MATHIRA WATER AND SANITATION COMPANY LIMITED

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT PROJECT REPORT FOR THE PROPOSED REHABILITATION OF KARATINA URBAN WATER SUPPLY PROJECT NYERI COUNTY

FIRM OF EXPERTS

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DECLARATION

FIRM OF EXPERTS

I, the undersigned, submit this Environmental and Social Impact Assessment Project Report for the Proposed Rehabilitation of Karatina Urban Water Supply, located in Karatina Town, Nyeri County. The Environmental and Social Impact Assessment has been carried out in accordance with the Environmental Management and Coordination Act, 1999 and Environmental (Impact Assessment and Audit) Regulations, 2003.

Name: _____

Signed at THIKA on this day of 2016

Signed: _____

Designation: LEAD EXPERT/DIRECTOR
MAZINGIRA & ENGINEERING
CONSULTANTS LTD NEMA Reg. No. 1734

Name: _____

Signed at THIKA on this day of 2016

Signed: _____

Designation: LEAD EXPERT/DIRECTOR
MAZINGIRA & ENGINEERING
CONSULTANTS LTD NEMA Reg. No. 1734

PROPONENT

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Name: _____

Signed at KARATINA on this day of 2016

Signed: _____
Designation: MANAGING DIRECTOR
MATHIRA WATER & SANITATION COMPANY LIMITED

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Acronyms and Abbreviations

AEZs	Agro-Ecological Zones
CBD	Central Business District
CBO	Community Based Organizations
CCD	Convention of Control of Desertification
CDE	County Director of Environment
CITES	Convention on International Trade in Endangered Species (CITES)
CO	Carbon Monoxide
CO_2	Carbon Dioxide
DFAT	Department for Foreign Affairs and Trade - Australian
DFID	Department for International Development - UK
DGIS	Directorate General for International Cooperation – Denmark
DOSHS	Directorate of Occupational Safety and Health Services
EA	Environmental Audit
EDCP	Effluent Discharge Control Plan
EDP	Effluent Discharge Points
EDT	Effluent Discharge Threshold
EHS	Environmental, Health and Safety
EHSO	Environmental Health and Safety Officer
EIA	Environmental Impact Assessment
EMCA	Environmental Management and Co-ordination Act, 1999
EMMP	Environmental Management and Monitoring Plan
ES&IA	Environmental Social and Impact Assessment
FC	Facility Code
GCS	Gravel Crushed Stones
GOK	Government of Kenya
GPOBA	Global Partnership Output Based Aid of the World Bank
Ha	Hectares
HGV	Heavy Goods Vehicles
HIV/AIDS	Human Immuno deficiency Virus/Acquired Immune Deficiency Syndrome.
IFC	International Finance Corporation
ITCZ	Inter-Tropical Convergence Zone
ISO	International Standard Organization
KFS	Kenya Forest Services
km	Kilometres
KURA	Kenya Urban Roads Authority.
KWS	Kenya Wildlife Services
LN	Legal Notice
m	metres
Masl	Metre above sea level

MAWASCO	Mathira Water and Sanitation Company Limited
MOH	Ministry of Health
mm	millimetres
NACC	National Aids Control Council
NEMA	National Environmental Management Authority
NO_X	Nitrogen oxide
OBA	Output-Based Aid
OHS	Occupational Health and Safety
PC	Public Consultation.
PAP	Project Affected Persons
PPE	Personal Protective Equipment
RE	Resident Engineer
SEA	Strategic Environmental Assessment
SERC	Standards and Enforcement Review Committee
SIDA	Swedish International Development Agency
SPA	Service Provision Agreement
STDs	Sexually Transmitted Diseases
STI	Sexually Transmitted Infections
TOR	Terms of Reference
TWSB	Tana Water Services Board
WWTP	Waste Water Treatment plant
WRMA	Water Resources Management Authority
WSBs	Water Services Boards
WUA	Water Users Association
WRMA	Water Resources Management Authority
UNEP	United Nations Environmental Program
VCT	Voluntary Counseling Testing
WHO	World Health Organization
WSS	Water Supply and Sanitation

EXECUTIVE SUMMARY

Introduction

Mathira Water and Sanitation Company Limited (MAWASCO) herein referred to as the Proponent, has proposed to rehabilitation of Karatina Urban Water Supply for Karatina Town in Nyeri County.

Launched in 2014, the World Bank's Water Global Practice brings together financing, implementation, and knowledge in one platform. By combining the Bank's global knowledge with country investments, this model generates more firepower for transformational solutions to help countries grow sustainably into the 21st century. Through the Global Partnership Output Based Aid of the World Bank (GPOBA) the World Bank has been piloting OBA approaches since 2003 as one way to help the poor gain access to essential services. A results-based approach, Output Based Aid (OBA) can help facilitate access to basic infrastructure (water, energy, sanitation, transport) or social (health, education) services for the poor by tying subsidy payments to the achievement of pre-agreed outputs. The Karatina Urban Water Supply falls under such a scheme targeting the urban households in Karatina Town and its environs.

The Government of the Republic of Kenya (GoK) has mainstreamed its National Water Policy to envisage 100 percent access to clean water and to basic sanitation services for the Country's population by 2030. To achieve this target, the Government has been implementing far reaching sector reform programs since 2002 aimed at harmonizing the management of water resources, supply and sanitation (WSS) throughout the country. This reform has been propelled by the Water Act (2002) among other national water policies. The government together with various development partners has been spearheading the water sector reforms through financing of programs towards improvement of water and sanitations services in the country. In this regard, the World Bank intends to fund the rehabilitation of Karatina Town Water Supply System in Karatina Town in Nyeri County. The project is currently under management of MAWASCO which operates within Mathira Sub-county as the main water and sewer services provider under a Service Provision Agreement (SPA) with the Tana Water and Service Board (TWSB).

The Environment Management and Co-ordination Act (EMCA), 1999, is the legislation that governs approval of projects requiring ESIA studies. The second schedule of the Act lists the projects that require EIA studies in accordance with section 58 (1-4) of the Act. It makes it mandatory for any proponent of a project, to; before financing, commencing, proceeding with, carrying out, executing or conducting or causing to be financed, commenced, proceeded with, carried out, executed or conducted by another person any undertaking specified in the second schedule in the Act, submit a project report to the National Environment Management Authority (NEMA), in the prescribed form, giving the prescribed information, accompanied by the prescribed fee. The Proponent therefore undertook this assessment to comply with this requirement of Part VI Section 58 of the Act and has produced this comprehensive Environmental and Social Impact Assessment (ESIA) Project Report for the purposes of obtaining an EIA license.

The scope of this Environmental and Social Impact Assessment covered:

- → The baseline environmental conditions of the ESIA study area;
- → Description of the proposed project;
- → Provisions of the relevant environmental laws;
- → Public consultation through administration of questionnaires;
- → Identification and discussion of any adverse impacts anticipated from the proposed Project;
- → Appropriate Mitigation Measures; and
- → Provision of an Environmental and Social Management Plan

ESIA Methodology

The study was based on a laid down scientific qualitative procedures with most recent methodologies and analysis required in ESIA and strictly adhered to relevant legislative framework governing water sector in the country. Our investigation examined the potential impact of the proposed project on the project area and immediate surroundings with due regard to all project phases from construction, operation and decommissioning.

The expert also undertook a stakeholders/public consultation where issues of concern were raised, discussed and documented. The proponent's commitment to continuous consultation is important and the experts wish to acknowledge the work of the proponent and the stakeholders/public members in identifying relevant issues and responding in a constructive manner.

Legal and Institutional Framework

An overview of the key environmental, health & safety legislation and regulations of relevance to each project component were taken into account during the ESIA exercise. The environmental regulatory context for water sector has been described in the legal section. In addition, the international conventions and treaties governing the conservation of biodiversity and control of greenhouse gases emissions have been considered, and their relevance to each of the components assessed.

National regal requirement include: Environmental Management and coordination Act (EMCA) and other sector specific acts of Parliament and regulations with a bearing on the environment. These have been discussed elsewhere in the report.

Kenya is a signatory as well as a party to various international conventions, treaties and protocols relating to the environment which aims at achieving sustainable development. According to the Registrar of International Treaties and other Agreements in Environment (UNEP 1999), there are 216 treaties, 29 of which are of interest to Kenya. The country is a signatory to 16 such agreements, which range from use of oil, protection of natural resources and protection of the atmosphere. The agreements are both regional and international and became legally binding on Kenya upon ratification thereof by the rightfully designated Kenyan Authority.

Some of these conventions include: Convention on Biological Diversity (CBD) 1993, United Nations Framework Convention on Climate Change 1992, United Nations Convention to Combat Desertification 1994, and World Bank Operational Policies among others.

Anticipated Potential Environmental Impacts

The activities to be carried out are bound to have both positive and negative environmental and social impacts. The potential impacts of the proposed project have been categorized into two: (1) Impacts on the natural environment and (2) Impacts on the human environment. Impacts on the natural environment include those on land, air and water, while the human impacts are largely health, safety, social and economic in nature. Further classification of the impacts have been done based on the project life cycle i.e. impacts during construction, operation and decommissioning stages of the project.

The main specific environment and social impacts triggered by the project include during construction and/or operation include: soil erosion, impact on biodiversity, interruption of water supply, demand on water and energy, human amenity, occupational and public health hazards, increased traffic, increased noise levels, dust and exhaust emissions, poor drainage, solid waste disposal, increased effluent and moral decay and spread of STDs and visual impacts.

Given the above summary of environment impacts the project the proposed rehabilitation of Karatina Town Water Supply will result to numerous mild negative impacts to the environment and as such is categorized under category B under World Bank Categorizations criteria.

Briefly, this study has observed that the majorities of potential impacts associated with project are of a short-term nature and will cease once the civil works phase is complete.

On the other hand, positive impacts are a direct consequence and key goals of the proposed project and include: creation of employment and improved access to clean water hence improved economy.

Mitigation of Significant Environmental Impacts

Mitigation is possible for all adverse impacts that may result from the proposed project. Proposed mitigation measures include proper site management, proper waste management, control of dust, control of noise and vibrations; best practices on occupational health and safety, proper traffic control. A system for continuous monitoring of the project activities should be put in place throughout the project life cycle. The implementation of the suggested mitigation measures will ensure that the significant impacts of the project activities are controlled.

Possible transmission of communicable disease from workers to local people and vice versa can be mitigated by creating awareness on HIV/AIDS and other related diseases and also avail health care services to deal with any incidents.

Environmental and Social Management Plan (ESMP)

A comprehensive environmental management and social plan (ESMP) has been prepared to assist the proponent and contractor address the identified adverse environmental impacts of the project. An ESMP helps in ensuring compliance with national regulatory authority stipulations and guidelines which may be local, provincial, national and/or international. The ESMP outlines the monitoring frequency, cost measurable and verifiable environmental and social indicators as well as the individual/institutions to undertake the required actions. Strict adherence to the environmental and social management plan provided is recommended to ensure environmental sustainability of the project.

Capacity and awareness building will ensure an efficient and effective implementation of the Environmental and Social Management Plan of the project. Monitoring and auditing should be conducted to ensure that negative impacts have been mitigated and minimized.

Key observations are that most adverse impacts can be resolved through careful management and coordination with relevant bodies such as the key institution and stakeholders, NEMA, NCC, National Government, Ministry of lands, WRMA, Public Health among others.

The table below lists the potential environmental and social impacts during construction, operation and decommissioning phases and includes a brief description of recommended mitigation measures.

Summary of the environment and social impacts and mitigation measures

Phase	**Environmental Impact**	**Proposed Mitigation measures**
Construction	Impact on soil resources	• Earthworks shall be controlled so as not to disturb land that is not required for the works; • Areas susceptible to erosion shall be protected by installing necessary temporary and permanent works; • Carry out excavation during the dry spell to prevent soil from being washed away by rain water; • Re-vegetate exposed areas immediately upon completion of the earthworks;
	Biodiversity loss	• Vegetation clearance shall be limited to pipeline routes; • Existing cleared or disturbed areas should be used for construction of temporary structures and stockpiling of materials; • Re-vegetate disturbed areas using indigenous tree and grass species whenever possible; • Where possible avoid felling indigenous trees and or trim the trees rather removing them;
	Exhaust and noise emissions	• Maintain construction machinery and vehicles in accordance with manufacturers specifications to keep noise and gas emissions to a minimum; • Control dust emissions by sprinkling; • Construction works should be undertaken only during daytime; • Noise standards should be enforced to protect construction workers and area residents; Workers subject to unacceptable noise levels should wear earplugs and their working time within these areas should be limited
	Construction Waste	Waste management should comply with EMCA (Waste Management) regulations 2006; • Waste disposal by burning should not be permitted; • Provide signage to ensure that the workers are sensitized on waste disposal and handling issues; • Reuse of construction waste should be done as much as

		possible; Contractor and consultant Should Include Environmental considerations in monthly progress reports and indicate progress in the implementation of mitigation measures as outlined in the EMP.
	Occupational health and safety	In order to prevent work-related accidents, there should be strict compliance with OSHA 2007 and relevant laws; • Hazardous areas should be secured and all workers should be provided with personal protective equipments; • All workers should be trained in fire response and basic first aid procedures; • Hazardous areas should be well secured.
Operation	Increased water demand	• There should be due adherence to the Safest maximum abstract-able water quantities of throughout the project life; • Adhere to WRMA water use permits; o Monitor streamflow/stage height to determine whether there is reduced downstream flow
	Management of increased domestic wastewater generation	• Plans should be put in place by the WSPs on how to address sewer and waste water from the expected effluent increase by ensuring that the sewer system is commensurate with water supply system in terms of design capacity.
	Emergency preparedness	Design and implement an emergency response plan; Coordinate with aid organizations/agencies such as with the local fire brigade; Install fire hydrants within the proposed development
	Waste management during routine maintenance	• Waste disposal from the project should comply with existing waste management practice that is acceptable under Waste Management regulation 2006; • Proponent should conduct annual training for members on safe disposal of wastes.
	Archaeological and other cultural properties	• Develop and implement a chance find procedure in case archaeological sites are found during the construction process.
	Land Acquisition and Involuntary Resettlement	• Implementatio of a Resettlement Action Plan (RAP)
Decommissioning	Waste scattering, pollution and asbestos contamination	• Remove and resell or scrap excess materials, wastes and asbestos materials accordingly.
	Social Impacts	Proposed Mitigation measures
Throughout	Increased infections of HIV/AIDS	• Provide contraceptives and create awareness for communicable diseases and other social behavior changes due to increased population interaction
Construction	Insecurity	• Provide security guards and facilities during construction periods

	Unpredictable impacts i.e digging up graves, hostility during digging etc	• Ensure significant reconnaissance study of the area before trenching begins and also consult with the owners of the areas to ensure such areas are not affected
	Spread of communicable diseases and other infections	→ Treat affected local and migrant workers → Ensure awareness raising on proper sanitation and personal hygiene to promote proper health. → The contractor should also establish a relationship/agreement with local hospitals to have regular checkups and treatment for workers
	Impacts of temporary project induced labor influx.	• Put in place a Labor Influx Management Plan • Put in place a Workers' Camp Management Plan
	Child Labor	• All work of persons under the age of 18 will be subject to an appropriate risk assessment and regular monitoring of health, working conditions, and hours of work.
	Gender based violence and Sexual harassment	• Undertake regular M&E of progress on GBV activities, including reassessment of risks as appropriate. Implement appropriate project-level activities to reduce GBV risks prior to civil works commencing •

The proposed project will have both positive and negative impacts as outlined in this report. Overall no adverse environmental and social impacts are foreseen that cannot be mitigated, provided the project activities are done with due attention to the mitigation and management measures outlined in the ESMP. On the other hand, positive impacts are a direct consequence and key goals of the project implementation. We therefore recommended that the proponent be granted an EIA license for the proposed project.

Recommendations

The recommendations made in this report are summarized as follows:

→ Inform local people on the details and progress of the project, particularly those who will be affected by the civil and realignments works;

→ Source labour from the local communities and where possible procure construction materials and services locally

→ Ensure proper awareness for stakeholders on environmental, social, gender and HIV/AIDS issues. This should be done in collaboration with NEMA, NACC, MOH and relevant NGOs.

1.0 INTRODUCTION

1.1 Background

Environmental Impact Assessment (EIA) is one of the proven management tools for incorporating environmental concerns in development process and also in improved decision making. The growing awareness, over the years, on environmental protection and sustainable development has further given emphasis on sound environmental management practices through preparation of Environmental Management Plans (EMPs) for minimizing the impacts from developmental activities.

The ESIA has been undertaken to fulfill the legal requirements as outlined in Sections 58-69 of the Environmental Management and Co-ordination Act (EMCA) 1999 (amended 2015) and Part II of the Environmental (Impact Assessment and Audit) Regulations 2003.

Under Part VI Section 58 of the Environmental Management and Coordination Act 1999, any person, being a proponent of a project is required to apply for and obtain an Environmental Impact Assessment (EIA) license from National Environment Management Authority (NEMA) before he/she can finance, commence, proceed with, carry out, execute, or conduct any undertaking specified in the 2nd Schedule of the Act.
In addition, the ESIA is carried out in accordance to the World Bank OP 4.01 on Environmental Assessment. The Bank requires environmental assessment (EA) of projects proposed for Bank financing to help ensure that they are environmentally sound and sustainable, and thus to improve decision making.

The Proponent therefore undertook this assessment to comply with this requirement and has produced this comprehensive Environmental and Social Impact Assessment Project Report as required by NEMA for purposes of obtaining an EIA license.

1.2 Global Partnership Output Based Aid of the World Bank (GPOBA)

According to the World Health Organization: “1.1 billion people globally do not have access to improved water supply sources whereas 2.4 billion people do not have access to any type of improved sanitation facility. About 2 million people die every year due to diarrheal diseases, most of them are children less than 5 years of age.”

GPOBA is a partnership of donors working together to support output-based aid (OBA) approaches. GPOBA was established in 2003 by the United Kingdom’s Department for International Development (DFID) as a multi-donor trust fund administered by the World Bank. Since 2003, four additional donors have joined the partnership: the International Finance Corporation (IFC), the Dutch Directorate General for International Cooperation (DGIS), the Australian Department for Foreign Affairs and Trade (DFAT), the Swedish International Development Agency (SIDA).

GPOBA’s mandate is to fund, design, demonstrate, and document OBA approaches to improve the delivery of basic services to the poor in developing countries. OBA approaches have been tested in every region and applied in six sectors, including energy,

water and sanitation, health, solid waste management, education, and information and communication technology (ICT). OBA projects have taken a diversity of approaches, each one with a unique design and financial model, incorporating lessons learned from previous experiences.

Pilots have been implemented in urban, peri-urban, and rural areas, employing public and private operators, public-private partnerships (PPPs), nongovernmental organizations (NGOs), and community organizations as implementing agencies and service providers

Over the last decade, macro-economic conditions in Kenya have improved, as has the welfare of the general population. However, about 43 percent of the population lives below the national poverty line, 1 with many in this segment lacking access to water, sanitation and other basic services.

The Water Services Regulatory Board (WASREB) estimates urban and rural water access to be 54 percent and 51 percent, respectively. Sanitation access is estimated to be 73 percent for urban and 70 percent for rural. Sewerage coverage is low, and the use of on-site methods is common.

County-owned water services providers (WSPs) provide services to 48 percent of the population, and communities operate many small piped-water systems in rural and peri-urban areas. Operational and financial performance of providers is mixed, and only about half of 100 licensed WSPs cover operating and maintenance (O&M) costs through user fees, with weaker utilities relying on grants to sustain their operations.

The Kenya Water Act of 2002 introduced important reforms in the sector, separating responsibilities for asset ownership and operation, creating autonomous utilities and an independent sector regulator, ring-fencing revenues within the sector, and establishing a framework for utilities and other WSPs to move toward cost-reflective tariffs. Considerable public investment has been put into state owned Water Services Boards (WSBs) to build and rehabilitate water-resource assets managed by WSBs, as well as treatment and distribution infrastructure operated by WSPs.

The Kenya Vision 2030 national development plan seeks to make basic water and sanitation available to all by 2030.

The annual cost of investment and rehabilitation in water supply is estimated at $303 million, and the sector has typically looked to the Government of Kenya (GoK) and development partners for its funding. But with a budget allocation of only $193 million,3 there is a considerable gap in financing. This gap could be partially filled through private sector lending to utilities, typically for revenue generating investments with a shorter payback period. However, commercial lending to water utilities is in its nascent phase. Banks still see the sector as financially weak and unable to generate sufficient returns. Moreover, WSPs have limited capacity to provide collateral to secure loans and do not generate sufficient self-financing. Many have only a limited relationship with commercial banks and are not familiar with lending practices and what is needed to become creditworthy. These factors increase lending risk considerably. Furthermore, commercial

interest rates are high, making it difficult for this source of financing to gain traction without strategic support from the international finance community to lower the weighted cost of borrowing.

In 2007, the World Bank launched a pilot with K-Rep Bank, a commercial bank specializing in microfinance lending, to incentivize rural and peri-urban communities to access loan finance to rehabilitate and expand small piped-water systems. Under the Maji ni Maisha loan program, investment projects of up to $200,000 that had potential to cover O&M costs and partially repay loans were identified. Qualifying communities contributed 20 percent of project cost up front, and K-Rep financed 80 percent through a medium-term loan. On achieving pre-agreed targets,4 an output-based grant of up to 40 percent of project cost was awarded to communities that successfully implemented sub-projects.

1.3 Scope of the Environmental and Social Impact Assessment (ESIA)

The Kenyan Government Policy on all new projects, programs or activities requires that an environmental impact assessment is carried out at the planning stages of the proposed undertaking to ensure that significant impacts on the environment are taken into consideration during the design, construction, operation and decommissioning of the Project.

The World Bank OP 4.01 on Environmental Assessment requires environmental assessment (EA) of projects proposed for Bank financing to help ensure that they are environmentally sound and sustainable. The Bank undertakes environmental screening of each proposed project to determine the appropriate extent and type of EA. The Bank classifies the proposed project into one of four categories, depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts. the proposed project is categorized under category B under World Bank Categorizations criteria. Category B: A proposed project is classified as Category B if its potential adverse environmental impact is less adverse than that of Category A projects. Typically, this is site-specific, few if any are irreversible, and in most cases normal mitigation measures can be designed more readily.

The scope of this Environmental and Social Impact Assessment covered:

- → The baseline environmental conditions of the ESIA study area;
- → Description of the proposed Project;
- → Provisions of the relevant environmental laws;
- → Public/stake holders consultation
- → Identification and discussion of any adverse impacts to the environment anticipated from the proposed Project;
- → Appropriate Mitigation Measures; and
- → Provision of an Environmental Management Plan

1.4 Objective of ESIA

The specific objectives of the Environmental and Social Impact Assessment (ESIA) are to:

- Collect and analyse baseline information for physical, biological and socio-economic environments in the project area;
- Discuss the legal and regulatory issues associated with the proposed project;

- To assess and predict the potential impacts during site preparation, construction and operational phases of the proposed Project;
- To make suggestions of possible alterations to the proposed Project design based on the assessment findings;
- Propose appropriate mitigation measures for any negative impacts and enhancement measures for the positive impacts resulting from implementing the project;
- Allow for public/stake holders participation in order to incorporate their views during project implementation;
- Prepare an environmental management plan;
- Prepare an ESIA Project Report for submission to NEMA.

1.5 Terms of Reference (TOR) for the ESIA Process

The TOR for this Environmental and Social Impact Assessment is based on the Environmental (Impact Assessment and Audit) Regulations dated June 2003. According to the Regulations, the Project Report should where possible, contain description of the following:

→ Description of the nature of the proposed project;
→ The location of the project including the physical area that may be affected by the project's activities;
→ The activities that shall be undertaken during the proposed Project construction, operation and decommissioning phases;
→ The design of the proposed project;
→ The materials to be used, products and by-products, including waste to be generated by the proposed project and the methods of their disposal;
→ The potential environmental impacts of the proposed project and its activities and the mitigation measures to be taken during and after implementation of the project;
→ Mitigation measures for the prevention and management of possible accidents during the proposed project cycle;
→ Mitigation measures for health and safety risks faced by the workers and neighbouring communities;
→ The economic and socio-cultural impacts to the local community and the nation in general;
→ The project cost; and
→ Any other information the Authority (NEMA) may require.

1.6 Methodology of ESIA

The Environmental and Social Impact Assessment (ESIA) was carried out based on site investigations, document review and consultations with the residents/stakeholders. The consultation was done through a structured residents/stakeholders meeting. The data collection was carried out through observations during site visits, desktop environmental and social studies in the manner specified in Part V (Regulation 35) of the Environmental (Impact Assessment and Audit) Regulations, 2003.

(i) Screening/Scoping

This was the first step on evaluation of requirements of ESIA on the proposed project. The project is listed under the Second Schedule of EMCA 1999, as projects that should undergo Environmental and Social Impact Assessment.

The proponent representatives namely the project manager who was the Technical Manager, the Geographical Information System desk officer took the consultants through the documents describing the project, existing network, project scope and site visits to the project sites on various dates in April and June 2016.

