoring and evaluation is a key component of ESMP and is an integral part of RESSP/EUCL and contractor responsibilities and obligations and this M&E will be entirely breakdown into the internal and external monitoring based on key indicators and frequencies. Beyond commitments identified in this plan, this review will also assess overall compliance with other mitigation measures to address non-resettlement-related social impacts as the project does not involve resettlements. The types of commitments that will be verified by the external monitoring expertise include the following:

- **Pollution prevention** - dust and noise management in communities,
- Community safety - awareness raising programs in communities on communicable diseases; community awareness of project traffic routes and traffic safety briefing,
- **Infrastructure and services** - reinstatement of damaged infrastructure and compensation process; project use of water not affecting communities; and roads shared with the public are maintained in reasonable condition
- **Community liaison** - community awareness of project activities; complaints procedures; camp rules; recruitment process; project traffic speed limits; pre-warning of blasting, noisy activities and other planned disruptions; procurement process and regular community meetings and access to community liaison officers,
- **Complaint management** – follow up of complaints reported; accessibility of Community Liaison Officers; community awareness of complaints procedures and complaints close out.

8.1 Responsibilities and institutional arrangements

Table 8: Roles and responsibilities for each acting institution

ORGANIZATION	ROLES AND RESPONSIBILITY
EUCL/EARP/ RESSP team	• Supervision of implementation of ESMP and overall project activities progress • Provide utility facilities
District authorities	• Responsible in monitoring of implementation • community mobilization • Provide local administrative facility

Contractor	• Procurement of required material and equipments • Construction and rehabilitation of substations/cabins • Backfilling of opened pits during construction phase • Handling of all debris metals and other wastes generated during construction and installation phases

TECHNICAL NOTES

The ESMP report reveals that the substations/cabins rehabilitation and construction activities have both positive and negative impacts that are classified as direct, indirect and cumulative impacts. The projects have a significant number of positive impacts starting from projects design to the implementation phase.

In addition, some negative impacts will be created by the substation rehabilitation/construction; however they mitigation measures will be specifically mitigated and will be carefully given much attention during implementation phase of the project.
However, the plan mentions the following:

- The projects should be implemented as it has no significant adverse impacts on the environment
- During implementation of the alternatives considered should be complied with: the choice of the construction materials, choice of the reuse and disposal of waste water and solid wastes,
- The monitoring and evaluation process of the ESMP should be done parallel with the monitoring and evaluation of the project activities to minimize costs and save time,
- A half-yearly environmental audit shall be carried (as the project period is one year) to ensure compliance with the report recommendations for impact mitigation measures and minimization.

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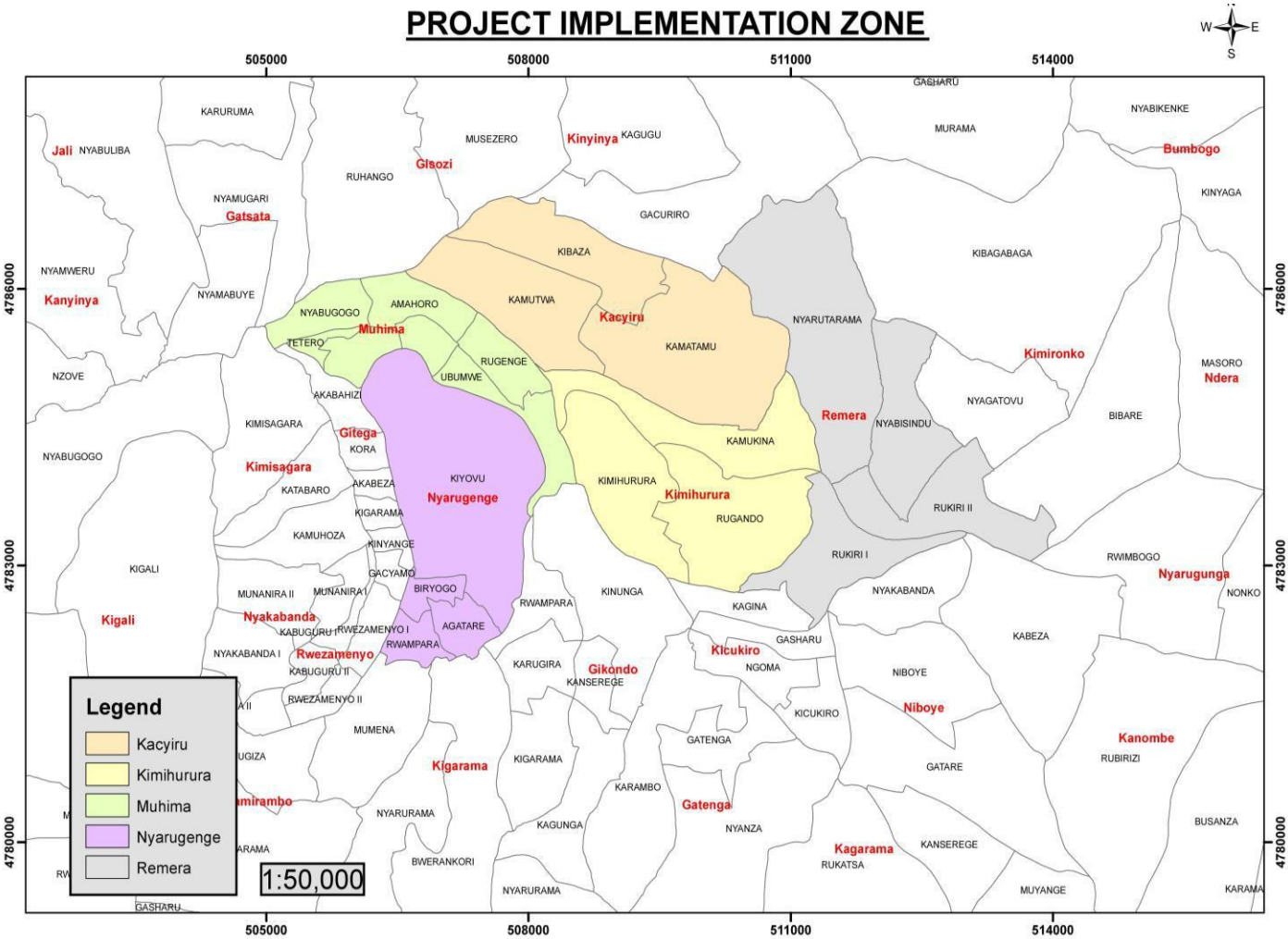
APPENDICES

1. PROJECT IMPLEMENTATION ZONE



Figur 2: PROJECT IMPLEMENTATION ZONE