During scoping, discussions were primarily held with the project proponent; project consultants and stakeholders, and involved clarification of the proposed project and environmental aspects that need to be considered during project implementation.

ii) Desktop Study and Field Survey

A desktop study was conducted to review available published and unpublished reports and relevant Kenya Government Legislations in order to compile relevant baseline biophysical and socio-economic information about the study area and the Project.

Project documents, bills of quantities descriptions, project layouts and maps were discussed with the proponent team during this stage. Institutional memory on layouts was also explored where there were information gaps and secondary site visits were made to verify data.

Field visits were conducted in the study area in order to collect site-specific information on the biophysical and socio-economic environment and to cross-check the secondary data that had been compiled during the desktop studies.

While at the site, environmental data were recorded and potential impacts identified. In addition, environmental features relevant to the study were noted and photographs taken as record of key features.

iii) Stakeholders Consultation

Public/stakeholders' consultations were undertaken through questionnaires between Thursday 19th and Friday 26th May 2016. The consultation was meant to give an indication of whether the proposed project is welcome and the immediate perceptions that the affected parties associate with it. The public consultation addressed the following:

1. Inform the Karatina Town residents on the proposed rehabilitation of Karatina Town Water Supply System located in Karatina Town, Nyeri County;
2. Establish if the residents foresee any positive or negative environmental effects from it; and

3. Seek views, concerns and opinions of the stakeholders likely to be affected by the Project.

(ii) Impact Assessment and Analysis

A checklist was used as a starting point for collecting baseline information and carrying out the assessment. Results of the evaluation were then used in identifying those environmental effects which are likely to be key issues in relation to the environmental impacts and sustainability of the project. The next step involved identification of changes that are most significant and the assessment of the overall impact of all changes.

Data collection was carried out through observations, photography, site visits and consultation with stakeholders. Visual inspections were carried out in the proposed project area to identify physical features, land use, vegetation cover, and existing infrastructure and land development.

The assessment and analysis methodology for the ESIA was based on multi- disciplinary approaches and structured to allow for holistic study and assessment of the following key components of the environment in relation to the proposed Project:

→ Physical/chemical component;
→ Biological/ecological component;
→ Sociological/cultural component; and
→ Economic/operational component.

(iii) Consultant's Compliance

As required by Regulation 14 of the EIA/Audit Regulations, **Mazingira & Engineering Consultants Ltd** is registered and licensed by NEMA as a Firm of Experts in Environmental Impact Assessment and Audit, and are therefore authorized to undertake Environmental and Social Impact Assessment and submit a report. A copy of the current practicing License for the year 2016 has been provided in the Annex of this ESIA Project Report.

(iv) Reporting and Documentation

A comprehensive ESIA Project Report containing the findings has been compiled by the Firm of Experts in accordance with NEMA guidelines for consideration and approval. In preparing the Project Report, the Experts paid attention to the following issues as specified in the second schedule of the Environmental (Impact Assessment and Audit) Regulations, 2003:

→ Ecological considerations including: Biological diversity, sustainable use, and ecosystem maintenance;
→ Social consideration including: Economic impacts, social cohesion or disruption, effect on human health, communication, and effects on culture and objectives of culture value.

Summary of Methodology

PERIOD	ACTIVITY
9th May 2016 to 13th May 2016	• Project preparation • Pre-visit activities • Screening • Development of questionnaires/interview schedules for: • Project proponent/consultants • Business community/Locals /project affected parties • Relevant statutory authorities • Other interested stakeholders
May And June 2016	Consultation with Technical Manager - Mawasco, and the Geographical Information System desk officer who took the consultants through the documents describing the project, existing network, project scope and site visits to the project sites on
16th May 2016 to 2nd June 2016	Site visits: baseline studies, data collection, desktop studies (questionnaires and associated documentation) Evaluation and verification of findings, Identification of potential impacts through site visits, quantification/prediction of impacts
Thursday 19th And Friday 26th May 2016	• Public/stakeholders consultation and participation.The consultation was done from door to door along the pipeline routes through structured questionnaires • This representation was drawn from single dwelling units, multi-dwelling units, plot owners, commercial premises and general public.
6th June 2016 to 29th June 2016	• Selection of mitigation measures for all the potential impacts. • Development of the EMP • Development and peer review of the draft report • Submission of the draft reports to the MD – Mawasco

1.7 Report Structure

The scope of the study complied with Kenyan legislative requirements set out in Part IV of the EMCA, and also conformed to the provisions for ESIA required by the Environmental

(Impact Assessment and Audit) Regulations 2003 and the World Bank Operational Principle4.01 on Environmental Assessment. This report represents the findings of the ESIA and is structured as follows:

Declaration
Acronyms
Table of Contents
Preface The executive summary which highlights the main results of the ESIA

Section 1 Provides an introduction to the project and sets out the contents of the report

Section 2 Describes the project design and proposed activities.

Section 3 Describes the baseline environmental conditions in the project area in sufficient detail to enable an adequate assessment of probable environmental impacts. The baseline studies were desk based, but was supported with secondary data and interviews with stakeholders.

Section 4 Outlines the environmental policy, institutional and legislative framework in Kenya and identifies the provisions of ESIA required by NEMA. International treaties and agreements on environmental protection and conservation to which the GOK is committed are also outlined.

Section 5 Describes the public/stakeholders consultations.

Section 6 Describes the alternative options for the project.

Section 7 Describes the potential environmental impacts of the proposed project. The assessment includes an evaluation of impacts associated with the construction, operation and decommissioning phases.

Section 8 Describes the mitigation measures for the potential negative impacts. **Section 9** Presents an environmental and social management plan

Section 10 Presents the Conclusion and Recommendations.

2.0 PROJECT DESCRIPTION

2.1 Project location

The project covers a total of 4 km long and traverses through Karatina Town, Nyeri County. It starts at water reservoir area and takes a southerly direction passing through the CBD area, then cuts across A2 highway before ending at Karindundu area. The project is currently under management of MAWASCO which operates within Mathira Sub-county as the main water and sewer services provider under a Service Provision Agreement (SPA) with the Tana Water and Service Board.

A map of the proposed supply area is included in appendix. The appendix of this report contains selected photographs which give a comprehensive pictorial representation of the obtaining scenario along the pipeline route.

2.2 Background Information of MAWASCO

Mathira Water and Sanitation Ltd (MAWASCO) comprise of two water schemes namely Karatina Urban and Mathira Rural Water schemes. The schemes consist of the old water scheme previously operated by National Water & Conservation Corporation in the rural areas and Government operated systems in urban centre i.e. Karatina Town . These two schemes inclusive of the newly constructed water projects are all being currently operated by Mathira Water and Sanitation Company (MAWASCO)

Current operations data

(i) MAWASCO WSP is served by water supplies originating from different water sources namely:-

   a. Rural Water Supply – old system originating from Ragati River (cross weir constructed in 1970`s)
   b. Ragati Water Supply – new system originating from Ragati dam to Canteen and Karindundu localities where it joins the old system, i.e. Mathira East areas
   c. Hombe water supply – new system originating from Hombe dam to Tumutumu tank (Mbogoini area) i.e. Mathira West areas
   d. Urban water supply – system operating from Ihwagi treatment works to Karatina Municipality.

(ii) Area covered by MAWASCO is 320 km^2 i.e. Mathira east and West Sub-counties
(iii) Current population based on 2009 census is 148,847 people
(iv) Population served by the WSP is 55,390 people (37.2% as at September 2015)
(v) Current connection status as at September 2015

2.3 Project Justification

Water is the essence of life and a natural resource to be publicly owned and enjoyed. Human survival depends on water. The importance of water as a vital resource for human survival was recognized as early as 1946 by the international community. In 2002, UNESCO officially recognized it as an independent human right. Water's recognition as an independent human right implied that it is the duty of every state to respect, protect and fulfill this basic human requirement and thereby prevent undesirable corporate interference in its accessibility.

The existing Karatina Town Water Supply System dates back to the 70s when pollution was still low and available water infrastructure was adequate for the population. Other factors that have remained constant are water pipe network and lack adequate investment in water investment in the region commensurate with a growing demand. Encroachment on road reserves and permanent structures over pipelines have also made maintenance and organized extensions impossible leading to a disorganized connections and theft of the important resource in addition to leaks.

The project will involve augmentation of already existing systems which implies that majority of the infrastructure will be setup in areas of already existing infrastructure and no new acquisition is envisaged. The project will address the above problems which will interfere or lead to disturbance on encroached areas to replace the old network.

To prevent extended supply interruptions, the project intends to put in a new system parallel to the existing system and once complete, even if in phases, switch over seamlessly to the new system. Since only regular genuine connections will be reconnected, once the switch over is done, most system losses will be addressed. The project intends to have sectoral master metres to monitor consumption in various blocks of the supply system such that system losses can be narrowed down and addressed efficiently when they occur.

Some of the piped network includes old asbestos pipes some of which is not under use. Their removal or retention based on cost and risk will be important due to its potential hazardous effect on human health.

2.4 Background of Karatina Urban Water Supply

(i) Service area

The area to be served by the project is Karatina Municipality covering an area of 12 km^2 with a beneficiary population of 25,000 people. The water supply scheme for the area is Karatina Urban Water Supply that gets water from Ihwagi treatment works.

The connection status of Karatina Water supply is as follows;

Connection type	**Status**		
	Active	**Inactive**	**Total**
Domestic	3,034	706	3,740
Institutions	51	4	76
Commercial	536	-	533
Total connections	3,621	731	4,349

In addition Karatina Town has sewerage network with a treatment plant at Kiamwangi area. The number of sewer connections is 2,440.

(ii) Challenges in water supply system

There are quite a number of challenges we encounter as we endeavor to supply water to all residents of Karatina Municipality. These include;

- → Low water supply coverage especially in most outskirts of Karatina Town
- → Inactive connections as a result of low water supply (731 number)
- → Old dilapidated water & sewerage system which has never been augmented since construction in the 1970`s
- → Low pressure in the system such that not all areas get adequate water
- → Operational hours are few. (currently doing less than 12 hours)
- → Rapid increase in population leading to high demand of water

2.5 Scope of Works for Rehabilitation of Karatina Urban Water Supply

2.5.1 Scope and project brief

This project entails construction of a trunk main of 5 kilometres and rehabilitation of pipe network within Karatina Urban Municipality of various sizes of approximately 39km totaling 44 kilometres at an estimated cost of Kshs 87.8M. The objective of the project is to revive 700 inactive connections.

Scope of works (project brief)

→ Replacement of 39 km distribution lines of various sizes ranging from 15mm to 160mm within Karatina Town.
→ Construction and equipping of a meter testing laboratory.
→ Procurement of leak detection equipment.
→ Installation of GIS for urban reticulation system.
→ Metering of 3500 connections and installations of 11 Nr. Master metres.
→ Construction of inspection chambers for master meter and control valves for the various DMA

Generally, the works to be executed under the Project comprise mainly of but are not limited to the following:

Item	**Rural**			**Urban**		
	Active	**Inactive**	**Total**	**Active**	**Inactive**	**Total**
Domestic	4,042	11,881	15,923	3,034	706	3,740
Institutions	64	69	133	51	25	76
Commercial	102	-	102	536	-	533
Total active connections	4,208	11,950	16,158	3,621	731	4,349

2.5.2 Raw Material Requirements

The pipe Laying of 150 mm & 300 mm dia. are of IS approved make, Marginal quantity of Cement, Sand, Bricks and Concrete will be required.

Table 2.3: Raw Material Requirements

Sr. No.	**Raw Material**	**Unit**	**Source**	**Mode of Transport**
1.	R.M.C	Cu.M.	Nearer suppliers	Trucks
2.	HDPE Pipes	Nos	Nearer suppliers	Trucks
3.	Metal	Cu.M.	Nearer suppliers	Trucks
4.	Sand	Cu.M.	Nearer suppliers	Trucks

2.5.3 Power Supply

No major Electric supply required; 5 HP pumps may be required for dewatering ground / body water pipeline if required.

2.5.4 Water Supply and Sewerage System

Construction Phase:

Water Requirement: Not required
Drinking: Required
Construction: Required

Treatment: Not Applicable

Operation Phase:

No water requirement

2.5.5 Solid Waste Management

Construction Phase:

During the construction phase, a considerable quantum of waste generated at the project site would be inert waste, which largely comprises of clay, sand, gravel, concrete, asphalt, pipes, conduits, light steel material, stone, bricks, plastic, paper, metal and glass.

Operation Phase:

No solid waste generation

2.5.6 Methodology of Laying of Pipelines.

Lying of water mains and service lines is as under.

- → Cutting down and/or uprooting of any shrubs, trees or any vegetation from the site; and
- → Removal of any obstructions on site which include structures built along the pipeline route, tree stumps, rocks and boulders, disused structures, etc.
- → Excavation road from 0 level to 0.45 m below ground level
- → Excavation in soil strata 0.45m below ground level to 1.5 m
- → Preparing the base for laying of line
- → Laying the pipe line and jointing the pipes with titan joint with socket and spigot pipe ends.
- → Making connections, fixing the mechanical joints, fixing fire hydrants, and other fixtures.
- → Testing & chlorination of the pipe line.

No lead will be used for jointing the pipe line, the pipe lines will be joined by Socket and spigot pipe.

2.5.7 Relocation of Utility Services

There are existing utility services such as Fiber optic cables, Kenya Power (KP) poles along the same project path/road reserves. To avoid any damage to the utility services, the proponent should map out the affected services and notify the service providers for the said services in case of any damages.

The trunk main will cross the A2 highway and this will require authorization from Kenya Highways Authority (KeNHA) to micro-tunnel or cut across the road. Micro-tunneling is the most appropriate method as it causes minimum destruction to the road infrastructure though with a cost implication.

2.6 Estimated Project Cost

The Proposed Project is estimated to cost a total of Kenya Shillings Eighty Seven Million, Seven Hundred Thousands (Ksh. 87,800,000). A summary BOQ of the proposed project is attached in Annex.

2.7 Duties of the contractor/proponent

Proponent/contractor shall be responsible for the following measures to protect the environment:

- → It will be the duty of the proponent to ensure that all legal requirements as pertaining to the project are met as specified by the law.
- → Compliance with national and local statutes and regulations relating to protection of the environment. The contractor will be responsible for familiarizing himself with all existing national and local legislation in this regard
- → All construction activities shall be carried out using the best possible means to reduce environmental pollution such as noise, dust and smoke. All vehicles and plant shall be regularly serviced in accordance with the manufacturer's recommendations to ensure that they operate efficiently and without excessive noxious emissions.
- → The contractor shall at all times maintain all sites under his control in a clean and tidy condition and shall provide appropriate and adequate facilities for the temporary storage of all waste prior to disposal
- → The contractor shall be responsible for the safe transportation and disposal of all waste generated as a result of his activities in such a manner as will not give rise to environmental pollution in any form, or hazard to human or animal health.

- → The contractor shall be responsible for the provision of adequate sanitary facilities for his workforce, and that of his sub-contractors, at all construction and ancillary sites. The contractor shall not allow the discharge of any untreated sanitary waste to groundwater or any surface watercourse
- → Prior to the mobilization of the workforce the contractor shall provide details of proposed sanitary arrangements which should be in conformity with OSHA 2007 requirements.
- → The contractor shall regularly dowse with water all exposed dirt surfaces to reduce dust levels
- → The contractor shall take all reasonable measures, at all sites under his control, to prevent spillage and leakage of materials likely to cause pollution of water resources. Such measures shall include, but not be limited to the provision of bunds around fuel, oil and bitumen storage facilities, and provision of oil and grease traps for servicing and fuelling areas.

→ The proponent/contractor shall be responsible for ensuring that exposed surfaces are re-vegetated as construction progresses.

→ The contractor shall ensure that fires do not start within the sites or in the environs thereto as a result of the works or from the actions of his employees. The burning of waste, such as vehicle tyres causes noxious emissions will be

prohibited. The c ontractor shall have available at all times trained fire-fighting personnel provided with adequate fire-fighting equipment to deal with all fires. The contractor shall additionally at all times provide sufficient fire protection and fighting equipment close to works which constitute particular fire hazards.

→ The contractor in conjunction with line ministries and, organizations such as Ministry of Health, N A C C , NGOs and Community Based Organization (CBO) should be involved in creating awareness on HIV/AIDS and other STDs in order to play a role in the control of the spread of the infectious diseases

→ The contractor is required to be conversant with chance find procedures in case the civil works such as excavations unearth materials that are considered historic in nature. Chance find procedures requires that once excavated materials are considered to of historic importance the site is sealed off , left undisturbed until a qualified archaeologist verifies if the material is of historical importance or not. If material is found to be of historic importance an emergency evacuation is done to collect the material for further investigation or safe keeping by the Museums of Kenya.

→ The contractor shall ensure that the safety of the workers and the community in the project area is safeguarded as required by the Occupation Health and Safety Act 2007. This shall include ensuring that the design components and operation procedures minimize exposure of workers and, the general public to risks and, hazards and, ensuring all environmental and social safeguards on air quality, water quality, energy conservation, water conservation, hazardous material management, waste management and noise and land contamination are maintained within the recommended standards.

3.0 ENVIRONMENTAL AND SOCIAL BASELINE INFORMATION

3.1 Introduction

The following baseline information describes the environmental, socio-economic and bio-physical characteristics of the site. It is expected that it will provide for a benchmark for continued monitoring and assessment of the impact of project on the environment.

3.2 Geographic location

The project is located in the outcast of Karatina town as shown in the location plan and neighbours several commercial/residential premises. The project area lies at an altitude of 1700m above sea level, but this height ranges from 1600m (to the east) to 2000m (to the West). It is located between longitude 37^{o} 05' & 37^{o} 10' east and between latitude 0^{o} 25' & 0^{o} 30' South about 40 km South of the Equator and situated at an elevation of about 5,500 feet above sea level, placing its high affect for the cooler air to keep its temperatures moderate.

3.3 Climate

3.3.1 Average daily temperatures

The average daily temperature throughout the year varies slightly from month to month with average temperatures of around 16.8 ^{o}C during the months of July and August to about 20^{o}C in March. But, the daily range is much higher, with the differences between maximum and minimum temperatures each day around 10^{o}C in May and up to 15^{o}C in February. Between the months of June to September, southeast winds prevail in the coastal parts of Kenya and last up to several days without a break. The clouds cause day temperatures to remain low and most times the maximum temperature stay below 18^{o}C. The minimum temperatures also remain low during cloudy nights, usually hovering around 8^{o}C and sometimes even reaching 6^{o}C. Clear skies in January and February also bring colder nights.

3.3.2 Average Rain Amounts

The average rainfall ranges between 500 mm - 2,400mm. The area experiences Equatorial rainfall due to its location and being within the highland equatorial zone of Kenya. The rainfall is influenced by the rain shadow caused by Mt. Kenya and the Aberdare Ranges. With routinely high relative humidity figures, it is not surprising that the area climate is one that produces much rain annually. In fact, from the past 50 years, the expected amount of rain could be anywhere in the range of 500 to 1500 mm, with the average

ringing in at 900 mm. The majority of these rainfall figures crash down in the area in one major and one minor monsoon seasons respectively. The major monsoon season occurs within the months of March to May, and is called the "Long Rains" by the locals. The minor monsoon seasons emerges within the October to December Months, and is called the "Short Rains" although this pattern is occasionally disrupted by abrupt and adverse climatic conditions. That is what the meteorologists as a whole know about the monsoon seasons. What they do not know is exactly when these seasons will start. There is usually not an indication of when these rainy seasons will start, since it is difficult to determine when one starts and when the other finishes.

3.4 Geology and hydrogeology

(a) Geology and soils

The wider area, including the site, is covered by tertiary volcanic rocks, mainly of alkaline type, and can be broadly grouped as follows:

- The trachytes and trachytic tuffs, which outcrop to the southwest;
- The Simbara Series, mainly basalts that outcrop in several patches and in the west;
- The Kenyte group, mainly porphyritic phonolytes, synytes and agglomerates;
- The Thomson Falls phonolytes.

Soil around the site area can broadly be classified as Andosols and Histosols. Whereas the Andosols are well drained, moderately deep to very deep, dark reddish brown clay loam to clay soils with a humic topsoil, the Histosols are imperfectly drained and relatively shallow, very friable, acid humic to peatly, loam to clay with rock outcrops and ice in the highest parts. Red soils are commonly 3-7m thick resulting from rock decomposition, while black soils cover most of the flatter ground. Distribution of red and black soils depends on drainage and oxygenation rather than nature of bedrock

(b) Hydro-geology

The area lies in the Tana River Drainage Basin where major rivers drain from the West and flow towards the Eastern direction as dictated by the topographical features. As the rivers pass through the towns and settlement area, industrial effluents, municipal waste and siltation heavily pollute them.

The water for the project is drawn from the River Ragati and after use is treated by means of a wastewater treatment plant and discharged back into the river. The effluent is treated according to National Guidelines and measured regularly to ensure the water is not polluted downstream.

3.5 Biodiversity

Flora

The general area is planted with vegetation (trees) mostly along the roads, plot boundaries and in designated gardens within the respective plot boundaries. The

proposed project route has no rich vegetation except grass and isolated trees and bushes. Within and in the immediate neighbourhood, there is no vegetation of special conservation or cultural importance.

Fauna

The site is situated within an area zoned for commercial and residential use where human activities have altered the natural habitat over the years. Consequently, there are no major animals in the environs except birds, insects, and small rodents. Therefore there is no fauna threatened by the proposed project.

3.6 Social - Economic

3.6.1 Infrastructure

The area is well served, with good communication and transport. This network facilitates transportation of agricultural products from the area to Nairobi and other parts of the country. Due to such rapid urban growth, provision of basic infrastructure for all has become an important concern in the area. Basic infrastructural services that have deteriorated due to such rapid increase in population include: Solid waste management system; drainage; roads; energy demand. Environmental pollution and other problems have been the result of under-provision of such basic services.

3.6.2 Demography

The average population density is high at approximate 744 persons/km^2. High density, as is typical in a number of rural towns in Kenya, is an indicator of ecological potential and is a strong determinant of settlement patterns in the project area.

Drastic increase in the resident population is not expected since the project is both small scale in nature and will also employ locals for all non-skilled work. As such social impacts associated with in-migration (e.g. increased crime levels and cases of sexually transmitted infections during construction stage) will not be major issues in the proposed development.

Karatina Town is a densely populated area as compared to other towns ranking behind Nyeri Town, but ahead of Mukurweini, Othaya and Naromoru among others.

Table 3.1: Population of Mathira Constituency by County Assembly Wards

Name	Population	Area -km^2	Description
Ruguru	22,946	94.00	Gatung'ang'a, Karuthi, Hiriga, Chieni, Ruturu, Kiamariga, Iruri and Sagana Sub–Locations of Nyeri County

Magutu	24,114	35.30	Gatei, Gitunduti, Gaikuyu, Gathehu and Gikumbo Sub–Locations of Nyeri County
Iriaini	27,652	49.90	Chehe, Kairia, Kiamwangi, Gatundu, Kaguyu and Kiaguthu Sub–Locations of Nyeri County
Konyu	21,959	31.80	Mukore, Gakuyu, Gachuku and Karindundu Sub–Locations of Nyeri County
Kirimukuyu	28,898	54.30	Gachuiro, Ngaini, Mutathi-Ini, Thaithi, Ngandu, Mbogoini, Thiu and Kiria Sub–Locations of Nyeri County
Karatina Town	23,278	31.30	Cheru/Kiangararu, Kiharo/Biashara, Muthua/Giakairu, Ragati, Baricho, Ichuga and Itiati Sub–Locations of Nyeri County
Total	148,847	296.60	

Source: Independent Electoral and Boundaries Commission (IEBC)

Table 3.2: Gender, Age group, Demographic indicators and Households Size by County, Constituency and Wards.

County /constituency /ward	Gender			Age group						Demographic indicators				Proportion of HH members			
	Total pop	Male	Female	0-5 yrs	0-14 yrs	10-18yrs	15-34yrs	15-64yrs	65+ yrs	Sex ratio	Total dependency ratio	Child dependency ratio	Age dependency ratio	0-3	4-6	7+	Total
Nyeri county	679,236	331,365	347,880	92,013	229,302	127,981	230,379	405,204	44,730	0.953	0.676	0.566	0.110	55.4	37.9	6.7	199,476
Mathira constituency	147,267	71,093	76,174	18,953	47,644	27,042	48,714	88,420	11,203	0.933	0.666	0.539	0.127	55.6	38.0	6.3	43437
Ruguru	22,908	11,212	11,696	3,075	7,831	4,510	7,105	13,148	1,929	0.959	0.742	0.596	0.147	53.2	38.9	7.8	6,513
Magutu	19,366	9,469	9,879	2,373	6,341	3,757	6,238	11,501	1,524	0.957	0.684	0.551	0.133	52.0	41.2	6.8	5,471
Iria-ini	27,463	13,163	14,300	3,423	8,842	4,949	8,848	16,648	1,973	0.920	0.650	0.531	0.119	56.7	38.2	5.2	8,314
Konyu	21,824	10,527	11,297	2,914	7,068	3,867	7,319	13,092	1,664	0.932	0.667	0.540	0.127	56.0	38.6	5.3	6,535
Kirimukuyu	28,481	13,754	14,727	3,683	9,331	5,316	8,731	16,473	2,677	0.934	0.729	0.566	0.163	52.0	40.4	7.6	7,977
Karatin	**27,225**	**12,96**	**14,257**	**3,48**	**8,231**	**4,64**	**10,47**	**17,558**	**1,436**	**0.91**	**0.551**	**0.469**	**0.082**	**61.**	**32.**	**5.6**	**8,627**

a town		**8**		**5**		**3**	**3**			**0**				**8**	**6**		

3.6.3 Economic Activities

Karatina Town being located on the Nairobi-Nyeri road, about 20km from Nyeri town, Karatina is known for its large vegetable and food market. The Karatina Market, which operates on Tuesdays, Thursdays and Saturdays, is reputed to be the second largest open air market in Africa after Addis Ababa's Merkato Market.

Nestling between Mount Kenya and the Aberdare ranges, agriculture is the main economic activity in Mathira Sub-County and Nyeri County as a whole. The project area is renowned for its high production of tea and coffee, which are grown mainly for export.

These crops earn farmers billions of shillings every year. In 2012, Nyeri farmers earned Sh2.58 billion in tea bonus payments. Many other residents are engaged in retail business across the main towns and in open-air markets selling agricultural produce.

Other agricultural activities which act as a source of income include dairy farming and fish keeping along Sagana and Ragati Rivers. Dairy farming is mostly practiced on a small scale basis mainly at homes.

Mathira has a number of light industries which provide employment opportunities and markets for local produce. Notable factories include Tea and Coffee factories.

Non-governmental organizations (NGOs) also run various projects in the county. Organizations such as USAID, DFID, the UN and NACADA are involved in funding and sustenance of humanitarian projects such as environmental conservation, bee keeping, horticulture, health and other socio-economic activities that have impacted the lives of the county residents.

3.6.4 Land tenure and Land use

The project is located within town area whose land is mainly leasehold with holding ranging from 0.05Ha to 2acres. Further outside the project area the land has been adjudicated and classified as freehold. Residents have title deeds which can allow transfer of ownership and use of land as collateral for bank loans. Small holders own plots that average 0.87 Ha per family of about 5 persons. Available arable land per household as well as per person is considered unsustainable.

Land use in the project area is mainly commercial and residential premises while those in surrounding areas is mainly rain-fed mixed farming with the main crops grown as indicated in the table below. Coffee was the main cash crop in the 1980s but is now neglected because of the low market prices.

Table 3.3: Crops grown

AEZ	First Rainy Season	Second Rainy Season	Perennial Crop
UM4	Beans, Cabbages, Irish potatoes, Kales, Maize, Onions, Sweet potatoes	Beans, Cabbages, Kales, Maize, Onions, Sweet potatoes, Tobacco	Avocado, Bananas, Coffee, Mangoes, Papaws
LM3	Beans, Black grams, Green grams, Maize, Sweet potatoes	Beans, Cow peas, Green grams, Kales, Maize, Sweet potatoes	Bananas, Coffee

Table 3.4: High Value Crops

AEZ	First Rainy Season	Second Rainy Season	Perennial Crop
UM4 and LM3	Asian vegetables, French beans, Karella, Okra, Tomatoes	French beans, Tomatoes, Capsicum,	Avocado, Bananas, Mangoes

3.6.5 Water Supply and Sanitation

Most members obtain drinking water from Mawasco water supply. According to the District Development Plan 2008-2012, about 90.9 % of the population in the project area are connected to sewer services. Further outside the CBD septic tanks and pit latrines are used.

Table 3.5: Source of water by county, constituency and ward

County/ constituency/ward.	Pond	Dam	Lake	Stream/River	Unprotected spring	Unprotected well	Jabia	Water vendor	Other	Unimproved sources	Protected springs	Protected well	Borehole	Piped into dwelling	piped	Rain water collection	Improved source	No. of individuals
Nyeri county	0.2	0.4	0.0	28.9	1.0	2.5	0.8	1.8	0.1	35.7	1.0	3.1	2.0	12.3	42.6	3.2	64.3	679,236
Mathira Constituency	0.4	0.4	0.0	36.8	1.4	6.8	0.7	1.1	0.0	47.7	1.5	9.4	4.0	8.4	26.3	2.8	52.3	147,267
Ruguru	0.3	0.5	0.0	47.6	0.4	1.1	0.4	2.3	0.0	52.6	0.9	0.3	2.3	7.8	34.4	1.7	47.4	22,908
Magutu	0.1	0.2	0.0	29.0	0.3	3.3	0.3	0.1	0.2	33.6	0.4	3.4	2.5	12.3	46.7	1.2	66.4	19,366
Iriaini	0.1	0.0	0.0	41.3	0.3	1.0	1.2	0.1	0.0	43.9	0.6	4.3	3.3	7.2	39.3	1.4	56.1	27,463
Konyu	0.1	0.3	0.1	52.8	1.1	6.9	2.0	2.1	0.1	65.5	2.8	16.3	4.9	1.3	5.3	3.8	34.5	21,824
Kirimukuyu	1.4	0.3	0.0	36.5	3.7	114.6	0.4	1.1	0.0	55.0	3.3	23.2	6.7	2.5	3.9	5.4	45.0	28,481
Karatina Town	**0.1**	**0.8**	**0.0**	**16.3**	**2.1**	**14.8**	**0.2**	**1.0**	**0.0**	**35.3**	**0.5**	**6.6**	**3.6**	**19.1**	**32.3**	**2.6**	**64.7**	**27,225**

3.6.6 Solid waste disposal

Table 3.6: Solid waste disposal by county, constituency and ward

County/constituency	Main sewer	Septic Tank	Cess pool	Vip latrine	Pit Latrine	Improved Sanitation	Pit latrine uncovered	Bucket	Bush	Other	Unimproved sanitation	No. of HH members
Nyeri county	3.91	3.19	0.27	5.32	61.46	74.15	25.55	0.07	0.22	0.01	25.85	679,236
Mathira constituency	4.52	1.90	0.65	4.02	71.05	82.13	17.52	0.20	0.13	0.02	17.87	147,267
Ruguru	0.69	0.77	0.12	3.26	76.87	81.71	18.12	0.00	0.15	0.02	18.29	22,908
Magutu	0.80	0.86	0.06	2.75	80.05	84.51	15.43	0.02	0.04	0.00	15.49	19,366
Iria-ini	0.94	2.20	0.12	2.05	81.52	86.82	12.72	0.04	0.37	0.05	13.18	27,463
Konyu	1.07	0.96	0.17	5.13	80.15	88.03	11.57	0.38	0.02	0.00	11.97	21,824
Kirimukuyu	0.19	1.39	0.04	6.03	74.19	81.83	18.00	0.09	0.06	0.01	18.17	28,481
Karatina town	**21.30**	**4.57**	**2.62**	**4.58**	**38.58**	**71.64**	**27.62**	**0.62**	**0.12**	**0.00**	**28.36**	**27,225**

3.6.7 Health Facilities

There are several hospitals and health centers in Mathira. Notable healthcare facilities include the Karatina Sub-county Hospital and several health centres Church-run health facilities include PCEA Tumutumu. Private hospitals include the Jamii Nursing Home.

3.6.8 Energy

The main cooking fuel for Mathira Constituency is firewood with 76.9% of the households in the area using the same. Firewood is obtained from existing natural vegetation and pruning of trees planted on farms and farm boundaries. Charcoal is mainly supplied from the drier lower zone where charcoal burning is a common practice. Other sources of energy are paraffin and electricity. High dependency on firewood is exerting pressure on the few trees on individual farms in the project area.

Table 3.7: Lighting fuel by county, constituency and wards

County/constituency /wards	Electricity	Pressure lamp	Lantern	Tin lamp	Gas lamp	Fuel wood	Solar	Other	Households

Nyeri county	26.2	0.8	34.5	33.0	0.5	0.5	4.3	0.2	128,319
Mathira constituency	27.5	1.0	37.0	30.8	0.5	0.3	2.8	0.1	27,615
Ruguru	17.5	0.6	37.9	39.3	0.8	0.2	3.5	0.0	4,064
Magutu	19.3	0.4	38.5	36.2	1.0	0.7	3.7	0.1	3,444
Iria-ini	21.7	0.6	47.3	26.6	0.4	0.2	3.1	0.1	5,494
Konyu	22.8	1.4	39.3	32.8	0.4	0.3	2.6	0.4	4,304
Kirimukuyu	24.0	2.2	33.3	36.6	0.5	0.2	3.1	0.1	4,953
Karatina town	**52.4**	**0.9**	**27.1**	**18.0**	**0.2**	**0.1**	**1.2**	**0.2**	**5,356**

Table 3.8: Cooking fuel by county, constituency and ward

County/constituency /ward	Electricty	Paraffin	LPG	Biogas	Firewood	Charcoal	Solar	Other	Households
Nyeri county	0.7	5.3	4.7	0.5	72.8	15.8	0.1	0.2	199,476
Mathira constituency	1.1	5.6	3.9	0.4	76.9	11.9	0.1	0.1	43,437
Ruguru	1.1	1.9	1.5	0.3	87.3	7.8	0.0	0.0	6,513
Magutu	1.1	2.5	1.5	0.4	89.1	5.2	0.1	0.0	5,471
Iria-ini	0.4	2.5	1.9	0.3	82.6	12.1	0.1	0.1	8,314
Konyu	0.4	5.5	2.3	0.5	73.9	17.2	0.0	0.1	6,535
Kirimukuyu	0.6	1.9	1.7	0.2	90.5	5.0	0.1	0.0	7,977
Karatina town	**2.9**	**16.8**	**12.4**	**0.4**	**45.5**	**21.5**	**0.0**	**0.4**	**8,627**

3.6.9 Transport and Communications

Transportation to and within the project area is by earth roads, 60% of which are in poor state due to inadequate maintenance. “Matatus” are the most frequently used mode of transport, although farmers also use wheelbarrows and hand-carts to transport farm produce to the roadside or nearest collection point. It should be noted that the poor road network affects timely delivery of agricultural produce to the markets. Telephone services are available with coverage from mobile network service providers.

3.6.10 Employment and household income

According to the 2018 – 2022 Nyeri County Integrated Development Plan, agriculture contributed to 60% of household incomes in the District and the rest was shared among urban self-employment and wage employment. It is, therefore, observed that immediate development initiatives that will have impacts of the socio-economic status of a large fraction of the population should focus on agriculture and related sectors. Rural self employed persons in the county are 15,368 contributing 4 per cent of household income while urban self employed persons are 4,444 and contribute 13 per cent of the household income. This is the population aged between 15 and 64 years. In the county, this comprises of 215,624 females and 206,674 males totaling to 421,298 and represents 60 per cent of the county population.

The high population density is attributed by good land for agriculture and livestock production. The main cash crop in the area is coffee though there is tea in areas nearer to Othaya.

Table 3.9: Sectoral contribution to Household income

County /constituency /ward	**Work for pay**	**Family business**	**Family agricultural holding**	**Intern/ volunteer**	**Retired/ home-maker**	**Full time Student**	**Incapacitated**	**No work**	**Number of individuals**
Nyeri County	26.7	11.9	36.1	0.8	6.5	13.1	0.6	4.4	405,204
Mathira constituency	25.7	12.9	33.5	0.8	9.1	13.4	0.6	4.0	88,420
Ruguru wards	21.4	10.9	41.6	0.7	10.8	11.0	0.6	3.0	13,148
Magutu wards	20.5	6.9	48.5	0.8	5.1	14.3	1.1	2.8	11,501
Iria-ini wards	28.3	12.3	35.6	0.7	5.6	14.0	0.6	2.8	16,648
Konyu wards	21.6	15.4	30.5	0.8	11.3	15.2	0.4	4.8	13,092
Kirimukuyu wards	24.6	9.9	30.3	1.0	15.6	12.6	0.7	5.3	16,473
Karatina town wards	**33.9**	**19.9**	**21.0**	**0.8**	**6.0**	**13.5**	**0.5**	**4.5**	**17,558**

3.6.11 Public health

Statistical records show that the most common diseases, in the county, in order of prevalence are Upper Respiratory Trachea Infection, with a prevalence rate of 54.4 per cent, skin diseases 15.4 per cent, rheumatic and joint pains 13.1 percent, hypertension 11 percent and diarrhea 6.2 percent. There is a general increase in non-communicable diseases such as cancer, diabetes, kidney failure among others.

3.6.12 HIV / AIDS

According to the 2018 – 2022 Nyeri County Integrated Development Plan, HIV and AIDS prevalence in the county is 2.1 per cent, affecting mostly the youth between 15-34 years with the highest percentage being among females. HIV and AIDS prevalence is high in peri-urban areas It is recognized that progressive gains on poverty reduction may be reversed if intensive efforts are not put in place to bring the HIV/AIDS pandemic under control.

3.6.13 Education

Table 3.10: Education by county, constituency and wards.

County/constituency/ward	**None**	**Primary**	**Secondary+**	**Total pop**
Nyeri County	12.2	54.0	33.9	630,578
Mathira constituency	11.3	53.9	34.9	137,171
Ruguru wards	11.6	57.3	31.2	21,273
Magutu wards	12.7	54.7	32.7	18,007
Iria-ini wards	11.4	54.0	34.7	25,769
Konyu wards	11.6	56.3	32.2	20,165
Kirimukuyu wards	11.4	55.1	33.5	26,609
Karatina town wards	**9.5**	**47.2**	**43.4**	**25,348**

3.6.14 Housing

Table 3.11: Main material of the wall by county, constituency and wards.

County/constituency/ward	Stone	Brick/ Block	Mud/Wood	Mud/Cement	Wood only	Corrugated iron sheets	Grass reeds	Tin	Other	Households
Nyeri county	21.4	4.7	10.2	1.3	60.3	1.5	0.1	0.2	0.3	199,476
Mathira constituency	25.2	3.5	11.3	1.4	57.2	0.8	0.0	0.1	0.5	43,437
Ruguru wards	13.9	1.9	14.8	1.5	66.3	1.2	0.2	0.1	0.1	6,513
Magutu wards	13.7	1.5	6.5	0.4	77.3	0.4	0.1	0.1	0.1	5,471
Iria-ini wards	21.7	2.9	6.9	0.5	67.3	0.5	0.0	0.0	0.2	8,314
Konyu wards	24.2	9.3	21.5	3.1	39.3	0.7	0.0	0.2	1.7	6,535
Kirimukuyu wards	20.6	2.4	14.2	2.5	59.3	0.9	0.0	0.1	0.1	7,977
Karatina town wards	**49.4**	**3.1**	**5.3**	**0.8**	**39.6**	**0.9**	**0.0**	**0.1**	**0.7**	**8,627**

Table 3.12: Main mineral of the floor by county, constituency and wards

County/constituency /ward	Cement	Tiles	wood	Earth	Other	Household
Nyeri county	41.1	0.5	1.6	56.4	0.3	199,476
Mathira constituency	43.0	0.5	1.5	54.5	0.6	43,437
Ruguru	29.7	0.2	3.5	66.2	0.3	6,513
Magutu	32.8	0.3	2.2	64.4	0.3	5,471
Iria-ini	42.8	0.5	1.1	55.5	0.2	8,314
Konyu	40.8	0.5	0.5	56.4	1.8	6,535
Kirimukuyu	40.9	0.5	1.8	56.7	0.2	7,977
Karatina town	**63.2**	**0.8**	**0.5**	**34.7**	**0.8**	**8,627**

Table 3.13: Main roofing material by County, Constituency and Ward

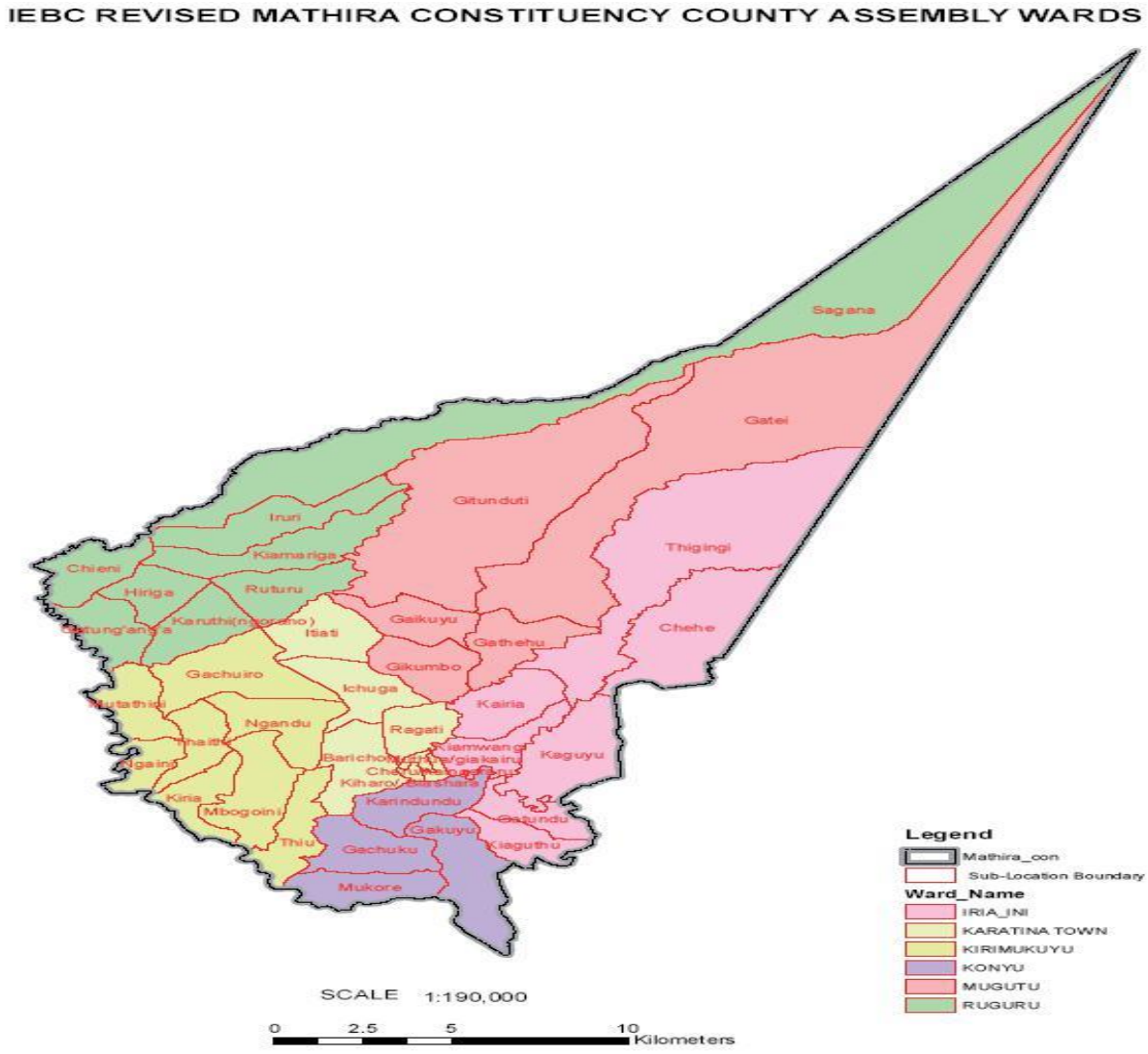
County/ constituency/wards	Corrugated iron sheets	Tiles	Concrete	Asbestos sheets	Grass	Makuti	Tin	Mud/ Dund	Other	Household
Nyeri county	94.4	1.2	1.2	2.2	0.4	0.1	0.2	0.0	0.3	199,476
Mathira constituency	94.3	1.3	1.7	1.8	0.2	0.1	0.1	0.0	0.4	43,437
Ruguru wards	92.0	1.8	0.6	4.1	0.7	0.4	0.1	0.0	0.2	6,513
Magutu wards	93.8	0.7	0.1	5.2	0.1	0.0	0.1	0.0	0.0	5,471
Iria-ini wards	97.9	1.3	0.2	0.5	0.0	0.0	0.0	0.0	0.0	8,314
Konyu wards	95.9	1.1	0.9	0.1	0.1	0.0	0.1	0.0	1.7	6,535
Kirimukuyu wards	98.5	0.8	0.1	0.4	0.0	0.0	0.0	0.1	0.0	7,977
Karatina town wards	**87.9**	**1.9**	**7.1**	**1.9**	**0.1**	**0.0**	**0.3**	**0.0**	**0.7**	**8,627**

3.6.15 Religion and Culture

Majority of people living in Nyeri County are Christians. Notable among Christian faith are the Presbyterian, Methodist, Catholic, Anglican Pentecostals and Akorino denominations. There's a small number residents, mainly found in major towns, who prophesy to the Muslim and Hindu religions.

The Kikuyu people speak Gikuyu; a language widely spoken across the country even in towns where a majority of people speak Kiswahili. English language is primarily used in the education system and in the employment sector.

Gikuyus traditionally believed in a single god, called ngai (the provider), living at the top of Mount Kenya. However, most Kikuyus have abandoned their traditional beliefs for Christianity



3.7 Physical attributes at the proposed project site

The following is a brief summary on correlation of the project activities to the baseline environmental data.

- The project site lies within Karatina CBD which is highly developed with several premises encroaching on the pipeline way leaves
- Proposed project area is located on a gentle sloping land suitable for the gravity conveyance as water will flow though force of gravity
- The pipeline route has no major vegetation except a few trees and grass vegetation along the route

4.0 POLICY, LEGAL AND REGULATORY FRAMEWORK

4.1 National Legal and Institution Framework

Kenya has approximately 77 statutes that guides on environmental management and conservation. Most of these statutes are sector specific, covering issues such as public health, soil conservation, protected areas conservation and management, endangered species, public participation, water rights, water quality, air quality, excessive noise control, vibration control, land use among other issues.

The National Environment Management Authority (NEMA) in conjunction with the various lead agencies studies proposed projects to ensure all aspects of the proposed project adheres to all Institutional Frameworks requirements. The institutional framework directly governing water sector are: Environmental Management and coordination Act (EMCA) of 1999 and its subsequent supplements the Environmental (Impact Assessment and Audit) Regulation, 2003; EMCA (Waste Management) Regulations, 2006 and EMCA (Water Quality) Regulations, 2006; EMCA (Controlled Substance) Regulations, 2007; EMCA (Noise and Vibration Control) Regulations,2009; EMCA (Emissions Control) Regulations,2006; EMCA (Wetlands, River Banks, Lake Shores and Sea Shore Management) Regulations, 2009; EMCA(Conservation of Biological Diversity and Resources, Access To Genetic Resources and Benefit Sharing) Regulations,2006, Land Acquisition Act (Cap.295), Land Act Way Leaves Act (Cap. 292), Forest Act, Physical Planning Act (CAP 286), Local Government Act (CAP 265), Traffic Act Chapter 295, Water Act 2002, Public Health Ac (Cap. 242), Lakes and River Act Chapter 409, Wildlife Conservation and Management Act, Cap 376 and the Penal Code (CAP 63) 514.

4.2 National Policy Framework

Several policies have been developed over the years to guide the development and management of proposed projects to ensure both economic and social sustainability these policies are discussed below.

The Kenya Government's environmental policy aims at integrating environmental aspects into national development plans. The broad objectives of the national environmental policy include:

- Optimal use of natural land and water resources in improving the quality of human environment;
- Sustainable use of natural resources to meet the needs of the present generations, while preserving their ability to meet the needs of future generations;

- Integration of environmental conservation and economic activities into the process of sustainable development;
- Meeting national goals and international obligations by conserving bio-diversity, arresting desertification, mitigation effects of disasters, protecting the ozone layer and maintaining an ecological balance on earth.

4.2.1 The National Environmental Action Plan Framework, 2009 - 2013

The National Environmental Action Plan Framework is the second national environmental policy after the 1994 National Environmental Action Plan (NEAP). The development of NEAP is provided for by EMCA, 1999 which requires preparation of Environmental Action Plan at different levels; district, provincial, and national levels. The framework recognizes the intertwined linkages between economic growth and environment in Kenya. It highlights priority themes and activities for the country towards achieving sustainable environment.

The policy framework among others, proposes integration of environmental concerns into regional and local development plans, promotion of appropriate land uses and enforcement of EMCA, 1999 and its subsidiary and other relevant legislations. The policy framework also advocates for efficient water harvesting, storage and usage. On human settlements and infrastructure, this policy framework recognizes the associated environmental issues. These include waste management, sanitation, diseases, land use changes in conservation areas, demand for water, energy, construction materials, pollution, land degradation, biodiversity loss etc. In managing operations of the proposed Project, consideration of the highlighted issues is vital towards contribution to the national sustainable development goals.

Multiple stakeholders' involvement inclusive of the private sector is advocated for within the implementation of this framework towards achievement of sustainable development goals. Finally, the framework also advocates for monitoring and evaluation to ensure effective and efficient environmental policy implementation.

The NEAP for Kenya was prepared in mid 1990s. It was a deliberate policy effort to integrate environmental considerations into the country's economic and social development. The integration process was to be achieved through a multi-sectoral approach to develop a comprehensive framework to ensure that environmental management and the conservation of natural resources are an integral part of the societal decision-making.

4.2.2 Policy Paper on Environment and Development (Sessional Paper No. 6 of 1999)

The key objectives of the policy include:

→ To ensure that from the onset, all the development policies, programs and projects take environmental considerations into account;
→ To ensure that an independent EIA report is prepared for any industrial venture or other development before implementation; and
→ To come with effluent standards that will conform to acceptable health guidelines.

Under this paper, broad categories of development issues have been covered that require a sustainable development approach. These issues relate to waste management and human settlement. The policy recommends the need for enhanced reuse/recycling of the residues including waste water, use of raw or non-waste technologies, increased public awareness rising and appreciation of the clean environment. It also encourages participation of the stakeholders in the management of the waste within their localities. Regarding human settlement, the paper encourages better planning in both rural and urban areas and provision of basic needs such as water, drainage and waste disposal facilities among others.

4.2.3 Kenya Vision 2030

Following the expiry of the Economic Recovery Strategy (2003-2007), Kenya's Development Agenda is now anchored on the Kenya Vision 2030, which aims at creating "a globally competitive and prosperous country with a high quality of life by 2030". It aims to transform Kenya into "a newly – industrialized, middle-income country providing a high quality of life to all its citizens in a clean and secure environment". Simultaneously, the Vision aspires to meet the Millennium Development Goals (MDGs) for Kenyans by 2015.

The Vision is anchored on three key pillars: economic, social and political. The economic pillar aims was to achieve an average economic growth rate of 10 per cent per annum by 2012 and sustaining the same till 2030 in order to generate more resources to meet the MDGs and Vision 2030 goals. The social pillar seeks to achieve a just, cohesive and equitable social development in a clean and secure environment, while the political pillar aims for a democratic, issue-based, people-centred, result-oriented and accountable system.

The proposed project falls under the first pillar-fostering economic growth.

4.2.4 The National Biodiversity Strategy and Action Plan, 2007

The overall objective of the National Biodiversity Strategy and Action Plan (NBSAP) is to address the national and international undertakings elaborated in Article 6 of the Convention on Biological Diversity. It is a national framework of action to ensure that the present rate of biodiversity loss is reversed and the present levels of biological resources are maintained at sustainable levels for posterity. The general objectives of the strategy are to conserve Kenya's biodiversity to sustainably use its components; to fairly and equitably share the benefits arising from the utilization of biological resources among the

stakeholders; and to enhance technical and scientific cooperation nationally and internationally, including the exchange of information in support of biological conservation.

4.2.5 National Policy on Water Resources Management and Development

While the National policy on water resources management and development (1999) seeks to enhance systematic development of facilities in all sectors for promotion of the country's socio-economic progress, it also recognizes the by-products of this process as wastewater. It, therefore, calls for development of appropriate sanitation systems to protect people's health and water resources from institutional pollution.

Industrial and business development activities therefore should be accompanied by corresponding waste management systems to handle the wastewater and other waste emanating there from. The same project requires that such projects should also undergo comprehensive EIA studies that will provide suitable measures to be taken to ensure environmental resources and people's health in the immediate neighborhood and further downstream are not negatively impacted by the emissions. As a follow-up to this, EMCA, 1999 requires annual environmental audits to be conducted in order to ensure that mitigation measures and other improvements identified during EIA study are implemented.

In addition, the policy provides for charging levies on waste on the basis of quantity and quality. The "polluter-pays-principle" applies in which case parties contaminating water are required to meet the appropriate cost of remediation. The policy provides for establishment of standards to protect water bodies receiving waste water, a process that culminated in the enactment of the Environmental Management and Coordination (Waste management) Regulations 2006.

Water is at the heart of all development, because it is the key resource for health, food and cash crops, hydropower and the ecosystems. Safe, adequate, reliable water supplies, good sanitation and sound hygiene are therefore essential to achieving the Millennium Development Goals including those on poverty, hunger and the HIV/Aids epidemic

The Kenya government recognizes that the current arrangement are inappropriate and a bottleneck to achieving the set poverty reduction objectives. The government therefore started a process of comprehensive policy and institutional reform that will facilitate pro-poverty water and sanitation services programs. As a first step, a national water policy on water resources management and development was created in 1999. It has four broad objectives:

- → To preserve, conserve and protect available water resources and allocate them in a sustainable, rational and economic way;
- → To supply water of good quality and in sufficient quantities to the various water needs, while ensuring safe disposal of waste water and environmental protection;

→ To establish an efficient and effective institutional framework to achieve a systematic development and management of the water sector promoting and supporting participation of users;

→ To develop a sound and sustainable financing mechanism for effective water supply and sanitation development

It is noteworthy that Kenya has only 4 m^3 stored water per person, as compared to 746 m^3 for South Africa and 6150 m^3 for the USA. Further Kenya depends largely on rain fed agriculture, as so far less than 5% of arable land is under irrigation. Unfortunately, and to compound the resource problems, loss of water catchments has been steadily destroying the resource base on which the whole country depends. Kenya is thus classified as a chronically water scarce country. According to the study by the National Water Master Plan 1992 supported by JICA, the average annual water available is 20.2 Billion Cubic Meters (BCM) and distributed as shown in the table below.

Renewable water resources by drainage areas in BCM/yr.

Drainage Area	Catchment Area of the Drainage Basins km^2	Total Annual Mean Surface Runoff (10^6 m^3)	% of Annual Mean Surface Runoff by Drainage Basins	Groundwater (10^6 m^3) Groundwater potential by Drainage Basin	% of Groundwater potential by Drainage Basin	% of Total Water Resources potential by Drainage Basin
L Victoria	46,229	11,672	59.2	115.7	18.7	54.1
Rift Valley	130,452	2,784	1.0	125.7	20.3	3.4
Athi River	66,837	1,152	2.9	86.7	14.0	4.3
Tana River	126,026	3,744	33.5	147.3	23.8	32.3
N. Ewaso Nyiro	210,226	339	3.3	142.4	23.0	5.8
Total	**579,770**	**19,691**	**100**	**610**	**100**	**100**

Source: National Water Master Plan 1992 and National Water Master Plan after Care 1998.

Assuming that the 20.2 BCM is divided equally over the population of 31.2 million people of the year 2002, the endowment of water is 647 m^3 per person per year. In comparison, the supply for Tanzania is 2,696 m^3 and for Uganda it is 2,940 m^3.

In the year 2020, Kenya is projected to have just 359m^3 per person per year assuming a projected population of 56.5 million people. The per capita availability is projected to fall further to 235 cubic meters by 2025 and could be even less if the resource base continues to deplete. Water is increasingly becoming scarce because of the limited national endowment, the growing needs of a rapidly increasing population, and the serious degradation of water resources. In addition, Kenya is highly vulnerable to variability in rainfall. Droughts are now endemic and floods occur quite frequently.

The average national water abstraction volume in 1998 was estimated at 1.1 x 10^9 m^3 / year as tabulated in the table below. This amount is 5.4% of the potential resources volume and reflects a very low level of water development.

Average annual water abstraction by basin

No.	**VOLUME (MCM/YR*)**		**% WATER ABSTRACTED**
1	Lake Victoria Basin	11,672	2.2
2	Rift Valley inland Basin	2,784	1.7
3	Athi River Basin	1,152	11.6
4	Tana River Basin	3,744	15.9
5	Ewaso Ng'iro North Basin	339	12.4
6	Groundwater	600	9.1
National Total Water	**20,291**		**5.4**

Source: The aftercare study on the National Water Master Plan, July 1998

4.2.6 World Bank Operational Policies

(i) Environmental Assessment (OP 4.01)

Environmental Assessment is used by World Bank to identify, avoid, and mitigate the potential negative environmental impacts associated with Bank lending operations.

Category A: A proposed project is classified as Category A if it is likely to have significant adverse impact on the environment. A project with complicated impact or unprecedented impact which is difficult to assess is also classified as Category A. The impact of Category A projects may affect an area broader than the sites or facilities subject to physical construction.

Category B: A proposed project is classified as Category B if its potential adverse environmental impact is less adverse than that of Category A projects. Typically, this is site-specific, few if any are irreversible, and in most cases normal mitigation measures can be designed more readily.

Category C: A proposed project is classified as Category C if it is likely to have minimal or no adverse environmental impact. Projects that correspond to one of the following are, in principle, classified as Category C.

The proposed rehabilitation of Karatina Town Water Supply will result to numerous mild negative impacts to the environment which will be mitigated as the proposed project is categorized under category B under World Bank Categorizations criteria.

Relevance

The proposed project is a project whose impacts to the environment are less adverse to the environment and can be mitigated as they are site specific. The project does not traverse in any protected habitat, international water way or indigenous persons regions.

(ii) Natural Habitats (OP 4.04)

This policy seeks to ensure that World Bank-supported infrastructure and other development projects take into account the conservation of biodiversity, as well as the numerous environmental services and products which natural habitats provide to human society. The policy strictly limits the circumstances under which any Bank supported project can damage natural habitats (land and water areas where most of the native plant and animal species are still present).

Specifically, the policy prohibits Bank support for projects which would lead to the significant loss or degradation of any Critical Natural Habitats, whose definition includes those natural habitats which are either:

→ Legally protected,
→ Officially proposed for protection, or
→ Unprotected but of known high conservation value.

In other (non-critical) natural habitats, Bank supported projects can cause significant loss or degradation only when there are no feasible alternatives to achieve the project's substantial overall net benefits and acceptable mitigation measures, such as compensatory protected areas, are included within the project.

Relevance

Although the natural vegetation cover in the project area has been significantly altered, precaution is required in line with OP 4.04 to ensure the riverine resources management is sustainable.

(iii) Water Resources Management OP 4.07

This deals with water resources management in terms of provision of portable water, sanitation facilities, flood control and water for productive activity. It calls for economical viability, environmental sustainability and social equitability.

Relevance

The policy is relevant to the project because of sound management of water resources. This policy is triggered by the use of water resources for provision of safe drinking water.

(iv) Physical Cultural Resources (OP 4.11)

This policy defines the cultural property as having archaeological, palaeontological, historical, religious and unique natural values. There are no known physical cultural resources within the proposed site thus this policy may be not be triggered.

Chance find procedures

This Performance Standard recognizes the importance of cultural heritage for current and future generations. Consistent with the Convention Concerning the Protection of the World Cultural and Natural Heritage, it aims to protect irreplaceable cultural heritage and to guide clients on protecting cultural heritage in the course of their business operations. In addition, the requirements of this Performance Standard on a project’s use of cultural heritage are based in part on standards set by the Convention on Biological Diversity.

Relevance

- Is triggered if the Contractor discovers archeological sites, historical sites, remains and objects, including graveyards and/or individual graves during excavation or construction.
- The contractor and TWSB will be required to follow chance find Procedures and contact the National Museums of Kenya (NMK).

(vi) Environmental, Health, and Safety General Guidelines

The Environmental, Health, and Safety (EHS) Guidelines provide industry-specific examples of Good International Industry Practice (GIIP). These EHS Guidelines are applied as required by their respective policies and standards and are designed to be used together with the relevant Industry Sector EHS Guidelines which provide guidance to users on EHS issues in specific industry sectors. For complex projects, use of multiple industry-sector guidelines may be necessary.

The EHS Guidelines contain the performance levels and measures that are generally considered to be achievable in new facilities by existing technology at reasonable costs. Application of the EHS Guidelines to existing facilities may involve the establishment of site-specific targets, with an appropriate timetable for achieving them. The applicability of the EHS Guidelines should be tailored to the hazards and risks established for each project on the basis of the results of an environmental assessment such as the ESIA. in which site-specific variables, such as host country context, assimilative capacity of the environment, and other project factors, are taken into account. When host country regulations differ from the levels and measures presented in the EHS Guidelines, projects are expected to achieve whichever is more stringent. If less stringent levels or measures than those provided in these EHS Guidelines are appropriate, in view of specific project circumstances, a full and detailed justification for any proposed alternatives is needed as part of the site-specific environmental assessment. These justifications should demonstrate that the choice for any alternate performance levels is protective of human health and the environment.

General Approach to the Management of EHS Issues at the Facility or Project Level

Effective management of environmental, health, and safety (EHS) issues entails the inclusion of EHS considerations into corporate and facility-level business processes in an organized, hierarchical approach that includes the following steps:

- Identifying EHS project hazards and associated risks as early as possible in the facility development or project cycle, including the incorporation of EHS considerations into the site selection process, product design process, engineering planning process for capital requests, engineering work orders, facility modification authorizations, or layout and process change plans.
- Involving EHS professionals, who have the experience, competence, and training necessary to assess and manage EHS impacts and risks, and carry out specialized environmental management functions including the preparation of project or activity-specific plans and procedures that incorporate the technical recommendations presented in this document that are relevant to the project.
- Understanding the likelihood and magnitude of EHS risks, based on:
- The nature of the project activities, such as whether the project will generate significant quantities of emissions or effluents, or involve hazardous materials or processes;
- The potential consequences to workers, communities, or the environment if hazards are not adequately managed, which may depend on the proximity of project activities to people or to the environmental resources on which they depend.

- Prioritizing risk management strategies with the objective of achieving an overall reduction of risk to human health and the environment, focusing on the prevention of irreversible and / or significant impacts.
- Favoring strategies that eliminate the cause of the hazard at its source, for example, by selecting less hazardous materials or processes that avoid the need for EHS controls.
- When impact avoidance is not feasible, incorporating engineering and management controls to reduce or minimize the possibility and magnitude of undesired consequences, for example, with the application of pollution controls to reduce the levels of emitted contaminants to workers or environments.
- Preparing workers and nearby communities to respond to accidents, including providing technical and financial resources to effectively and safely control such events, and restoring workplace and community environments to a safe and healthy condition.
- Improving EHS performance through a combination of ongoing monitoring of facility performance and effective accountability.

(vii) **Environmental, Health, and Safety General Guidelines for Water and Sanitation**

The EHS Guidelines for Water and Sanitation include information relevant to the operation and maintenance of (i) potable water treatment and distribution systems, and (ii) collection of sewage in centralized systems (such as piped sewer collection networks) or decentralized systems (such as septic tanks subsequently serviced by pump trucks) and treatment of collected sewage at centralized facilities.2

The EHS guidelines include; Industry specific-impacts and management that include;

i. Environmental issues associated with water and sanitation projects may principally occur during the construction and operational phases, depending on project-specific characteristics and components
   a) Drinking water – water withdrawal, water treatment, water distribution,
   b) Sanitation – fecal sludge and septage collection, sewerage (Domestic wastewater discharges, Industrial wastewater discharges, Leaks and overflows), Wastewater and Sludge Treatment and Discharge (Liquid effluents, Solid waste, Air emissions and odors, Hazardous chemicals, Ecological impacts).

ii. Occupational Health and Safety during the construction and decommissioning of Water and Sanitation facilities. Occupational health and safety impacts associated with the operational phase of water and sanitation projects primarily include the following:
   a) Accidents and injuries
   b) Chemical exposure
   c) Hazardous Atmosphere
   d) Exposure to pathogens and vectors
   e) Noise

iii. Community Health and Safety Community health and safety impacts during the construction of water and sanitation projects are discussed including;
   a) Drinking Water - Water Intake (Water Supply Protection), Water Treatment (Drinking Water Quality and Supply, Hazardous Chemicals) and Water Distribution.
   b) Sanitation - Wastewater and Septage Collection (Preventing sewerage system overflows, Preventing buildup of potentially toxic and explosive gases in the sewer), Wastewater and Sludge Treatment (Liquid effluents, Air emissions and odors, Physical hazards)

Performance Indicators and Industry Benchmarks

i. Environmental Performance –Guidelines (Drinking water, sanitation), Environmental monitoring.

ii. Occupational Health and Safety Performance - Occupational Health and Safety Guidelines, Accident and Fatality Rates, Occupational Health and Safety Monitoring.

(vii) Managing the Risks of Temporary Project Induced Labor Influx

This Note provides guidance on identifying, assessing and managing the risks of adverse social and environmental impacts that are associated with the temporary influx of labor resulting from Bank-supported projects. The Note contains guiding principles and recommendations to be considered as part of the design and implementation of projects with civil works that require labor from outside the project's area of influence. This Note does not introduce new requirements, but rather seeks to provide concrete guidance on how to approach temporary labor influx within the environmental and social assessment process. Impacts can only be fully assessed once a contractor is appointed and decides on sourcing the required labor force. Therefore it's important to develop site-specific measures before the contractor starts work and update them as necessary to reflect project developments
These effects can be mitigated by;

i. Reduce labor influx by tapping into local workforce
ii. Assess and manage labor influx risk based on appropriate instruments-based on risks identified in the ESIA, bank required assessments, and Bank's sector specific experience in the Country. This may range from broad requirements set out in an ESMP or in a more specialized instrument such as a site-specific Labor Influx Management Plan and/or a Worker Camp Management Plan.A Labor Influx Management Plan addresses specific activities that will be undertaken to minimize the impact on the local community, including elements such as worker codes of conduct, training programs on HIV/AIDS, etc. A Workers' Camp Management Plan addresses specific aspects of the establishment and operation of workers' camps.

Risk factors to consider include;

- Weak institutional capacity of the implementing agency
- Predominant presence of the contractors withut strong worker management and health and safety policies
- Anticipated high volumes of worker influx
- Re-existing social conflicts or tensions
- Weak local law enforcement
- Prevalence of gender based violence and social norms towards it in the community
- Local prevalence of child and forced labor

iii. Incorporate social and environmental mitigation measures into the civil works contract – most adverse impacts can only be mitigated by the contractor and hence it is important that these contractual obligations are reflected as contractual obligations, with appropriate measures for addressing non-compliance.

4.2.7 Instruments Addressing Involuntary Resettlement

(i) World Bank Policy on Involuntary Resettlement

Involuntary Resettlement OP 4.12

The Bank's OP 4.12 is triggered in situations involving involuntary taking of land and involuntary restrictions of access to legally designated parks and protected areas. The policy aims to avoid involuntary resettlement to the extent feasible, or to minimize and mitigate its adverse social and economic impacts.The World Bank is one of the international funders of development projects that have resulted in involuntary displacements and relocations without adequate compensations or resettlement assistance of the affected people across the world. Due to prolonged negative publicity and criticism of the Bank's failure to intervene on behalf of the displaced peoples, the World Bank initiated the process to develop its own policy and

procedures for involuntary resettlement to address the plight of millions of people around the world whose homes are destroyed or livelihoods adversely affected as a result of Bank financed projects (Don and Frauke, 2001).

The current version, Operational policy (OP) 4.12 remains the most widely used guideline for any project involving involuntary resettlement. According to the World Bank any bank financed project that involves land acquisition should be reviewed for potential resettlement requirements early in the project cycle. The World Bank Resettlement Policy emphasizes that project planning must avoid and minimize involuntary resettlement, and that if people lose their homes or livelihoods as a result of Bank-financed projects, they should have their standard of living improved, or at least restored. In determining appropriate compensation for the PAPs, the directive states that preference should be land-based resettlement as opposed to cash compensation, which is usually inadequate to restore previous livelihoods (Don and Frauke, 2001).

(ii) Eviction Way leave and Rehabilitation Bill (2014)

Once passed by the parliament, it will be an Act of Parliament to provide for procedures for the evictions of unauthorized occupants from private or public land and the resettlement of displaced persons coerced or involuntary displacement and for matters incidental and related thereto.

The Bill main objective is to set out appropriate procedures applicable to evictions and resettlement, the bill also has outlined principles that are intended to guide the resettlement and eviction procedures including;

a) Every person shall be protected from arbitrary eviction;
b) The persons, affected by an eviction should not suffer detriment to their human rights;
c) The Sate while carrying out eviction and resettlement, must observe the human dignity, equity, social justice, human rights, nondiscrimination and protection of the marginalized and vulnerable groups; and
d) Every person has the right to administrative action that is expeditious, efficient, reasonable and procedurally fair

Part (111) section (17) of the bill elaborates of the process to the undertaken when the government intends to evict persons from their land to create room for project, the bill gives power to the cabinet secretary based on the Environmental and Social Impact Assessment Report prepared, prepare a plan for the resettlement of the affected persons after consultation with the representatives of the affected persons

(iii) Constitution of Kenya 2010

Constitution of Kenya 2010 recognizes individuals' right to acquire and own property provided they are citizens of the country in article 40. However, Article 66 of the same Constitution provides for the State to regulate the manner in which these rights may be curtailed for the benefit of the general public. Through the National Lands Commission, whenever the government requires land to construct a project for public benefits then Article 47 of the Constitution is applied which applies administrative action to override the individual rights but the victim has to be given written reason for the action taken
that undermines the right. This article is interpreted together with the Land Act 2012 which provides the legal framework of administering land in Kenya.

(iv) The Land Act 2012 Laws of Kenya

It is the substantive law governing land in Kenya and provides legal regime over administration of public and private lands. It also provides for the acquisition of land for public benefit. The government has the powers under this Act to acquire land for projects, which are intended to benefit the general public. The projects requiring resettlement are under the provision of this Act, however, during construction of the proposed project the Land Acquisition Act, 1968, Section 6, which empowers the Minister for Lands to acquire land compulsorily if he/she is satisfied that such acquisition, inter alia, will promote public benefit (Government of Kenya, 1968) will be applied.

(v) National Land Commission Act 2012

The act establishes the National Land Commission with the purpose of managing public land and carrying out compulsory acquisition of land for specified public purposes. In the current context, land acquisition for construction of public projects are now managed by the commission with the Land Act 2012 providing guidelines and principles as well as legal interpretation on land acquisition matters.

(vi) National Policies on Resettlement

In Kenya, Resettlement Policies are often developed specific for projects in different sectors, the policies provide guideline to be adopted when implementing project that trigger resettlement of people from their homes or business to provide land for implementation of the projects. The policies have enabled the project implementing agencies to prepare in advance environment and social Safeguard measures that mitigate against the risk associated with project induced involuntary resettlement.

4.3 Legal Framework

Table 4-1: Key Environmental Legal Sections in Kenya

Legal Section	Relevant Provisions	Compliance Aspects
The Environment Management And Coordination Act, 1999 (Amended 2015)	Part II of the Environment Management & Coordination Act, 1999 states that every person in Kenya is entitled to a clean and healthy environment and has the duty to safeguard and enhance the environment. In order to partly ensure this is achieved, Part VI of the Act directs that any new programme, activity or operation should undergo environmental impact assessment and a report prepared for submission to the National Environment Management Authority (NEMA), who in turn may issue a license as appropriate. According to Section 68 of the Act, all projects listed in the Second Schedule of the Act must undertake an environmental audit, keep accurate records and make annual reports to NEMA or as NEMA may, in writing, require. The Environmental (Impact Assessment and Audit) Regulations, 2003, provide the basis for procedures for carrying out Environmental Impact Assessments (EIAs) and Environmental Audits (EAs). Section 87 sub-section 1 states that no person shall discharge or dispose of any wastes, whether generated within or outside Kenya, in such a manner as to cause pollution to the environment or ill health to any person, while section 88 provides for acquiring of a license for generation, transporting or operating waste disposal facility. According to section 89, any person who, at the commencement of this Act, owns or operates a waste disposal site or plant or generate hazardous waste,	This applies in all aspects of the intervention project including among others; - Social disruption control - Waste management - Effluent discharge practices - Aerial emissions, - Excessive noise and vibrations - Excavations and soil loss - Adverse interference with natural resources including wetlands and water resources. The project cycle should ensure compliance with this statute all the time.

Legal Section	Relevant Provisions	Compliance Aspects
	shall apply to the NEMA for a license. Sections 90 through 100 outline more regulations on management of hazardous and toxic substances including oils, chemicals and pesticides. Part V section 42, subsection 1 directs that no person shall among others deposit any substance in a water body if the substance will have adverse environmental effect on the water. According to section 45 of the Act, hilly or mountainous areas are at risk when they are prone to erosion, high rate of vegetation removal or land use activities likely lead to environmental degradation. Section 47 defines these measures, among them being control of soil erosion. Excavations during rehabilitation works have potential for such effects for example if excavations are to take place at the hilly section within the project site. Part VIII section 72 of the Act prohibits discharging or applying pollutants materials into aquatic environment. Section 73 requires that all operators of projects which discharge effluent or other pollutants to the environment submit to NEMA accurate information on the quality and quantity of the waste thereof. Materials used in proposed project have potential of intoxicating both the above and underground water bodies. It is recommended that the project team should meet the requirements of the Act which aims to reduce environmental pollution. The section below reviews the statue that guides the development and management of water projects to ensure their environment and socio-economic sustainability. Finally, the environmental impact assessment guidelines require that study be conducted in accordance with the issues and general guidelines spelt out in the	

Legal Section	Relevant Provisions	Compliance Aspects
	second and third schedules of the regulations. These include coverage of the issues on schedule 2 (ecological, social, landscape, land use and water considerations) and general guidelines on schedule 3 (impacts and their sources, project details, national legislation, mitigation measures, a management plan and environmental auditing schedules and procedures	
Environmental (Impact Assessment and Audit) Regulations, 2003	The Environmental (Impact Assessment and Audit) Regulations, 2003 state in Regulation 3 that "the Regulations shall apply to all policies, plans, programs, projects and activities specified in Part IV, Part V and the Second Schedule of the Act". Regulation 4(1) further states that: ''…no Proponent shall implement a project: (a) likely to have a negative environmental impact; or (b) for which an environmental impact assessment is required under the Act or these Regulations, unless an environmental impact assessment has been concluded and approved in accordance with these Regulations…'' Part V Section 31 states that an environmental audit is expected to be undertaken on the development activities likely to have adverse environmental impacts. The audit exercise is expected to be conducted by a qualified environmental lead expert or environmental inspector registered in accordance with regulation 14. Section 31(3) the environmental Audit study is prepared based on the baseline information provided in the Environmental impact assessment study report which will be used as baseline information upon which subsequent environmental control audit studies shall be undertaken.	Provides a guide to the environmental inspectors and auditors on the requirements during the audit process.

Legal Section	Relevant Provisions	Compliance Aspects
	According to section 31(7) information required to be included in the audit report is mentioned; past and present impacts of the project, responsibility and proficiency of the operators of the project, existing internal control mechanisms to identify and mitigate activities with negative environmental impacts, existing internal control mechanisms to ensure workers health and safety, existence of environmental awareness and sensitization measures including environmental standards and regulations, law and policy for managerial and operational personnel.	
The Environment Management and Co- ordination Act, 1999 (Water Quality) Regulations, 2006	These regulations were drawn under section 147 of the Environmental Management and Coordination Act 1999. In accordance with the regulations, every person shall refrain from acts that could directly or indirectly cause immediate or subsequent water pollution and no one should throw or cause to flow into water resources any materials such as to contaminate the water. The regulation also provides for protection of springs, streams and other water sources from pollution. Regulation 8 of these regulations provides for compliance with water quality standards. It states that "all operators and suppliers of treated water, containerized water and all water vendors shall comply with the relevant quality standards in force as may be prescribed by the relevant lead agencies". Regulation 9 of these regulations provides for water quality monitoring. It states that the "Authority in consultation with the relevant lead agency, shall maintain water quality monitoring for sources of domestic water at least twice every calendar year and such monitoring records shall be in the prescribed form as set out in the second schedule to these regulations". The Table below shows the	Applies anytime there is a discharge of effluent into the environment without meeting the established standards. This requires all time compliance through the project cycle. The contractor should observe the requirements of the Regulations which prohibit anyone to undertake development within a minimum of 6m from the highest ever recorded flood level. Section 4(2), 6 and section 24 of the regulation prohibits pollution

<table>
<tr><th>Legal Section</th><th>Relevant Provisions</th><th>Compliance Aspects</th></tr>
<tr><td></td><td>quality standards for sources of domestic water.
<table><tr><td>Parameter</td><td>Guide Value (Maximum allowable)</td></tr><tr><td>pH</td><td>6.5 – 8.5</td></tr><tr><td>Suspended solids</td><td>30 (mg/l)</td></tr><tr><td>Nitrate – NO3</td><td>10 (mg/l)</td></tr><tr><td>Ammonia – NH3</td><td>0.5 (mg/l)</td></tr><tr><td>Nitrite – NO2</td><td>3 (mg/l)</td></tr><tr><td>Total dissolved solids</td><td>1200 (mg/l)</td></tr><tr><td>Ecoli</td><td>Nil/100ml</td></tr><tr><td>Fluoride</td><td>1.5 (mg/l)</td></tr><tr><td>Phenols</td><td>Nil (mg/l)</td></tr><tr><td>Arsenic</td><td>0.01 (mg/l)</td></tr><tr><td>Cadmium</td><td>0.01 (mg/l)</td></tr><tr><td>Lead</td><td>0.05 (mg/l)</td></tr><tr><td>Selenium</td><td>0.01 (mg/l)</td></tr><tr><td>Copper</td><td>0.05 (mg/l)</td></tr><tr><td>Zinc</td><td>1.5 (mg/l)</td></tr><tr><td>Alkyl benzyl sulphonates</td><td>0.5 (mg/l)</td></tr><tr><td>Permanganate Value (PV)</td><td>1.0 (mg/l)</td></tr></table></td><td>of water bodies and requires that all substance discharged into the water bodies should meet the standards set under third schedule of the regulation.</td></tr>
<tr><td>The Environment Management and Co- ordination Act, 1999 (Waste</td><td>The regulations are formed under sections 92 and 147 of the Environmental Management and Coordination Act, 1999. Under the regulations, a waste generator is defined as any person whose activities produces waste while waste management is the administration or operation used in handling, packaging,</td><td>Water projects involve use of inputs which are likely to generate the mentioned wastes and thus will need</td></tr>
</table>

Legal Section	Relevant Provisions	Compliance Aspects
Management)Regulations, 2006	treatment, conditioning, storage and disposal of waste. Part II of regulations, regulation 4 (1) states that no person shall dispose of any waste on a public highway, street, road, recreational area or in any place except in a designated receptacle. Regulation 4 (2) further states that a waste generator shall collect, segregate and dispose such waste in the manner provided for under these regulations. Regulation 5 (1) provides for cleaner production methods. It states that "a waste generator shall minimize the waste generated by adopting the following cleaner production methods: a. Improvement of production process through: (i) Conserving raw materials and energy; (ii) Eliminating the use of toxic raw materials; and (iii) Reducing toxic emissions and waste. b. Monitoring the product cycle from beginning to end by: (i) Identifying and eliminating potential negative impacts of the product; (ii) Enabling the recovery and re-use of the product where possible; and c. Incorporating environmental concerns in the design and disposal of a product". Regulation 8 of the regulations provides for responsibility of waste transporters.	to be handled as required by the regulations, standards and procedures all the time. The contractor should put in place measures to ensure that construction materials requirements are carefully budgeted and to ensure that the amount of construction materials left on site after construction is kept minimal. The contractor should undertake the following in addition to the above-mentioned recommendations; → Should not dispose any waste on the highway, street road, recreational area and public places; → Segregate waste and group them according to their similarity for

Legal Section	Relevant Provisions	Compliance Aspects
	It states that "any person granted a license to transport waste shall ensure that: (1) The collection and transportation of such waste is conducted In such a manner that will not cause scattering of the waste; (2) The vehicles and equipment for the transportation of waste are in such a state that shall cause scattering of, flowing out of waste or emission of noxious smells from such waste; (3) The vehicles for transportation and other means of conveyance of waste follow the scheduled routes approved by the Authority from the point of collection to the disposal site or plant and (4) He or his agent (s) possess at all times during transportation of the waste, a duly filled tracking document as set out in Form III in the first schedule to these regulations and shall produce the same tracking document on demand to any law enforcement officer".	example plastics, toxic, organic etc; → Ensure all waste is deposited in a designated dumping are approved by the local authority; → All waste handlers engaged by the contractor should be licensed by NEMA and possess all relevant waste handling documents such as waste transport license, tracking documents, license to operate a waste yard, insurance cover, vehicle inspection documents among others; → Implement cleaner production principles of waste management strategy namely reduce, reuse and recycle; → Label all hazardous

<table>
<tr><th>Legal Section</th><th>Relevant Provisions</th><th>Compliance Aspects</th></tr>
<tr><td></td><td></td><td>wastes as specified in section 24 (1-3) of the regulation.</td></tr>
<tr><td>The Environment Management and Co- ordination Act, 1999 (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009</td><td>Part II section 3(I) of these Regulations states that: no person shall make or cause to be made any loud, unreasonable, unnecessary or unusual noise which annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and the environment and section 3(2) states that in determining whether noise is loud, unreasonable, unnecessary or unusual.
Part II Section 4 also states that: except as otherwise provided in these Regulations, no person shall (a) make or cause to be made excessive vibrations which annoy, disturb, injure or endanger the comfort, repose, health or safety of others and the environment; or (b) cause to be made excessive vibrations which exceed 0.5 centimetres per second beyond any source property boundary or 30m from any moving source.

Regulation 5 of these regulations provides for permissible noise levels. The regulation states that “No person shall cause noise from any source which exceeds any sound level as set out in the applicable column in the First Schedule to these Regulations, unless such noise is reasonably necessary to the preservation of life, health, safety or property”. The Table below shows the permissible noise levels as set in the First Schedule to these Regulations.
<table>
<tr><td colspan="2" rowspan="3">Zone</td><td colspan="2">Sound Level Limits dB(A)</td><td colspan="2">Noise Rating Levels (NR)</td></tr>
<tr><td colspan="2">Leq, 14h)</td><td colspan="2">Leq, 14h)</td></tr>
<tr><td>Day</td><td>Night</td><td>Day</td><td>Night</td></tr>
<tr><td>A</td><td>Silent Zone</td><td>40</td><td>35</td><td>30</td><td>25</td></tr>
</table>
</td><td>It is anticipated that the proposed project will generate excessive noise and/or vibration and will originate from the construction equipment, vehicles and the workers. Since the project site lies within a settlement area, the contractor should ensure the regulation requirements are observed.</td></tr>
</table>

Legal Section	Relevant Provisions	Compliance Aspects

B	Places of worship	40	35	30	25
C	Residential: Indoor Outdoor	 45 50	 35 35	 35 40	 25 25
D	Mixed residential (with some commercial and places of entertainment)	55	35	50	25
E	Commercial	60	35	55	25

Time Frame
Day: 6.01 a.m. – 8.00 p.m. (Leq, 14 h);
Night: 8.01 p.m. – 6.00 a.m. (Leq, 10h)

Regulation 13 of these Regulations provides for construction at night. Regulation 13 (1) states that "Except for the purposes specified in sub- Regulation (2) hereunder, no person shall operate construction equipment (including but not limited to any pile driver, steam shovel, pneumatic hammer, derrick or steam or electric hoist) or perform any outside construction or repair works so as to emit noise in excess of the permissible levels as set out in the Second Schedule of these regulations".

Regulation 13 (2) states that "This Regulation shall not be deemed to prohibit-

1. any work of an emergency nature;

Legal Section	Relevant Provisions	Compliance Aspects
	2. work of a domestic nature on buildings, structures or projects being undertaken by a person residing in such premises; or 3. public utility construction, or, with respect to construction of public works, projects exclusively relating to water projects, roads, bridges, airports, public schools and sidewalks: Provided that, if any domestic power tool, including but not limited to mechanically powered saws, sanders, grinders and lawn and garden tools used outdoors, is operated during the night time hours, no person shall operate such machinery so as to cause noise within a residential building or across a residential real property boundary where such noise interferes with the comfort, repose, health or safety of members of the public within any building or outside of a building, at 30 metres or more from the source of the sound". Regulation 14 of these Regulations provides for noise, excessive vibrations from construction, demolition, mining or quarrying sites. Regulation 14 (1) states that "Where defined work of construction, demolition, mining or quarrying is to be carried out in an area, the Authority may impose requirements on how the work is to be carried out including but not limited to requirements regarding- a. machinery that may be used, and b. the permitted levels of noise as stipulated in the Second and Third Schedules to these Regulations". Regulation 14(3) further states that "Any person carrying out construction, demolition, mining or quarrying works shall ensure that the vibration levels do not exceed 0.5 centimetres per second beyond any source property boundary or 30	

<table>
<tr><th>Legal Section</th><th>Relevant Provisions</th><th>Compliance Aspects</th></tr>
<tr><td></td><td>
metres from the moving source".

Regulation 15 of these regulations states that "Any person intending to carry out construction, demolition, mining or quarrying work shall, during the Environmental Impact Assessment studies-
(a) identify natural resources, land uses or activities which may be
affected by noise or excessive vibrations from the construction, demolition, mining or quarrying;
(b) determine the measures which are needed in the plans and specifications to minimize or eliminate adverse construction, demolition, mining or quarrying noise or vibration impacts; and
(c) incorporate the needed abatement measures in the plans and specification".

The Table below shows the maximum permissible noise levels for construction sites (measurement taken within the facility) as per the second schedule of these regulations.
<table>
<tr><td colspan="2">Facility</td><td>Maximum Noise Level Permitted (Leq) in dB (A)</td><td></td></tr>
<tr><td colspan="2"></td><td>Day</td><td>Night</td></tr>
<tr><td>(i)</td><td>Health facilities, educational institutions, homes for disabled etc.</td><td>60</td><td>35</td></tr>
<tr><td>(ii)</td><td>Residential</td><td>60</td><td>35</td></tr>
<tr><td>(iii)</td><td>Areas other than</td><td>75</td><td>65</td></tr>
</table>
</td><td></td></tr>
</table>

Legal Section	Relevant Provisions	Compliance Aspects
	those prescribed in (i) and (ii) Time Frame Day: 6.01 a.m. – 6.00 p.m. (Leq, 14h) Night: 6.01 p.m. – 6.00 a.m. (Leq, 14 h)	
The Environment Management and Co- ordination Act, 1999 (Conservation of Biodiversity Diversity and Resources Access to Genetic Resources and Benefit Sharing), Regulations, 2006	Part II of Regulations, section 4 states that no person shall engage in any activity that may have adverse impacts on ecosystems, lead to introduction of exotic species or lead to unsustainable use of natural resources without an EIA license. The regulation puts in place measures to control and regulate access and utilization of biological diversity that include among others banning and restricting access to threatened species for regeneration purposes. It also provides for protection of land, sea. Lake or river declared to be a protected natural environmental system in accordance to section 54 of EMCA, 1999.	This regulation has relevance on activities interfering with natural habitats and genetic species therein.
The Environment Management and Co- ordination Act, 1999 (Fossil Fuel Emission Control), Regulations, 2006	These regulations came into operation on 1st February 2007. The regulations aim at eliminating or reducing emissions generated by internal combustion engines to acceptable standards. The regulations provide guidelines on use of clean fuels, use of catalysts and inspection procedures for engines and generators. This regulation is triggered as the proponent would use vehicles and equipment's that depend on fossil fuel as their source of energy. It is recommended the requirements of the regulation be implemented in order to eliminate or reduce negative air quality impacts. Regulation 4 (1) states that "any internal combustion engine is subject to	This would be relevant for construction equipment and vehicles and operations within the project site thereafter. The requirements of the regulation should be implemented in order to eliminate or reduce negative

	inspection under these regulations and shall, as a condition of compliance with	air quality impacts.

Legal Section	Relevant Provisions	Compliance Aspects
	the inspection, pass such tests as may be required to demonstrate that the internal combustion engine complies with any standards and requirements for the control of air pollution or contamination as may be prescribed". Regulation 4 (2) further states "that the emission standards to be complied with by any internal combustion engine shall be those set out in the First Schedule to these regulations". Regulation 5 of these regulations provide for Environmental Inspectors. It states that "the Authority may appoint such number of environmental inspectors as it may deem appropriate for purposes of carrying out emissions inspection under these regulations and may, without prejudice to the foregoing, appoint any employee of a lead agency conducting inspection of internal combustion engines on behalf of the Government". Regulation 7 (1) states that "the Authority may approve any substance to be used as a fuel catalyst if, in the opinion of the Authority, the substance improves fuel economy, enhances combustion and reduces harmful emissions that adversely affect human, animal and plant health and degrade the environment".	
The Environment Management and Co- ordination Act, 199 9 (Controlled Substances) Regulation, 2007	These Regulations controls the production, consumption and, exports and imports of controlled substances. Controlled substances are grouped into three lists according to the regulation and the groups are as written below: – Group 1 list consists of halogenated flourochemicals with ozone depleting substances – Group 2 list consist of hydrobromoflourocarbons with ozone depleting substances – Group 3 list consist of bromochloromethane with ozone depleting substances	This regulation s h o u l d be observed to ensure equipment, machinery, vehicles and chemicals containing such components are not imported for project use.

Legal Section	Relevant Provisions	Compliance Aspects
	Products containing controlled substances include: air conditioners, air coolers, refrigerants, portable fire extinguishers, heat pump equipment, dehumidifiers, insulation boards, panels and pipe covers, pre-polymers etc.	
The Environment Management and Co- ordination Act, 1999 (Wetlands, River Banks, Lake Shores and Sea Shore Management Regulations, 2009)	The aim of these Regulations is to ensure conservation and sustainable use of river banks, wetlands, Lake Shores and Sea Shore in Kenya. The regulations provide guidelines on the above natural resources management.	The regulation should be observed to ensure any river bank within the project site is preserved
The Water Act 2002	According to Section 5 of this Act, the right to use of water from any water resource is hereby vested in the Minister, except to the extent that it is alienated by or under this Act or any other written law. Section 4 (1) of the same Act states that "the Minister shall have and may exercise control over every water resource in accordance with this Act". Subsection 2 states that "it shall be the duty of the Minister to promote the investigation, conservation and proper use of water resources throughout Kenya and to ensure the effective exercise and performance by any authorities or persons under the control of the Minister of their powers and duties in relation to water". Subsection 3 further states that "the Minister shall be assisted in discharge of his duties under this Section by Director of Water". Section 13 provides for determination of a reserve. Section 13 (1) states that "the Minister shall, by notice in the Gazette, determine the reserve for the whole or	▯ The statute established to coordinate sustainable utilization of water resources including protection of the same from pollution and degradation (abstraction, use and disposal of wastewater thereof). ▯ Related water rules should be applied at all times. Water related initiatives should undergo ESIA process.

Legal Section	Relevant Provisions	Compliance Aspects
	part of each water resource which has been classified under this Part". Subsection 2 further states that "a determination of the reserve shall ensure that adequate allowance is made for each aspect of the reserve". Section 13(3) states that "the Minister, the Authority and all public bodies shall, when exercising any statutory power or performing any statutory function in relation to the water resource concerned, take into account and give effect to the requirements of the reserve". Part II section 18 provides for national monitoring and information systems on water resources. Following on this, sub-section 3 allows the Water Resources Management Authority to demand from any person, specified information, documents, samples or materials on water resources. Under these rules, specific records may be required to be kept and the information thereof furnished to the authority on demand. Section 25 of the Act requires a permit to be obtained for among others any use of water from a water resources, discharge of a pollutant into any water resource. According to section 29 of the same Act, application for such a permit shall be subject to public consultation as well as an environmental impact assessment as per the Environmental Management and Coordination Act, 1999. The conditions of the permit may also be varied if the authority feels that the water so used is causing deterioration of water quality or causing shortage of water for other purposes that the authority may consider has priority. This is provided for under section 35 of the Act.	
Water Resources Management Rules, 2007	One of the outcomes of the water sector reforms has been improved regulatory framework for water resource management and use. In addition to the Water Act 2002, the main document outlining the regulations is the Water Resource Management Rules 2007. The rules set out the procedures for	Sets the standard procedures and rules to be followed in the utilization of water

Legal Section	Relevant Provisions	Compliance Aspects
	obtaining water use permits and the conditions placed on permit holders. Sections 54 to 69 of the Water Resources Management Rules 2007 impose certain statutory requirements on dam owners and users in regard. Other sections within the rules imply that the Water Resources Management Authority (WRMA) can impose water quality sampling requirements from the water sources and impacts to the hydrology, water chemistry and river morphology downstream basin. Section 16 of the Water Rules requires approval from the WRMA for a variety of activities that affect the water resources, including the storage of water in dams and pans. Approval by WRMA is conferred through a Water Permit. A permit is valid for five years and must be renewed. Section 104 of the Water Resource Management Rules requires certain water permit holders to pay water use charges. The intention of the water use charges was to raise revenue for water resource management, raise revenue for catchment conservation activities, improve efficiency of water resource abstraction and provide a system of data collection on water resource usage.	resources including abstraction controls, modes of use and responsibilities in protection of the resources including effluent treatment standards. The rules were established as implementation tools for the Water Act 2002.
Public Health Act (Cap 242)	Part IX section 115 states that no person shall cause nuisance or condition liable to be injurious or dangerous to human health. Section 116 requires Local Authorities to take all lawful, necessary and reasonably practicable measures to maintain their jurisdiction clean and sanitary to prevent occurrence of nuisance or condition liable for injurious or dangerous to human health. Such nuisance or conditions are defined under section 118 as waste pipes, sewers, drains or refuse pits in such a state, situated or constructed as, in the opinion of the medical officer of health, to be offensive or injurious to health. Any noxious matter or waste water flowing or discharged from any premises into Public Street	All health and safety measures should be in place to ensure the workers and the neighbouring communities are not exposed to risks.

Legal Section	Relevant Provisions	Compliance Aspects
	or into the gutter or side channel or watercourse, irrigation channel or bed not approved for discharge is also deemed as a nuisance. Other nuisances are accumulation of materials or refuse which in the opinion of the medical officer of health is likely to harbor rats or other vermin. On the responsibility of local authorities, Part XI section 129 of the Act states in part "It shall be the duty of every local authority to take all lawful, necessary and reasonably practicable measures for preventing any pollution dangerous to health of any supply of water which the public within its district has a right to use and does use for drinking or domestic purposes, and purifying such supply so polluted". Section 130 provides for making and imposing on local authorities and others the duty of enforcing rules in respect of prohibiting use of water supply or erection of structures draining filth or noxious matter into water supply as mentioned in section 129.	
The Penal Code (Cap. 63)	Section 191 of the Penal Code states that any person or institution that voluntarily corrupts or foils water for public springs or reservoirs, rendering it less fit for its ordinary use is guilty of an offence. Section 192 of the same Act says a person who makes or vitiates the atmosphere in any place to make it noxious to health of persons/institution in dwellings or business premises in the neighbourhood or those passing along public way, commit an offence.	This statute controls public nuisance including safety and security from construction activities. The contractor should observe the regulation by mitigating against excessive noise and by controlling pollution of water bodies and land
The Lands Act, 2012 No. 6 of 2012	Part II Section 8 provides guidelines on management of public land by National Land Commission on Behalf of both National and County Governments. This law in	This part of the law seeks to preserve and direct

Legal Section	Relevant Provisions	Compliance Aspects
	Section 8(b) stipulates that the Commission shall evaluate all parcels of public land based on land capability classification, land resources mapping consideration, overall potential for use, and resource evaluation data for land use planning. Section 8(d) stipulates that The Commission may require the land to be used for specified purposes subject to such conditions, covenants, encumbrances or reservations as are specified in the relevant order or other instrument. In managing public land the Commission is further required in Section 10(1) to prescribe guidelines for the management of public land by all public agencies, statutory bodies and state corporations in actual occupation or use. In these guidelines management priorities and operational principles for the management of public land resources for identified uses shall be stated. This in essence means that the Commission shall take appropriate action to maintain public land that has endangered or endemic species of flora and fauna, critical habitats or protected areas. As well the Commission shall identify ecologically sensitive areas that are within public lands and demarcate or take any other justified action on those areas and act to prevent environmental degradation and climate change. Section 107 of the Act requires that National or County Governments after satisfying that it is necessary to acquire land for public development; the respective Cabinet Secretary will submit a request to the Land Commission. Upon approval, the target land will be geo-referenced and authenticated at the national and county levels (section 110). In accordance with Section111, just compensation shall be paid promptly to all persons whose interests have been affected by the land acquisition.	management of fragile public land held by the various public bodies for sustainable development.

Legal Section	Relevant Provisions	Compliance Aspects
Physical Planning Act (Cap 286)	Section 24 of the Physical Planning Act gives provision for the development of local physical development plan for guiding and coordinating development of infrastructure facilities and services within the area of authority of County, municipal and town council and for specific control of the use and development of land. The plan shows the manner in which the land in the area may be used. Section 29 of the Physical Planning Act gives the county councils power to prohibit and control the use of land, building, and subdivision of land, in the interest of proper and orderly development of its area. The same section also allows them to approve all development applications and grant development permissions as well as to ensure the proper execution and implications of approved physical development plans. On zoning, the Act empowers them to formulate by-laws in respect of use and density of development. Section 30 states that any person who carries out development within an area of a local authority without development permission shall be guilty of an offence and the development shall be invalid. The Act also gives the local authority power to compel the developer to restore the land on which such development has taken place to its original conditions within a period of ninety days. If no action is taken, then the council will restore the land and recover the cost incurred thereto from the developer. In addition, the same section also states that no person shall carry out development within the area of a local authority without development permission granted by the local authority. At the same time, sub-section 5, re-enforce it further that, no licensing authority shall grant under any written law, a license for commercial use for which no development permission had been granted by the respective local authority. Section 36 states that if in connection with development application a local	Any intervention sub-project is expected to be compatible with the existing physical plans and approved development and land use

Legal Section	Relevant Provisions	Compliance Aspects
	authority is of the opinion that, the proposed activity will have injurious impact on the environment, the applicant shall be required to submit together with the application an Environmental Impact Assessment Report. The environmental impact assessment report must be approved by the National Environmental Management Authority (NEMA) and followed by annual environmental audits as spelled out by EMCA 1999. Section 38 states that if the local authority finds out that the development activity is not complying to all laid down regulations, the local authority may serve an enforcement notice specifying the conditions of the development permissions alleged to have been contravened and compel the developer to restore the land to its original conditions.	
IDP Act: Protection And Assistance To Internally Displaced Persons And Affected Communities Act, 2012	This Act applies to all internally displaced persons either through calamities, social conflicts or development projects and is guided by the Bills of Rights under the Constitution of Kenya. Section 5 of the Act lists development projects among the displacement factors and outlines involvement of the affected persons through awareness, sensitization, training and education on causes, impacts, consequences and prevention measures. Under section 6 of the Act indicates displacements and relocations from development projects will take place only justified by compelling and overriding public interests. The procedures to follow are listed under section 22 such as to include: Justification as to why the displacement is unavoidable and that there is no other feasible alternative; Seeking free and informed consent from the affected persons; Holding public hearing on the project planning;	The project will likely have some Impacts on persons on the route of the pipelines and may result in displacement of persons depending on the routing. A survey on the pipeline route was done as per the attached map

Legal Section	Relevant Provisions	Compliance Aspects
	- Provision of reasonable notice time to allow affected persons review and react to the displacement conditions; and - Displacement process should reflect respect to human rights. Relocation of the affected persons will be guided by the following factors: - Full information on the affected persons and ensuring their participation; - Identification of safe, adequate and habitable alternatives; - Availability of safety, nutrition, health and hygiene as well as protection at the new locations; and - Acceptability by the host communities in the new locations.	
HIV/AIDS Prevention and Control Act (Act No.14 of 2006)	Part 11, Section 7 requires HIV and AIDs education in the work place. The government is expected to ensure provision of basic information and instruction on HIV and AIDs prevention and control to; Employees of all Government Ministries, Departments, Authorities, and Other Agencies; and, Employees of Private and Informal Sectors. The information on HIV/AIDs is expected to be treated with confidentiality at the work place and positive attitudes shown towards infected employees and workers. Part IV dealing with Testing, Screening and Access Health Care Services, states that:- (1) Subject to this Act, no person shall compel another to undergo an HIV test. (2) Without prejudice to the generality of subsection (1), no person shall compel another to undergo an HIV test as a precondition to, or for continued enjoyment of-	During the project implementation the contractor is expected to create awareness to the employees and the local communities on the issues related to HIV/AIDs.

Legal Section	Relevant Provisions	Compliance Aspects
	(a) Employment; (b) Marriage; (c) Admission into any educational institution; (d) Entry into or travel out of the country; or (e) The provision of healthcare, insurance cover or any other service. (3) Notwithstanding the provisions of subsection (1), a person charged with an offence of a sexual nature under the Sexual Offences Act, 2006 may be compelled to undergo an HIV test. (4) A person who contravenes any of the provisions of this section commits an offence. - No person shall carry out an HIV test except in a testing centre approved by the Minister under this section or in the manner specified under paragraph (d) of subsection (4). - No person shall carry out an HIV test unless such person is a healthcare provider approved by the Minister for that purpose. - No person shall provide pre-test or post-test counseling for the purposes of section 17 unless such person is approved by the Minister under this section. Part 17 stipulates that every testing centre shall provide pre-test and post- test counseling to a person undergoing an HIV test and any other person likely to be affected by the results of such test. The results of an HIV test shall be confidential and shall only be released- (a) To the tested person;	

Legal Section	Relevant Provisions	Compliance Aspects
	(b) In the case of a child, to a parent or legal guardian of such child; Provided that where any such child consents to an HIV test directly under section 14(1)(b), the results thereof shall be released to the child; or (c) In the case of a person with a disability which, in the opinion of the medical practitioner undertaking the test, renders him incapable of comprehending such result to- (i) The guardian of that person; (ii) A partner of that person; (iii) A parent of that person; or (iv) An adult offspring of that person Part V dealing with Confidentiality states that: - No person shall record, collect, transmit or store records, information or forms in respect of HIV tests or related medical assessments of another person otherwise than in accordance with the privacy guidelines prescribed under this section. - No person shall disclose any information concerning the result of an HIV test or any related assessments to any other person except- (a) with the written consent of that person; (b) if that person has died, with the written consent of that person's partner, personal representative, administrator or executor; (c) if that person is a child, with the written consent of a parent or legal guardian of that child: Part VI dealing with Transmission of HIV states that:	

Legal Section	Relevant Provisions	Compliance Aspects
	(1) A person who is and is aware of being infected with HIV or is carrying and is aware of carrying the HIV virus shall- (a) take all reasonable measures and precautions to prevent the transmission of HIV to others; and (b) Inform, in advance, any sexual contact or person with whom needles are shared of that fact. (2) A person who is and is aware of being infected with HIV or who is carrying and is aware of carrying HIV shall not, knowingly and recklessly, place another person at risk of becoming infected with HIV unless that other person knew that fact and voluntarily accepted the risk of being infected. (3) A person who contravenes the provisions of subsections (1) or (2) commits an offence and shall be liable upon conviction to a fine not exceeding five hundred thousand shillings or to imprisonment for a term not exceeding seven years, or to both such fine and imprisonment. (4) A person referred to in subsection (1) or (2) may request any medical practitioner or any person approved by the Minister under section 16 to inform and counsel a sexual contact of the HIV status of that person. (5) A request under subsection (4) shall be in the prescribed form. Part VIII dealing with Discriminatory Acts and Policies states that: (1) Subject to subsection (2), no person shall be- (a) denied access to any employment for which he is qualified; or (b) transferred, denied promotion or have his employment terminated, on the ground only of his actual, perceived or suspected HIV status. (2) Subsection (1) shall not apply in any case where an employer can prove, on application to the Tribunal that the requirements of the employment in question are that a person be in a particular state of health or medical or clinical condition.	

Legal Section	Relevant Provisions	Compliance Aspects
	- A person's freedom of abode, lodging, or travel, within or outside Kenya shall not be denied or restricted on the grounds only of the person's actual, perceived or suspected HIV status. -No person shall be quarantined, placed in isolation, refused lawful entry or deported from Kenya on the grounds only of the person's actual, perceived or suspected HIV status. -No person shall be denied the right to seek an elective or other public office on the grounds only of the person's actual, perceived or suspected HIV status. (1) Subject to this Act, no person shall be compelled to undergo a HIV test or to disclose his HIV status for the purpose only of gaining access to any credit or loan services, medical, accident or life insurance or the extension or continuation of any such services. (2) Notwithstanding the provisions of subsection (1), an insurer, re-insurer or health maintenance organization shall, in the case of life and healthcare service insurance cover, devise a reasonable limit of cover for which a proposer shall not be required to disclose his or her HIV status. (3) Where a proposer seeks a cover exceeding the no test limit prescribed under subsection (2) the insurer, reinsurer or health maintenance organization may, subject to this Act, require the proposer to undergo an HIV test.	
Traffic Act (Cap. 403)	Section 42 Part 1 forbids any driver to drive a vehicle at a speed exceeding fifty kilometers per hour on any road within the boundaries of any trading centre, township, municipality or city: The highway authority is expected to erect and maintain traffic signs as prescribed so as plainly to indicate to drivers entering or leaving such roads or areas where the fifty kilometer per hour speed limit restriction begins and ends. Section 47 of the Act states that any person who	This section of the law applies during construction phase of the project.

Legal Section	Relevant Provisions	Compliance Aspects
	drives a motor vehicle on a road recklessly, or at a speed or in a manner which is dangerous to the public, shall be guilty of an offence and liable to a fine. Part VIII of cancelling any driving license or provisional driving license held by the offender and declaring the offender disqualified for holding or obtaining a driving license for such period as it thinks fit. Section 52 Part 1, states that the drivers of the vehicles are expected at all times to obey directions given by the police officer whether verbally or in signal, conform to the indications given by any traffic sign, and when any person in charge of any cattle raises his hand or in any manner signaling to stop, and keep it stationary for as long as it is reasonably necessary. Section 52 (A) forbids any person who, being the driver of a vehicle from leaving the vehicle for a period in excess of the time, failing to comply with any traffic sign or leaving the vehicle in contravention of any traffic sign in any parking bay or parking area. Section 71, gives permission to the authority or the authority representative to close the roads for purpose of preventing damage caused to any road, carry out any works considered necessary in connection with maintenance/improvement of road or close whole or part of road to vehicles of particular type at any time for any period. Under the Traffic sign rules part 13, temporary traffic sign signal unit may be used for purposes of controlling the movement of vehicles on the road where the road works are in progress or where the width of the carriageway is temporary restricted.	
Urban Areas and Cities	Section 5 states that a municipality is eligible for a city status if it has infrastructural facilities including but not limited to roads, street lights, market	This is perhaps an important section of law for linking the

Legal Section	Relevant Provisions	Compliance Aspects
Act, 2011	and fire station and an adequate capacity for disaster management. Has infrastructure that provides national and regional connectivity. Under section 26 (b)gives power to the council of the city or large municipality to formulate and implement a master plan for urban and physical planning and infrastructural development and provision of essential services including; provision of water, sanitation, health care, education, housing, transport, disaster management systems and facilities for safe environment. According to section 26 (c) the council is expected to exercise control over land use, land sub-division, land development and zoning by public and private sectors for any purpose including; agriculture, industry, commerce, markets, employment centers, residential, recreational parks, entertainment, passenger transport freight and the transit stations within framework of spatial and master plans for the city and municipality. Section 44 provides for the council to form partnership on provision of social infrastructural services with companies within and outside the country. This includes; construction of roads, environment conservation and preservation, construction of health centers and promotion of tourism and cultural events.	proposed project to the land use practices along the pipeline route.
Occupation Safety and Health Act, 2007	This is an Act of Parliament that provides for the safety, health and welfare of workers and all persons lawfully present at work places to provide for the establishment of the National Council for Occupational Safety and Health and for connected purposes. Section 3 (1) states "that the Act shall apply to all workplaces where any person is at work, whether temporarily or permanently". Section 13 part 1(a) the employee is expected to ensure his own safety and health	The overall objective of the Act is to ensure safety at the work place. It is recommended that the objective of the Act be withheld during the construction phase to

Legal Section	Relevant Provisions	Compliance Aspects
	and of the other person who may be affected by his acts or omissions at work place, (c)requires the employee at all times to use protective equipment or clothing provided by the employer for purpose of preventing risks to his safety and health, (f) report to the supervisor any accidents or injury that arise in connection with his work Part 2 states that any employee who fails to follow this section commits an offence and shall on conviction be liable to a fine or imprisonment. Section 21 provides that the employer or self-employed person to notify the occupational health and Safety Officer of any accidents, dangerous occurrence, or occupational poisoning which has occurred at the work place. Section 32 gives power to the occupational safety and Health officer to enter inspects examine by day or night, a work place which he has reasonable cause to believe to be a work place and any part of any building of which forms a work place. Part V of the Act provides for the registration of workplaces. Section 43 states that "the Director shall keep a register of workplaces in which he shall cause to be entered such particulars in relation to every workplace required to be registered under this Act as he may consider necessary". Section 44 (1) further states that "Before any person occupies or uses any premises as workplace, he shall apply for the registration of the premises by sending to the Director a written notice containing the particulars set out in the fourth schedule" Section 44 (2) states that "Upon receipt of the notice referred to in subsection (1), the Director shall take such steps as may be necessary to satisfy himself that the premises are suitable for use as a workplace of the nature stated in the notice, and upon being so satisfied, shall cause the premises to be registered and shall issue to the applicant, upon payment of the prescribed fee, a certificate of registration in the	ensure that the health and safety of both the workers and the general public is safeguarded.

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<tr><th>Legal Section</th><th>Relevant Provisions</th><th>Compliance Aspects</th></tr>
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form set out in the Fifth Schedule". Section 44 (4) states that "All workplaces which were registered under the Factories and Other Places of Work Act (now repealed) shall be deemed to have been registered under this Act".

Part VI of the Occupational Safety and Health Act, 2007, addresses provisions concerning health. These provisions are:

(i) Cleanliness;
(ii) Overcrowding;
(iii) Ventilation;
(iv) Lighting;
(v) Drainage of floors; and
(vi) Sanitary conveniences.

These provisions are to be enforced by the Department of Occupational Health and Safety of the Ministry of Labour.

According to the scale for sanitary accommodation issued by Director of Occupational Safety and Health, LD280, the table below shows the guides for scale for sanitary accommodation:

<table>
<tr><td colspan="2">Ladies WC</td><td colspan="2">Gents WC</td><td colspan="2">Gents Urinals</td></tr>
<tr><td>No. of staff</td><td>No. of facilities</td><td>No. of staff</td><td>No. of facilities</td><td>No. of staff</td><td>No. of facilities</td></tr>
<tr><td>1 - 12</td><td>1</td><td>1 – 15</td><td>1</td><td>1 - 6</td><td>0</td></tr>
<tr><td>13 – 20</td><td>2</td><td>15 – 35</td><td>2</td><td>7 - 20</td><td>1</td></tr>
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</td><td></td></tr>
</table>

Legal Section	Relevant Provisions	Compliance Aspects

21 – 40	3	36 – 65	3	21 - 45	2
41 – 57	4	66 – 100	4	46 - 70	3
58 – 77	5	101 – 200	Add 3%	71 - 100	4
78 – 100	6	Over 200	Add 2.5%	101 - 200	Add 3%
101 – 200	Add 5%			Over 200	Add 2.5%
Over 200	Add 4%				

Section 55 requires all plant, machinery and equipment whether fixed or mobile for use at work place to be used for designed work and operated by a competent person.

Part VIII of the Occupational Safety and Health Act, 2007 describes safety general provisions.

Section 74 (1) provides for storage. It states that "all goods, articles and substances stored in a workplace shall be stored or stacked –

(a) in such a manner as will ensure their stability and prevent any fall or collapse of the stack;

(b) in such manner as not to interfere with the adequate distribution of the natural or artificial light, the natural ventilation systems, the proper operation of machines or other equipment, the unobstructed use of passageways, gangways

Legal Section	Relevant Provisions	Compliance Aspects
	or traffic lanes, and the efficient functioning of sprinkler systems, the unobstructed access to other fire extinguishing equipment within the workplace; and (c) on firm foundations not liable to overload any floor". Section 74 (2) further states that "No goods, articles or substances shall be stored or stacked against a wall or partition unless the wall or partition is of sufficient strength to withstand any pressure caused thereby". Section 76 provides for ergonomics at the workplace. Section 76 (1) states that "Machinery, equipment, personal protective equipment, appliances and hand tools used in all workplaces shall comply with the prescribed safety and health standards and be appropriately installed, maintained and safe guarded". Section 76 (2) states that "Every employer shall take necessary steps to ensure that workstations, equipment and work tasks are adapted to fit the employee and the employee's ability including protection against mental strain". According to Section 76 (3) "Every manufacturer, importer and supplier or an agent of a manufacturer, importer and supplier of the machinery and equipment referred to in paragraph (1) shall ensure that the equipment complies with the safety and health standards prescribed under this Act and shall provide adequate and appropriate information including hazard warning signs". Section 76 (4) further states that "An employer shall not require or permit any of his employees to engage in the manual handling or transportation of a load which by reason of its weight is likely to cause the employee to suffer bodily injury".	

Legal Section	Relevant Provisions	Compliance Aspects
	Section 97 prohibits employers to employ persons below the age of 18 years at the work place or perform work by which its nature it's likely to harm the persons safety or health.	
Work Injury compensation Benefit Act 2007	This Act provides guideline for compensating employees on work related injuries and diseases contacted in the course of employment and for connected purposes. The act includes compulsory insurance for employees. The act defines an employee as any worker on contract of service with employer. This Act is triggered by the proposed project thus it is recommended that all workers contracted during the project implementation phase have the required insurance covers so that they can be compensated in case they get injured while working.	The contractor should implement the requirements of this Act.
The Standards Act Cap 496	This Act is implemented by the Kenya Bureau of Standards who provides standards on the requirements of equipment and project materials. Standards regulating security and safety of the public also have to be observed during the design phase of the project.	The contractor should implement the requirements of this Act especially those on standardization of project inputs and equipment in order to reduce waste and pollution.
The Malaria Prevention Act (CAP 246)	This Act provides measures to curb the breeding of mosquitoes at development sites. Measures proposed in the act to control the breeding of the vector include: maintenance of free drainage channels, removal of stagnant water from any land around an area to prevent larvae breeding, removal of waste and broken bottles among other measures.	The contractor should implement measures to control the malaria disease vectors by implementing the mitigation measure proposed in the regulations.
County Governments Act 2012	This act gives effect to Chapter Eleven of the Constitution, which provides the county governments the powers to function and take responsibilities for the	The contractor should observe the requirements of

Legal Section	Relevant Provisions	Compliance Aspects
	delivery of services within their designated counties including management of environment and natural resources among other responsibilities. The functions provided for in Article 186 of the constitution and as assigned in the Fourth Schedule of the Constitution. These include management of water resources, biodiversity, forests, and National Reserves among others.	this Act
Kenya Roads Act 2007	This Act gives the Authority; Power to enter and to alter position of pipes, electric, telephone, telegraphic, fibre optic or other wire of whatsoever nature, or the position of any drain or sewer and give reasonable notice of its intention to do so to the person having control of the pipe, wire, sewer or drain and, Power to remove pipes etc. from within the road reserve where "pipe-borne utilities" refers to any pipes. devices and fittings for the supply or transmission of gas, oil products, water, wastewater, compressed air and any material conveyed by means of piping; , "wire-borne utilities, "infrastructure utilities" and requires the relevant provider or operator of such infrastructure utility to relocate such infrastructure utility to a location or alignment approved by the Authority at no cost to the Authority.	The contractor should implement the project taking cognizance of the restrictions and provisions of having the pipe infrastructure in the road reserve

4.4 Institutional and Administrative Framework

4.4.1 Institutions under EMCA

The Government established the following institutions to implement the EMCA.

(i) National Environmental Management Authority

The responsibility of the National Environmental Management Authority (NEMA) is to exercise general supervision and co-ordination over all matters relating to the environment and to be the principal instrument of government in the implementation of all policies relating to the environment.

(ii) County Environmental Committees

The County Environmental Committees also contribute to decentralized environmental management and enable the participation of local communities. Appointed by the Governor, these environmental committees consist of the following:

- The member of the county executive committee in charge of environmental matters who shall be the chairperson;
- An officer of the Authority whose area of jurisdiction falls wholly or partially within the county who shall be the Secretary to the County Environmental Committee;
- One representative for each of the Ministries responsible for the matters specified in the First Schedule at the county level;
- Two representatives of farmers or pastoralists within the county to be appointed by the Governor;
- Two representatives of the business community operating within the concerned county appointed by the Governor;
- Two representatives of the public benefits organizations engaged in environmental management programs within the county appointed by the Governor in consultation with the National Federation of Public Benefit Organizations;
- A representative of every regional development authority whose area of jurisdiction falls wholly or partially within the county.

(iii) National Environment Complaints Committee

The Committee is charged with the following functions: Investigating allegations/ complaints against any person or against the Authority (NEMA) in relation to the condition of the environment and its management, Prepare and submit to the Council periodic reports of its activities which shall form part of the annual report on the state of

the environment, and to perform such other functions and excise such powers as may be assigned to it by the Council.

4.4.2 The World Commission on Environment and Development of 1987

The Commission focused on the environmental aspects of development, in particular the emphasis on sustainable development that produces no lasting damage to the biosphere and to particular ecosystems. In addition to environmental sustainability is the economic and social sustainability

Economic sustainable development is development for which progress towards environmental and social sustainability occurs within available financial resources. While social sustainable development is development that maintains the cohesion of a society and its ability to help its members work together to achieve common goals, while at the same time meeting individual needs for health and wellbeing, adequate nutrition, and shelter, cultural expression and political involvement.

4.4.3 Institutional Structure of the Water Sector

The National Policy on Water Resources Management and Development and the Water Act 2002, presently guides water resources management. The overall goal of the national water development policy is to facilitate the provision of water in sufficient quantity and quality and within a reasonable distance to meet all competing uses in a sustainable, rational and economical way. This policy separates policy formulation, regulation and services provision and defines clear roles for sector actors within a decentralized institutional framework and includes private sector participation and increased community development

Under the policy, the Ministry of Water and Irrigation is responsible for policy development, sector co-ordination, monitoring and supervision to ensure effective Water and Sewerage Services in the Country, sustainability of Water Resources and development of Water resources for irrigation, commercial, industrial, power generation and other uses. The Ministry executes its mandate through the following sector institutions:

4.4.3.1 Water Resources Management Authority (WRMA)

The Water Resources Management Authority (WRMA) is of particular relevance to the project. Its mandate covers some sectoral issues which are applicable to environmental management, such as use of water resources, human settlement and administration of activities in the scheme.

Part III of the Water Act 2002 defines the powers and functions of WRMA which include:

- Developing principles, guidelines and procedures for the allocation of water resources;
- Monitoring the national water resources management strategy;
- Receiving and determining applications for permits for water use;

- Monitoring and enforcing conditions attached to permits for water use;
- Regulating and protecting water resources quality from adverse impacts;
- Managing and protecting water catchments.

4.4.3.2 Water Services Regulatory Board (WASREB)

The regulatory Board is responsible for the regulation of the water and sewerage services in partnership with the people of Kenya. The mandate of the regulator covers the following key areas;

→ Regulating the provision of water and sewerage services including licensing, quality assurance, and issuance of guidelines for tariffs, prices and disputes resolution.
→ Overseeing the implementation of policies and strategies relating to provision of water services licensing of Water Services Boards and approving their appointed Water Services Providers,
→ Monitoring the performance of the Water Services Boards and Water Services Providers,
→ Establish the procedure of customer complaints,
→ Inform the public on the sector performance,
→ Gives advice to the Minister in charge of water affairs.

4.4.3.3 Water Services Trust Fund (WSTF)

This body assists in the financing of the provision of Water Services to areas of Kenya which are without adequate water services. This shall include providing financing support to improved water services towards;

→ Capital investment to community water schemes in underserved areas
→ Capacity building activities and initiative among communities
→ Water services activities outlined in the Water Services Strategic Plan as prioritized by the Government
→ Awareness creation and information dissemination regarding community management of water services
→ Active community participation in the management of water services

4.4.3.4 Water Services Boards (WSBs)

The WSBs are responsible for the efficient and economical provision of water and sewerage services in their areas of jurisdiction. Tana Water Services Board is among the eight Water Services Boards established under the Water Act, 2002 and is mandated to;

→ Develop the facilities, prepare business plans and performance targets
→ Planning for efficient and economical provision of Water and sewerage services within their areas of jurisdiction;
→ Appointing and contracting Water Service Provider
→ Asset holding of Central Government facilities

4.4.3.5 Water Services Providers (WSPs)

Water Service Providers are the utilities or water companies. They are state owned but have been commercialized to improve performance and run like business within a context of efficiency, operational and financial autonomy, accountability and strategic, but minor investment.

4.4.4 National and County Governments

4.4.4.1 County Government of Nyeri

Nyeri County government is responsible for water, environment and public health management issues as provided for in the County Governments Act 2012. The County Executive for Water and Environment will therefore be expected to play a huge role in the implementation of the project.

4.4.4.2 The National Government

The National Government through the Mathira Deputy County Commissioners will be required where necessary during project implementation to provide the necessary security, advisory services and support for the project implementation.

4.5 International Conventions and Treaties

Kenya is a signatory as well as a party to various international conventions, treaties and protocols relating to the environment which aims at achieving sustainable development. According to the Registrar of International Treaties and other Agreements in Environment (UNEP 1999), there are 216 treaties, 29 of which are of interest to Kenya. The country is a signatory to 16 such agreements, which range from use of oil, protection of natural resources and protection of the atmosphere. The agreements are both regional and international and became legally binding on Kenya upon ratification thereof by the rightfully designated Kenyan Authority. The agreements of interest to Kenya can be categorized as those for protecting natural resources, atmosphere and social wellbeing of man. There are 12 agreements of significance to Kenya under protection of natural resources category which the country has signed and ratified. This section reviews a number of policies that are triggered or met by the proposed project:

4.5.1 United Nations Convention to Combat Desertification (UNFCCC) of 1994

The convention requires parties to take climate change considerations into account in their relevant social, economic and environmental policies and actions.

Relevance

The proponent has undertaken this EIA with the aim of minimizing adverse effects of the project on the economy, on public health and on the quality of the environment. The requirements of this convention can be mitigate against to reduce impacts on climate change by growing trees suitable for the area to act as carbon sinks along the highway. The community members in the project area depend majorly on wood and kerosene as their source of energy which are known to directly affect the ecosystem in terms of pollution and effects on water catchments. The proponent is advised to enhance the positive impacts of the project through engaging activities that control climate change for example developing tree planting programs with line ministries and the community members and conserving the catchment through water conservation.

4.5.2 Convention on Biological Diversity, 1992

The Convention requires Parties to use EIA and EA effectively to avoid or minimize significant adverse impacts on biodiversity; it introduces Strategic Environmental Assessment (SEA) to assess environmental implications of policies and programs particularly for those with major implications on natural resource use. The Convention also led to the establishment of Cartagens Protocol on Biosafety 1999 namely "The Cartagena Protocol on Biosafety to the Convention on Biological Diversity" which was adopted on 29th January 2000 entered into force on the same date. Kenya signed the protocol on 15th May 2000; ratified it on 24th January 2002 and became a party member on 11th September 2003. The protocol is an international treaty governing the movements of Living Modified Organisms (LMOs) resulting from modern biotechnology from one country to another. The proponent is advised to observe the requirements of this regulation if programs such as landscaping are incorporated and will involve use of plant species some of which can be biotechnology products . The use of LMO can have adverse environmental impacts if the correct material is not used leading to destruction of the micro-ecosystems, food webs and even invasion of farms.

4.5.3 The Convention on Wetlands of International Importance (Ramsar, 1971)

The convention seeks to ensure wise use of all wetlands and provides stringent guidelines for the conservation of those wetlands listed in the List of Wetlands of International Importance.

Relevance

The project is not located within an Important Bird Area (IBA) according to the Ramsar Sites list.

4.5.4 Kyoto Protocol to the United Nations Framework Convention

The Kyoto Protocol is an international agreement linked to the United Nations Framework Convention on Climate Change. The Clean Development Mechanism (CDM), defined in Article 12 of the Protocol, allows a country with an emission-reduction or emission-limitation commitment under the Kyoto Protocol (Annex B Party) to implement an emission-reduction project in developing countries. Such

projects can earn saleable certified emission reduction (CER) credits, each equivalent to one tonne of CO_2, which can be counted towards meeting Kyoto targets".

4.5.5 World Commission on Environmental and Development (The Brundtland Commission of 1987)

The commission focuses on the environmental aspects related to development and requires all development projects to be sustainable economically, socially and environmentally. The principle of the organization emphasis that development project should not have permanent negative on the biosphere and in particular the ecosystems.

Relevance

The consultants used participatory methods to involve the target group and concerned stakeholders in order to inform and enlightened them on the likely negative environment and social impacts in order for them to prepare mitigation measures so as to ensure the project is sustainable throughout its life span. It is recommended that the project incorporate mitigation measures to ensure that the project impacts on the ecosystem in reduced.

4.5.6 Convention concerning the Protection of World Cultural and Natural Heritage, 1972

The convention requires parties to adopt effective measures that include assessment of the feasible project alternatives to prevent or minimize or compensate for adverse impacts and assess the nature and extent of potential impacts on natural heritage resources, and designing and implementing mitigation plans. The convention also protects threatened plants.

4.5.7 Convention on International T r a d e in Endangered Species (CITES) of Wild Fauna and Flora, 1990

This convention protects forests as habitat for endangered species. The project area has no immediate forest which is rich in plants and wildlife.

4.5.8 The Convention of Control of Desertification in Countries Experiencing Serious Drought and/or Desertification, Particularly In Africa (UCCD)(1992)

This convention requires Parties to promote cooperation among affected parties in the fields of environmental protection and the conservation of land and water resources, as they relate to desertification and drought.

Relevance

This convention is domesticated in EMCA 1999 via Section 46 where District Environment Committees are required to identify areas that require re-forestation or afforestation as well as to mobilize the locals to carry out these activities. The proponent is advised to engage in activities geared towards eradicating drought through developing tree programs with relevant ministries/local communities, encouraging clean energy use and water conservation.

4.5.9 The Basel Convention

The overall goal of the convention is to protect human health and the environment against the adverse effects resulting from generation, movement and management of hazardous waste. This Convention requires that the Parties exercising their right to prohibit import of hazardous wastes or other wastes for disposal should inform the other Parties. It also requires the parties to ensure that the Trans boundary movement of hazardous wastes and other wastes is reduced to the minimum levels consistent with sound environmental management of such wastes, and that it is conducted in a manner which will protect human health and the environment against the adverse effects which may result from such movement.

Relevance

The project will involve use of solvents, emulsifiers, petroleum products and thus the requirements of the agreement should be observed by not importing or accepting expired inputs.

5.0 PUBLIC CONSULTATION

Public consultation is useful for gathering environmental data, understanding likely impacts, determining community and individual preferences, selecting project alternatives and designing viable and sustainable mitigation and compensation plans.

Public consultation process for the proposed project took place at the scoping stage and the ESIA stage. The main objective for the consultation process was to involve the community at the very early stages so as to identify likely negative impacts and find ways to minimize negative impacts and enhance positive impacts of the project.

5.1 Objectives of Public Consultation

The overall goal of the consultation process is to disseminate project information and to incorporate the views of the project beneficiaries and Project Affected Persons (PAPs) in the design of the mitigation measures and a management plan.

The specific aims of the consultation process are to:

→ Improve Project design and, thereby, minimize conflicts and delays in implementation;
→ Facilitate the development of appropriate and acceptable entitlement options;
→ Increase long term project sustainability and ownership;
→ Reduce problems of institutional coordination;
→ Make the resettlement process transparent; and
→ Increase the effectiveness and sustainability of income restoration strategies, and improve coping mechanisms.
→ All stakeholders and interested parties, are fully informed of the project and have the opportunity to raise their concerns;
→ Any issues resulting from this process are addressed in the ESIA and incorporated into the design and implementation of the project.
→ Consultation is done on sensitive issues and mitigation measures are established for management of any impacts that may arise during civil works and operation phase
→ An important element in the process of impact assessment is consulting with stakeholders to gather the information needed to complete the assessment.
→ Provide clear and accurate information about the project to the beneficiary community;
→ Obtain the main concerns and perceptions of the population and their representatives regarding the project;
→ Obtain opinions and suggestions directly from the affected communities on their preferred mitigation measures; and
→ Identify local leaders with whom further dialogue can be continued in subsequent stages of the project.

5.2 Legal Requirements

Section 17 of the Environmental (Impact Assessment and Audit) Regulations 2003 states that an ESIA should "seek the views of persons who may be affected by the project." The public consultation should involve direct contact with the respondents or their representatives. The respondents are people who are likely to be affected by the proposed project or stakeholders whose individual or collective interests in the short term of long-term may be affected. The respondents are therefore neighbours, business people, consumers, community leaders or generally Kenyans who have a collective interest in the project.

5.3 Analysis of the public/stakeholders consultation

5.3.1 Survey Questionnaires

The ESIA team in consultation with the proponent decided on a direct one to one contact with respondents who would respond to issues under discussion and after giving views had the option of filing a standard questionnaire touching on the project. This consultation was spread over a period of about 7 days in the project area where the team walked along the project pipeline route and met individuals two whom they introduced discussions and obtained views. Some respondents numbering 0ver 100 gave their views and signed the questionnaires. Others politely declined to give views or sign questionnaires. There were therefore no formal meetings or minutes.

This is an acceptable form of public participation which has an advantage of reaching out to a larger proportion of the affected population and it captures actual views of the respondents without influence. The method however takes a slightly longer time and collects a larger proportion of ignorant or pedestrian opinions as opposed to large meetings where a few experts give opinions and the larger number of persons does not individually air their views. At the review stage, if the responses are deemed inadequate by NEMA, a public hearing may be called for and this is an acceptable route for all projects.

The ESIA team targeted all types of respondents directly or indirectly affected by the proposed project primarily along the proposed pipeline which was also [parallel to the existing pipeline. Where possible, land or business owners were targeted but the responses were not restricted and also targeted consumers and residents who did not have connections. The major types of respondents were residents of Karatina Town and its environs who depend on the water from the proponent for domestic use and had experienced inadequacies in one form of another which they passionately talked about. These ranged from water rationing, biting prolonged shortage, poor communication or response and encroachment. Extensive discussions with the proponent team had been carried out during the site visits and this formed part of the participation.

Public participation forums were organized through administration of an open ended questionnaire aimed at introducing the project to the residents, gathering their views and concerns related to the project and incorporating their views into the project. Questionnaires were administered in the following areas earmarked to benefit from the project; Muthua, Karatina CBD and Karindundu. The sample questionnaires used the guiding questions below;

→ What is the integrity of the existing distribution network?
→ Is the water supply capacity adequate to provide the additional water demand to meet expanded system and expectations of the consumers?
→ How sustainable is the supply in the long run?
→ Is there a monitoring procedure and components for the water distributed and supplied to track losses and value of water supplied?
→ What is the level of ability and willingness to pay for water as a justification for the rehabilitation and expansion of the water supply?
→ What are implications to the physical environment (drainage, sanitation and hygiene) in the project area following the proposed works?
→ What are the social and economic implications of the works and the additional water supply?

5.3.2 Community Consultation Meetings

Public consultations were held at village levels to ensure that all concerns regarding the project implementation activities and the associated impacts on the local people and their livelihood activities were raised and openly discussed.
2 community meetings and 2 meetings with relevant county government were held at the various points along the proposed pipeline routing. The community, PAHs and key stakeholders were invited to attend the public consultation meetings by the Assistant Chief through baraza and direct phone calls and through direct contact with the PAHs and key stakeholders were made.

Table 5-1: Public Consultation Meetings

DATES	STAKEHOLDER	VENUE	NO. OF PARTICIPANTS
11th August 2018	Community	Gathugu Market	23
13th August 2018	National and County Government Institutions and Communities.	Industrial Area Market	48

5.3.3 Summary of Comments, Concerns and Views from the Public Consultation

The comments, concerns and views from the public consultation process that included a survey and consultative meetings are summarized below.

5.3.3.1 Summary of Concerns

Table 5-2: PUBLIC CONSULTATION AT GATHUGU MARKET ON 11th AUGUST 2018.

Comments and Issues	Response

The area chief wanted to know what measures the company (MAWASCO) is planning to put in place in order to bring down cost of water.	The technical manager informed the chief and residence present at the meeting that the water tariffs are provided by WASREB basing on various factors. Residents suggested that the company should incorporate technology in its operations for instance use of solar powered pumps. This will significantly reduce cost of pumping water which will lead to a reduction in water tariffs.
Is the project funded by the county government or is it purely funded by MAWASCO?	The project is by funded by World Bank through WSTF to MAWASCO?
How will the census of potential PAHs be carried out?	The RAP consultant will be in charge of enumerating all the PAHs, this will be done through administering asset register questionnaire that clearly captures the age, land number, vulnerability and the type of asset lost e.g. structure, business or crops and trees.
We utilize our land mainly for subsistence farming, if acquired what will we depend on?	The proposed project is not acquiring any land, however for those PAHs that the project will pass through their land, they will be identified by the consultant and compensated for easement and loses of structures, crops and trees.
Some of us have built structures along the road reserves. Will we be compensated for the displacement?	Those who have structures on the ROW are entitled compensation for structures and other assets lost other than land. They are also entitled to livelihood restoration measures and disturbance allowance as well as right to salvage.
Resident wanted to know the expected commencement date of the project.	The proposed project is expected to commence immediately all the PAHs are compensated and this is estimated to be in early January 2019.
Will the project benefit us in any other way apart from compensation for easement and disturbance?	The project will provide access to quality water supply regularly. The end result is that with regular water supply and adequate sanitation facilities, public health and sanitation will be enhanced. Jobs will also be available during construction and the operational lifetime of the water supply line.
Is there a grievance redress mechanism system in place and will it be effective?	There is a grievance redress mechanism in place which with cooperation from the PAHs is expected to handle any issues fairly.
Will my whole land be affected?	The water pipeline is only going to affect land size width of 3m & will not affect whole land. In a case where a substantial piece of land is affected rendering the remaining area uneconomical, outright acquisition will apply with full compensation given.
Will compensation be done before or after the pipeline has been constructed?	Compensation will be done before the construction begins.

Table 5-3: PUBLIC CONSULTATION AT INDUSTRIAL AREA MARKET ON 13th AUGUST 2018.

Comments and Issues	Response
When will the project begin?	The project will commence after all the PAHs are compensated. This will be perhaps in January 2019. However, the official date will be communicated.
Will we all be compensated?	All the affected PAHs will be compensated after a valuation of their property is done by a professional valuer
How about those people whose plots the pipe will pass through?	All those affected by the project will be compensated including land owners. Compensation will be for easement rights.
How will our youth benefit from this project besides the water supply?	The youth will be given priority when it comes to employment opportunities especially in areas where no skilled labour is required.
Will we be allowed to resume our areas of businesses?	After the pipe is laid and back filling done, affected persons will be allowed to resume and carry on with their businesses.

5.3.3.1 Summary of Views - Positive Impacts

The respondents mentioned the following positive impacts related to the proposed project.

There will be reliable and safe water supply for the urban population of Karatina town.

- → Adequate water supply once the project is completed.
- → Employment opportunities during the construction/ rehabilitation of water pipeline to the local youth.
- → Once Karatina town is connected to clean and safe water, cases of water borne diseases will be a thing of the past.
- → Installation of new pipes will reduce the cost of operation through checked water leakages.
- → Health hazards associated with asbestos materials that made the old pipes will be eliminated once the project is done.

5.3.3.2 Summary of Views - Negative Impacts

The respondents mentioned the following positive impacts related to the proposed project.

- → Interference with infrastructure and especially roads where the water pipes and the network cuts through the major roads.
- → If the supply and distribution of clean water is disrupted for long during the project implementation other methods of water supply which are not safe will pose health risks.
- → Water shortage or no water at all to the population of Karatina urban centre when the project will be going on.
- → Where the water pipeline passes through already built premises, existing walls and even building have to be brought down and thus cause huge financial loss to the owners. However this may also attract huge compensation on the part of the project owners as well. It may also attract civil action or court injunction which may result in delay.

5.3.4 Recommendations

The respondents mentioned the following positive impacts related to the proposed project.

- → Consider the sewer line as it is as important as the water pipeline.

→ The project timeline must be communicated in good time to the consumers and also reduce the time taken in implementation of the project
→ If the rehabilitated water pipeline checks the waste of water through leakages, the feeling of the general public is that the cost of operations will come down and therefore consumers get the cost benefit of the water bills per unit coming down.
→ MAWASCO is slow in responding to issues of simple leakages and repairs and therefore the general public is worried that the proposed project is mega and if they are equal to the task of rehabilitating all the water pipes covering the urban area.
→ Copies of questionnaires are attached in the annex to the report. The following is a list of respondents and their residences who responded to the questionnaires.

5.3.2 Contribution of the responses in design

From the public consultation and the issues highlighted by the respondents, it was apparent that there were skewed responses towards inadequate or no water supply, unresponsiveness, poor water quality and high cost per unit for connected households. Even though the ESIA was being carried out while the designs were in place, it was apparent that the main issues had been addressed in the design.

By sourcing for funding from noncommercial sources, the proponent was looking for cost effective connectivity which would guarantee that tariffs remain low for consumers. The proposed pipeline would be installed without breaking the existing supply and the migration will occur once the new one is complete ensuring that there will be minimal supply interruptions. To address illegal connections and pipe leaks which increase water cost the tariffs will stay low and there will be sufficient water supply. Illegal connections will also be monitored in the new system through sector metres which was not in the old system. This will reduce the extended periods of shortage.

By migration from leaking pipelines, illegal connections and asbestos lined pipes, the water quality will be guaranteed with the new system. With a new system the proponent will have adequate capacity to respond to issues promptly.

6.0 ANALYSIS OF ALTERNATIVES

6.1 Identification of Alternatives

The Environmental Impact Assessment Study should identify and assesses alternatives to the proposed development/project. Only the best alternative (one with the least adverse impacts) should be selected based on less negative impacts and cost-benefit analysis. An important alternative to be analyzed always is the "no project". This is a very important analysis because it helps the proponents measure the impacts from the project against those which would have taken place without the project. In this section, the alternatives to the proposed project are discussed.

The principle alternatives studied in the context of the proposed Project are:

→ Alternative 1: The "No Action" alternative - the Project site remains as it is;
→ Alternative 2: Relocation option; and
→ Alternative 3: Construction of the proposed Project at the proposed site with adequate mitigation measures.

6.1.1 Alternative 1: The "No Action" Alternative

The no-action alternative is often defined by the baseline information and is crucial in the assessment of impact because other alternatives are weighed with reference to it. This alternative would mean that the project does not proceed.

Without the project, the environmental situation will neither improve nor can we say that it will necessarily deteriorate. Development of the project on the other hand will improve water provision to the communities living within Karatina Town.

The no-project option will however lead to the following (general) major negative and long term impacts:

→ The targeted populations (for water provision) will continue to use raw water which is currently being supplied;
→ Increased exposure to health risks (water borne diseases);
→ Threatened Food Security of the district;
→ Stagnating growth of the district;
→ There will be loss of productivity and reduced ability to create wealth.

From the analysis above, it becomes apparent that the "No Action" alternative is therefore not considered as a viable alternative on either social or environmental grounds and is therefore discarded accordingly.

There is no alternative as the work is predominantly for improvement of existing water supply network in the area by replacing the existing pipelines; hence the existing

alignment is to be maintained. Also this alignment is along the existing route on the road reserves hence it is the best suited for the work.

6.1.2 Alternative 2: Relocation of the Project

Relocation of the Proposed Project is an alternative that is not available for the Project implementation. The pipeline already exists and it is just undergoing rehabilitation. Relocation of the project to alternative route will require land acquisition which will be significantly costly.

6.1.3 Alternative 3: Construction of the Proposed Project at the Proposed Site

Under the proposed Project alternative, the Proponent would be issued with an EIA License. In issuing the license, NEMA would approve the Proponent's proposed Project, provided all environmental measures are complied with during the planning and design, construction and operational and maintenance phases. The site is the best alternative due to following reasons:

- → Economy of the area will improve among other benefits.
- → The proposed work of laying is along the existing route (road reserves).
- → The work of trenching and pipe laying will be done manually and hence no major cause of air and noise pollution arises due to use of heavy machineries.
- → The depth of trench is @ 1.2 – 1.5 mtr hence the existing water table will not be disturbed.
- → The traffic on the road will not be affected as the width of trench is marginal considering the total width of the road.
- → Looking into the urgency, socio-economic cause & cost implications the present project is feasible.

6.2 Analysis of Alternative Equipment, Technology and Materials

The Proponent will use modern, locally and internationally accepted equipment, technology and materials to achieve public health safety, security and environmental quality requirement. The Contractors machines will be calibrated and thoroughly examined as per the Occupational Safety and Health Act, 2007 at least once every period of six months or after any modifications or extensive repair or within a shorter period, by a person approved by the Director of Occupational Safety and Health Services and a certificate issued.

The raw materials that will be used in the construction, including cement and bitumen/asphalt will be locally sourced and will be those that meet the Kenya Bureau of

Standards requirements. Equipment's that save energy and time will be given first priority.

6.3 Conclusion on project alternatives

Proceeding with the proposed project with adequate mitigation measures option is the preferred option and it entails carrying out the proposal with mitigation measures to prevent, offset or avoid its negative impacts thereby maximizing it gains. This option will therefore lead to achieving the project's objectives sustainably and contribute to the achievement of other sectoral and policy goals and objectives. This option also involves using the best process to minimize risks to environmental and social systems in the area and globally.

7.0 POTENTIAL ENVIRONMENTAL IMPACTS

7.1 Introduction

Economic, social and environmental change is inherent to development. Whilst development aims to bring about positive change it can lead to conflicts. In the past, the promotion of economic growth as the motor for increased wellbeing was the main development thrust with little sensitivity to adverse social or environmental impacts. The need to avoid adverse impacts and to ensure long term benefits led to the concept of sustainability. This has become accepted as essential feature of development if the aim of increased wellbeing and greater equity in fulfilling basic needs is to be met for this and future generations.

Reliable water availability is considered to be critical to economic growth and poverty reduction especially in agricultural zones that support urban and industrial activities through provision of raw materials and food supply. With increasing pressure on land for agriculture and settlement, water resources come under serious threat of degradation.

Socio – economic needs of a particular community entirely require water, over abstraction from sources, infrastructure maintenance, management of related wastewater and ecological balance and sustenance is among the problems associated with public water supplies.

Augmentation and Rehabilitation of the proposed project have far reaching social and economic implications that need to be addressed throughout the project cycle. The effects are mainly positive calling for enhancement and the negative ones calling for mitigation.

The Environmental and Social Impact Assessment (ESIA) has been systematically conducted to determine whether or not the proposed project will have a diverse impact on the environment. The EMCA No.8 of 1999 provides the legal and statutory guideline for the Environment and Social Impact Assessment process in Kenya.

Therefore this ESIA is a formal process to predict the environmental consequences of the proposed developments and to plan appropriate measures to eliminate or reduce adverse effects and to augment positive impacts:

The ESIA thus has three main functions:

→ To predict problems/ impacts;
→ To find ways to avoid them,
→ To enhance positive effects / impacts.

This chapter will highlight significant impacts which will be induced by the proposed project.

To this end, the focus of this chapter will be:

→ To identify and analyze the extent of the environmental and social impacts from the project;
→ To assess the environmental impacts of the operation and maintenance activities;
→ To assess the social impacts from the project;
→ To discuss the decommissioning of the project.

This Chapter identifies and discusses both positive and negative impacts associated with the proposed Project and their mitigation measures. The anticipated impacts and corresponding mitigation measures are discussed in Phases namely: design, construction, operation and decommissioning Phases.

The study has predicted and evaluated anticipated impacts using acceptable standard methods of impact prediction and evaluation. The significance of impacts is subjective, and expert judgments were used. Public participation and consultation with a wide sector of the community were conducted to reduce uncertainty. Table 7-1 below summarizes the anticipated environmental problems observed which may be created by the project.

Table 7-1: Summary of environmental and social impacts

Environmental and social impact	**Positive/ negative**	**Direct / indirect**	**Temporary /permanent**	**Major / Minor**	**Occurrence**	
						Operation
Employment opportunities	Positive	Direct/Indirect	Permanent/ Temporary	Major	√	√
Creation of	Positive	Direct	Permanent	Minor		-

awareness					√	
Creation of markets for construction material	Positive	Direct	Permanent	Minor	√	-
Increased water quality and quantity	Positive	Direct	Permanent	Major	-	√
Improved performance and living standards of the residents within the project area	Positive	Direct	Permanent	Major	-	√
Creation of Wealth	Positive	Direct	Permanent	Minor	-	√
Reduced exposure to health risks and improved nutrition	Positive	Direct	Permanent	Major	-	√
Sustainability of the Water Service Providers	Positive	Direct	Permanent	Major	-	√
Enhanced gender and participation in development	Positive	Indirect	Permanent	Minor	-	√
Education benefits to girl child	Positive	Indirect	Permanent	Minor	√	√
Interference with the physical setting	Negative	Direct	Permanent	Minor	√	-
Interruption of existing installations on the pipeline route	Negative	Direct	Permanent	Major	√	-
Land take	Negative	Direct	Permanent	Major	√	√
Noise generation	Negative	Direct	Temporary	Minor	√	-

Dust emissions	Negative	Direct	Temporary	Minor	√	-
Disposal of spoil	Negative	Direct	Temporary	Minor	√	√
Solid waste generation	Negative	Direct	Temporary/ Permanent	Major	√	-
Vegetation loss	Negative	Direct	Permanent	Major	√	
Accidental spills and leakages	Negative	Direct	Temporary	Minor	√	√
Worker accidents and hazards	Negative	Direct	Permanent	Major	√	-
Extraction and use of construction material	Negative	Direct	Temporary	Minor	√	-
Increased water demand	Negative	Direct	Temporary	Minor	√	-
Archaeological and other cultural properties	Negative	Direct	Temporary	Minor	√	-
Increase in HIV/AIDS prevalence and other STIs	Negative	Direct	Permanent	Minor	√	-
Spread of communicable diseases and other infections	Negative	Direct	Temporary	Minor	√	-
Immigration and settlement	Negative	Direct	Temporary	Minor	√	-
Growth of unplanned settlements	Negative	Indirect	Temporary	Minor	√	-
Child labour	Negative	Direct	Temporary	Minor	-	√
Reduced downstream flows	Negative	Direct	Permanent	Major	-	√
Increased domestic wastewater Generation	Negative	Direct	Permanent	Major	-	√
Emergency preparedness	Negative	Direct	Direct	Major	-	√

7.2 Positive impacts during planning and design phase

7.2.1 Employment opportunities

With the planning and design phase of the proposed Project, there will be employment opportunities especially for professionals. Those involved in planning and design include engineers, surveyors, valuers, environmentalists and sociologists among others. Those employed will improve their living standards from the fees they will be paid for their services.

7.2.2 Creation of awareness

During the planning and design phase of the proposed Project, the community will be informed of the Project and their views sought on the Project. In this way, awareness will be created for both the community and the Proponent. The Proponent will also be in a position to put into practice the useful advice from the community when planning and designing the Project.

Further, there will be enhanced interaction between key parties including government and private institutions in the Project area. The key players in this process shall include MAWASCO), TWSB, WRMA and the local community in the Project area. The national and Nyeri County administration will also be of vital importance in the disclosure.

7.3 Negative impacts during planning and design phase

The Consultant will mobilize an adequate team of skilled and unskilled human resource to undertake the surveys and other studies required to complete the designs. Among the activities to be undertaken are excavations for beacons and control stations establishment. These studies shall however not allow for large scale destruction and disturbance of vegetation and soils.

Mobilization of the skilled and non-skilled labour and the process of disclosure and consultations among the residents and other stakeholders shall however lead to heightened expectations and speculations.

With the foregoing, it is envisaged that there will be minimal to no negative impacts during the planning and design stage.

Mitigation:

→ Impacts during this phase of the project are not significant. However, the Design Team shall take necessary measures to document any concerns and address them

on as they occur. In that regard, the Design Team shall incorporate an Environmental Expert in the team and take time to sensitize and alert the residents of the ongoing.

7.4 Positive impacts during construction phase

7.4.1 Employment opportunities

With the construction of the proposed Project, there will be employment opportunities for both skilled and unskilled workers. This will be beneficial both from the economic and social point of view. Economically, it means abundant unskilled labour will be used in production. Socially these people will be engaged in productive employment and minimize social ills like drug abuse and other criminal activities.

Several workers including casual labourers, plumbers and engineers are expected to work on the site for a period of time. Semi-skilled, unskilled and formal employees are expected to obtain gainful employment during the period of construction.

With labour intensive construction technologies, the project will provide employment for youths and provide support to the Government of Kenya initiatives on creation of jobs.

7.4.2 Creation of a market for construction

The Project will require materials, some of which will be sourced locally and some internationally. These include plant (pump sets, switch gear, instrumentation) pipes, valves, cement, sand, hardcore and chemicals. This will provide a ready market for suppliers in and outside the project area.

7.5 Negative impacts during construction

The following negative impacts are associated with the construction of the proposed Project.

7.5.1 Community health and Safety

Project activities, equipment, and infrastructure can increase community exposure to risks and impacts. In addition, communities that are already subjected to impacts from climate change may also experience an acceleration and/or intensification of impacts due to project activities. The client has a responsibility to avoid or minimize the risks and impacts to community health, safety, and security that may arise from project related-activities, with particular attention to vulnerable groups. Some of the impacts relating to community health and safety are;

7.5.1.1 Increase in HIV/AIDS prevalence and other STIs

As the project is going to bring in a number of new people in the project area it is focused that rates of new infections may increase. This is due to the fact that the contractors, traders and workers will have money to attract women from the project area in a bid to solicit for sex, thereby creating avenues for spread of HIV/AIDS and other STIs.

The most vulnerable members of the community are women as they don't have access to resources necessary for production and wealth creation, in this case land. This will further predispose them to sex pests and consequently HIV/AIDS.

Mitigation:

→ The Resident Engineer should ensure that prevention and management of STIs occurrences as a result of social interaction between immigrant workers and local populations is conducted through:

- Selecting appropriate locations away from concentration of human settlements for construction camps;
- Education and sensitization of workers and the local communities on STIs including provision of condoms to the project team and the public;
- The contractor has to institute HIV/AIDS awareness and prevention campaign amongst workers for the duration of the contract e.g. erect and maintain HIV/AIDS information posters at prominent locations as specified by the Resident Engineer;
- The contractor has to ensure that staff are made aware of the risks of contracting or spreading sexually transmitted diseases;
- The contractor should ensure that the project workers are sensitized on the local culture.

7.5.1.2 Spread of communicable diseases and other infections

During the construction phase there is a risk of spread of communicable diseases such as tuberculosis and pulmonary infections. Aspects of the physical environment that promote transmission of diseases include: inadequate housing, disposal of wastes and ventilation which are likely to occur during the construction phase of the project. With the influx of people, there will be a likelihood of increase in diseases such as typhoid, tuberculosis, diarrhea diseases, respiratory diseases, dysentery and cholera.

Mitigation:

→ Test and treat affected local and migrant workers which will control the movement of disease vectors (through contaminated water and between people);

→ Provision of personal hygiene facilities in good condition with adequate water supply;

→ Ensure awareness raising on proper sanitation and personal hygiene to promote proper health.

→ The contractor should also establish a relationship/agreement with local hospitals to have regular checkups and treatment for workers

7.5.1.3 Gender based violence and Sexual harassment

The implementation of infrastructure projects creates potential GBV risks such as sexual harassment by project implementers, including engineers, construction workers and others to their colleagues and the surrounding community. An influx of workers and new roads can create new demand for sex workers, which can ultimately increase the prevalence of sex trafficking and disease transmission, especially HIV/AIDS and other sexually-transmitted diseases. The projects can result in negative social outcomes if the health risks, including the negative gender impacts, are not anticipated and incorporated into project planning. Women are increasingly involved in construction projects where the workforce has traditionally been all male.

Mitigation

- Assessment of capacity and the availability of quality, safe and ethical services for survivors such as health facilities, counselling services
- Have project workers sign and understand Codes of Conduct that prohibit GBV.
- Have separate, safe and easily accessible facilities for women and men working on the site
- Creation and identification of "Safe Spaces" for women and girls

- Visibly display signs around the project site (if applicable) that signal to workers and the community that the project site is an area where GBV is prohibited.
- As appropriate, public spaces around the project grounds should be well-lit.
- Requiring sexual harassment policies for contractors and grantees and establish written procedures for victims to document incidences, and ensure that worker complaints are fully investigated and proper disciplinary action is taken.
- Involve women, LGBTI, people living with disabilities, and other marginalized and vulnerable groups in project design to ensure that their needs are represented. • Conduct a comprehensive gender analysis that includes GBV.
- Focus on the needs of pedestrians.
- Provide safe sanitation facilities.
- Conduct a GBV safety audit of the design.
- Use contracting mechanisms to enforce correct behavior during implementation.
- Provide on-site anti-harassment trainings to create awareness of the harmful effects of GBV, as well as consequences if GBV occurs according to the anti-harassment policies.
- Promote the use of appropriate response mechanisms for reporting GBV that occurs during the life of the project.

7.5.1.4 Child Labor

Children may be; employed and underpaid, and may not be attending school as they work on the project in places or circumstances that is economically exploitative, or is likely to be hazardous or to interfere with the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral, or social development.

Mitigation

- The client will follow those laws applicable to the client.
- The client will identify the presence of all persons under the age of 18.
- Children under the age of 18 will not be employed in hazardous work.
- All work of persons under the age of 18 will be subject to an appropriate risk assessment and regular monitoring of health, working conditions, and hours of work.

7.5.1.5 *Risks of temporary project induced labor influx*

The contractor may put up a temporary labor camp and offices including pit latrines near the site. Manual labor will also be sourced from either the surrounding areas or transported from nearby centers. The heightened human activity may cause harm to the existing drainage and pollution to surface water. Potential impacts of increased influx of labor into the project area are both environmental and social.

The environmental impacts include;

→ Inadequate waste disposal and and illegal waste disposal sites
→ Wastewater discharges
→ Increased demand on freshwater resources
→ Camp related land use, access roads, noise and lights
→ Increased deforestation, ecosystem degradation, and species loss
→ Increase in population creating more pressure on the existing social utilities in the project area.
→ New immigrants with diverse cultures will also expose the area to different Kenyan cultures.
→ Unplanned settlements as the workers compete for the limited resources. This will strain local resources especially accommodation.
→ Increased demand for local social and health services
→ Increased volume of traffic and higher risk of accidents
→ Increased demands on the ecosystem and natural resources
→ Social conflicts, within and between communities
→ Increased risk of communicable diseases

→ Increased rates of illicit behaviour and crime

Mitigation:

A different number of measures can be put in place to mitigate the effects of labor influx.;

→ Reduce labor influx by tapping into local workforce. It is anticipated that most unskilled and semi-skilled workers will be recruited locally so that there will be no significant influx of workers into the project area. The incidence of diseases normally associated with the influx of workers into project area will be limited.

→ Assess and manage labor influx risk based on appropriate instruments-based on risks identified in the ESIA, bank required assessments, and Bank's sector specific experience in the Country. This may range from broad requirements set out in an ESMP or in a more specialized instrument such as a site-specific such as a Labor Influx Management Plan and a Worker Camp Management Plan.

→ Labor Influx Management Plan - addresses specific activities that will be undertaken to minimize the impact on the local community, including elements such as worker codes of conduct, training programs on HIV/AIDS, etc.

→ Worker Camp Management Plan. - addresses specific aspects of the establishment and operation of workers' camps.

→ Incorporate social and environmental mitigation measures into the civil works contract – most adverse impacts can only be mitigated by the contractor and hence it is important that these contractual obligations are reflected as contractual obligations, with appropriate measures for addressing non-compliance.

→ Establishment and operation of a Grievance Redress Mechanism (GRM) accessible to community members—ideally with involvement of NGOs—to facilitate early identification of problems and targeted mitigating interventions by Borrower Provision of information regarding Worker Code of Conduct in local language(s); Provision of cultural sensitization training for workers regarding engagement with local community.

7.5.2 Biodiversity Conservation and Sustainable Management of Living Natural Resources

7.5.2.1 Impact on biodiversity

The construction of the proposed project will involve clearing of vegetation cover especially in proximity to proposed developments. During construction, a small amount of vegetation will be cleared to give way for the proposed water pipelines. Not only may vegetation be lost, but also faunal habitats may also be lost or at least partly destroyed. In addition, the removal of areas of vegetation could mean that the same degree of interception will no longer occur, and consequently increased run-off might be expected. However, the significance of the vegetation loss during the site clearance is minimal. This is because some of the infrastructure already exists

Mitigation:

→ The Contractor should ensure proper demarcation of the Project area to be affected by the construction works;

→ Strict control of construction vehicles to ensure that they operate only within the area to be disturbed by access routes and other works;

→ Retention of trees and shrubs, where possible on the potential sites for screening of the visual impact;

→ Where the proposed route requires the removal of any vegetation, care should be taken to minimize the destruction or damage of trees.

→ Re-plant destroyed trees in cleared areas where works are complete.

7.5.3 Labor and Working Conditions

7.5.3.1 Risks of accidents and injuries to workers

Construction workers are likely to have injuries and hazards as the construction works unavoidably expose workers to occupational health and safety risks. The workers are also

likely to be exposed to risk of accidents and injuries resulting from accidental falls and injuries from hand tools and construction equipment.

Mitigation:

- → To reduce the workers accidents and hazards the Proponent will develop and commit the Contractors to Site Occupational Health and Safety rules and regulations as stipulated in the Occupational Safety and Health Act, 2007;
- → All construction workers should be advised of the dangers associated with construction work;
- → Workers should be provided with suitable personal protective equipment (PPEs);
- → Provision of adequate sanitary facilities to workers;
- → Train all workers on Safety Health and Environment (SHE) with an aim of improving awareness;
- → Trenches over 1.5 m deep or wherever soil conditions dictate should be shored and secured against accidental entry by workers and the public;
- → Install safety signage along the work areas;
- → Where construction activities interfere with the movement of traffic, the site should be signed and controlled by trained flagmen/flag women and lit by night.

7.5.4 Resource Efficiency and Pollution Prevention

7.5.4.1 Interference with the physical setting

The proposed project could result into the following negative impacts to the physical setting:

- → Changes in the local topography during excavations and laying of pipes among others;
- → Blockage of natural drainage system at valley crossings;
- → Excavation for creation of access routes and related structures; and
- → Development of informal business depending on the intensity of labour import.

Mitigation:

- → The design shall in no way propose to implement developments that will hinder drainage, change the topography or introduce physical changes that are not in harmony with the physical setting of the Project area;
- → The structures to be developed should be aesthetically acceptable to blend in with the surrounding. These structures should not form or end up being used by the resident population as access or bridges;
- → The proponent shall as much as possible complete the works in such a way that natural aesthetics shall be retained at the locations;
- → Restoration shall be undertaken to ensure that the original setting is as much as possible retained.

7.5.4.2 Effects of altering the landscape and visual impact

The visual impact is generally classified as an obstruction or an intrusion. An obstruction may be defined as some feature which obscures the view and is categorized as high, moderate or slight. An intrusion is essentially subjective and is the impact on the visual impression of the area.

Successful developments generally blend landscaping and architecture to achieve a consistent, unified and unique project character. In terms of thematic design, use of boulders, rock outcrops and local trees can provide both a sense of enclosure and integration with the existing landscape.

Appropriate landscape designs should be used to ensure the above is feasible. Good design can offer elements of texture, shadows, fragrances and colour. It should also be noted that the visual appearance of the site may be unpleasant during the construction stage due to stockpiling of stones, aggregates, pipes and other building materials. However such a situation will only be temporary.

7.5.4.3 Extraction and use of construction materials

Construction materials that will be used in the construction such as hard core, cement and rough stone will be obtained from quarries, hardware shops and sand harvesters who extract such materials from natural resource banks such as rivers and land.

Mitigation:

→ The Contractors will source construction materials such as sand and hard core from registered and approved quarry and sand mining firms whose projects have undergone satisfactory environmental impact assessment/audit and received NEMA approval. Since such firms are expected to apply acceptable environmental performance standards, the negative impacts of their activities at the extraction sites are considerably well mitigated;

→ The Contractor will only order for what will be required through accurate budgeting and estimation of actual construction requirements.

7.5.4.4 Energy consumption

Fossil fuels (mainly diesel) will be used to run construction machinery and trucks. Fossil energy is non-renewable and its excessive use may have serious environmental implications on its availability, price and sustainability.

The project will also use electricity supplied by KPLC. Electricity in Kenya is generated mainly through natural resources, namely, water and geothermal resources. In this regard, there will be need to use electricity sparingly since high consumption of electricity negatively impacts on these natural resources and their sustainability.

7.5.4.5 Increased water demand

During the construction phase of the proposed Project, both the construction workers and the construction works will create demand for water in addition to the existing demand. Water will mostly be used for wetting surfaces, concrete mixing or cleaning/curing completed structures. It will also be used by the construction workers to wash and drink.

Mitigation:

→ The Proponent through the Contractor shall ensure that water is used efficiently at the site by sensitizing construction staff to avoid irresponsible water use;

→ Any water handling equipment, facility and systems shall be appropriate for the intended usage. Water used on the construction shall reflect the level of conservation achieved by the Contractors. Documentation of amounts of water used will therefore be mandatory.

7.5.4.6 Noise and vibration

The construction works, delivery of building materials by heavy trucks/machinery/equipment including metal grinders and concrete mixers will contribute to high levels of noise and vibration within the construction site and the surrounding area. Elevated noise levels within the site can affect project workers and the residents, passers-by and other persons in within the vicinity of the project site.

Significance of noise impacts depends on whether the Project would increase noise levels above the existing ambient levels by introducing new sources of noise. Noise impacts would be considered significant if the Project would result in the following:

→ Exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;

→ Exposure of persons to, or generation of, excessive ground-borne vibration or ground-borne noise levels;

→ A substantial permanent increase in ambient noise levels (more than 3dBA) in the project vicinity above levels existing before the project; and

→ A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing before the project.

The Proponent through the Contractor shall put in place several measures that will mitigate noise pollution arising during the construction phase.

Mitigation

→ Install portable barriers to shield compressors and other small stationary equipment where necessary;
→ Use of quiet equipment (i.e. equipment designed with noise control elements);
→ Limit pickup trucks and other small equipment to a minimum idling time and observe a common-sense approach to vehicle use, and encourage workers to shut off vehicle engines whenever possible;
→ Provision of appropriate personnel protective equipment;
→ Construct mainly during the day; and
→ Consider labour based construction methodologies.

7.5.4.7 Dust and Exhaust emissions

The trucks used to transport various building materials from their sources to the project site will contribute to increases in emissions of CO_2, NO_X and fine particulate along the way as a result of diesel combustion. Such emissions can lead to several environmental impacts including global warming and health impacts.
Dust will be emitted during excavation and related earthworks. Air-borne particulate matter pollution is likely to occur during the route clearance and excavation. This is likely to affect site workers, in extreme situations leading to respiratory problems.

Mitigation:

→ Minimizing the number of motorized vehicles on use;
→ Rehabilitate disturbed areas;
→ Use predetermined tracks;
→ Avoiding machinery working in seasonally marshy areas, pans and floodplains;
→ Wet all active construction areas as and when necessary to reduce dust;
→ Undertake staff training and allocate roles to trained/responsible staff members.

7.5.4.8 Disposal of spoil

Project construction will involve earthworks and excavation. This will result in the generation of some spoil materials. But there will be little carting away of excavated material. The soils may affect the surrounding environment if not adequately disposed.

Mitigation:

→ Maximize the re-use of excavated materials in the works as far as feasible to ensure that no permanent spoil dumps are created;
→ Properly dispose of the spoil in the identified by the design team and approved by the confirmed land owners;
→ Care should be taken to avoid spoil location in land that could otherwise be used for productive purposes.

7.5.4.9 Solid waste generation

Solid wastes generated during construction include papers used for packing, plastics, cuttings and trimmings off materials among others. Dumping around the site will interfere with the aesthetic status and has a direct effect on the surrounding community. Disposal of the same solid wastes off-site could also be a social inconvenience if done in the wrong places. The off-site effects could be aesthetic, pest breeding, pollution of physical environment including water resource, invasion of scavengers and informal recycling by communities.

Mitigation:

- → Construction waste should be recycled or reused as much as possible to ensure that materials that would otherwise be disposed of as waste are diverted for productive uses;
- → The Proponent shall put in place measures to ensure that construction materials requirements are carefully budgeted and to ensure that the amount of construction materials left on site after construction is kept minimal;
- → Minimization of solid waste during construction of the proposed Project through use of durable, long-lasting materials that will not need to be replaced often, thereby reducing the amount of construction waste generated over time;
- → Skips and bins should be strategically placed within the campsite and construction site, they should also be adequately designed and covered to prevent access by vermin and minimize odor. They should also be emptied regularly;
- → Measures to ensure that waste materials from the Project are disposed at suitable sites will be taken. These will include engaging only reputable truckers and conducting appropriate spot checks to verify that disposal are done in accordance with the requirements of NEMA;
- → The ultimate fate of the wastes should be monitored so that they are not illegally disposed of;
- → Provide portable sanitary conveniences for the construction workers for control of sewage waste. A ratio of approximately 25 workers per chemical toilet should be used.

7.5.4.10 Accidental Spills and Leakages

The principal chemicals held on the site during the construction site are likely to be vehicle fuel and paints. Spillage or escape of such compounds are likely to have an immediate impact upon the local water resources and consequently on the terrestrial and aquatic flora and fauna.

Mitigation:

- → Maintain vehicles and machineries at manufacturers specifications;
- → Ensure proper storage of chemicals / materials;
- → During the course of the construction works, temporary drainage channels should be constructed to encourage dispersal of meteoric waters.

7.5.4.11 Impacts on water resources

No major on-site impacts on water resources are anticipated during the construction phase. Care should however be exercised when handling fuel and oil (hydraulic, transmission, engine, etc.). Measures should also be taken to avoid spillage of construction material into drainage channels as these would eventually reach the surface water resources. Dumping excavated and construction material into nearby drainage should be prohibited. Additionally, all earth-moving and other equipment should be in good working condition and well maintained (no leaks). Off-site impacts on water resources may occur from the reckless disposal of domestic waste. Where proper waste segregation and disposal is practiced, the likelihood of these impacts to occur will be negligible, if not nil.

7.5.4.12Impact on soil and drainage

Excavation works will lead to increased soil erosion at the project site and release of sediments into the drainage systems. Such waste materials can be injurious to the environment through blockage of drainage systems which can lead to stagnation of water hence bleeding grounds for mosquitoes. Uncontrolled soil erosion can have adverse effects on the local water bodies. However the volume of soil that would be excavated during construction is relatively small and thus may not lead to major erosion problems and impacts on soils.

Soil pollution from on-site as well as off-site works may occur by the intentional or accidental leakage of used chemicals, fuel, or oil products (from equipment and vehicles) on

construction sites. Such practices should be strictly avoided and utmost precautions and workmanship performance should be adopted for the disposal of such hazardous products.

7.5.4.13Interruption of existing installations on the pipeline route

The various installations will cross, move in or move along installations among them:

- → Property accesses;
- → Roads
- → Underground utilities e.g. electricity and telephone links; and
- → Fences and structures.

These services are critical and have implications with spillover effects on the social and economic performance.

Mitigation:

- → Formal request for permission to cross, break in and build the water pipeline should be sought from affected property owners and the relevant institutions such as Kenya Power and roads authorities;
- → Formal engagement should be done with key land and other property owners neighbouring the pipeline;
- → Ensure dissemination of relevant information to each of the affected parties;
- → A work plan with clear responsibilities for each party should be developed to ensure smooth execution of the construction.

7.5.4.14 Increased Heavy Traffic

The access roads leading to the site area will serve the additional vehicles used for transportation of materials, equipment and staff to the site. This will hence increase traffic especially given the site lies next to a highway.

7.5.5 Cultural Heritage

7.5.5.1 Archaeological and other cultural properties

From the field studies, there are no known impact on archaeologically protected monuments and cultural properties in the proposed project areas. However, during construction works, some archaeological or cultural sites may be encountered and damaged. Where these are encountered, they should be avoided as much as possible.

Mitigation:

The contractor should develop and implement a chance find procedure in case archaeological sites are found during the construction process. Such procedure must incorporate liaison with the National Museum of Kenya.

7.5.6 Grievances arising from the affected communities

Grievances are likely to arise from the local communities, employees, and affected stakeholders when they perceive a negative impact arising from the project activities.

Mitigation:

Establish a grievance redress mechanism (GRM) that enable local communities, employees, outgrowers, and other affected stakeholders to raise grievances with the investor and seek redress when they perceive a negative impact arising from the investor's activities. It is a key way to mitigate, manage, and resolve potential or realized negative impacts, as well as fulfill obligations under international human rights law and contribute to positive relations with communities and employees.

7.6 Positive impacts during operation

Just as in the construction phase, there are positive impacts associated with the operation phase of the proposed Project. These positive impacts are discussed under the following subsections;

7.6.1 Improved water quality and quantity

Improved water quality will in turn reduce exposure to water borne diseases to the consumers. General hygiene in the served area will improve through use of acceptable water quality. Markets and communities within Karatina will greatly benefit from the project.

7.6.2 Creation of job opportunities

During operation phase, there will be employment opportunities especially, for those who will be employed to manage, maintain and the installed equipment and pipeline route. This will improve the living standards of these employees. Furthermore the availability of water within Karatina will most likely create self-employment.

7.6.3 Improved performance and living standards within the project area

Water provision is one of the MDG goals for 2015. Provision of water and clean environment has been identified as one of the key pillars for alleviation of poverty. It is therefore envisaged that the continued existence of the project area as a sustainable settlement is reliant of the supply clean potable water for each and every person. This will immensely contribute to the property value, land value and aesthetic value of the Project area while ensuring that the population in this area remains healthy and productive.

Accesses to water will in the long term result in improved income levels and health of the people, this consequently leads to poverty reduction. Reduced distances traveled and time used to collect water is then put to economic activities.

7.6.4 Creation of wealth

The proposed development will ultimately provide revenues to the exchequer and expand the wealth base for the study area. It will also go a long way in cementing the value of the Project area and its environs as a whole.

7.6.5 Reduced exposure to health risks and improved nutrition

Improved water quality for domestic consumption reduces the risk to the health of the consumers and their dependents that would spend less on health and improve their standard of living.

7.6.6 Sustainability of the Water Service Provider

Increased revenue collection will help MAWASCO to be sustainable in terms of increased revenue due to increased customer base as the proposed project will increase the number or residents being served.

7.6.7 Enhanced gender and participation in development

Women form a high percentage of the project areas' population but are inadequately participating in development activities due to the burden of fetching water. Increased availability of water will relieve them and thereby give them an opportunity to engage in development activities.

7.7 Negative impacts during operation phase

The following negative impacts are associated with the proposed project.

7.7.1 Community Health and Safety

There will be migrant labour involved in construction which may take several months to complete. The community neighboring the site will interact with the migrants to an extent that several communicable diseases whose prevalence may not be high presently may be more prevalent. Such diseases are venereal diseases which are communicable including AIDS.
Mitigation procedures are as follows;

- → Community based organizations should conduct awareness programs around the area before commencement of the project to prepare the community for the possible impacts.
- → Health, safety and sanitation should be incorporated in education programs targeting the communities.
- → Churches and provincial administration should also pass this message to their subjects.

□□□□□ Labour Health and safety issues during construction

Unsafe labour practices can have a significant impact on the health and safety of the workers and of the public. Worker productivity may be also adversely affected. During construction workers may be exposed to falling objects from heights. Those working on high levels may fall from those heights leading to loss of life or injury.
The impact assessment was done and mitigation measures outlined as follows;
Ensure that only the critical numbers of workers are hired during the construction phase and ensure that litterbins and proper pit latrines are in place at the site.

- → Minimize any human settlement within the forest reserve by using migrant labor from nearest community or transporting them daily.
- → Contractor should ensure proper scaffolds are used during construction and should comply with the Factories (Building Construction and Works of Engineering Construction) Rules made under the Factories and other places of Work Act Cap 514. This is in regard to safe work procedures and provision of personal protective equipment like hand gloves, dust masks, helmets, harness and boots.
- → Smoking should be restricted to designated areas which do not have flammables and there is adequate fire-fighting capability.
- → Means of putting off fire should be provided at the site.

Mitigation measures include;
Worker and public health and safety should be safeguarded at all times through application of health and safety measures required by law and by internationally accepted standards which need to be complied with. All workers and especially the temporary labour recruited locally should be equipped with adequate H&S protection or personal protective equipment

7.7.3 Emergency preparedness

The proponent should be prepared to handle incidents affecting drinking water. Pipelines may be washed away by natural disasters such as excessive rain and landslides. Contamination of water can also impact the community.

Mitigation:

- → Design and implement an emergency response plan;

8.0 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

8.1 Introduction

Environmental and Social Management Plan (ESMP) has been developed to assist in prioritizing the key findings of the Environmental Impact Assessment Report, and to suggest necessary mitigation actions. From the ESMP, a schedule for the operations implementation could also be drawn that takes into consideration all issues that could develop into serious risks to environment, health and safety at all times.

Environmental and Social Management Plan is based on the ISO 14001 which states management principles for environmental management. Finally, management reviews and continuous improvement determines which of the activities require to be re-visited and at what schedules.

On the basis of the national and international legal and policy framework that includes Environmental Management and coordination Act (EMCA) of 1999 and its subsequent supplements the Environmental (Impact Assessment and Audit) Regulation, 2003 and World Bank Op 4.01 on Environmental Assessment and development of the ESMP, among other actions recommended to undertaken by the management in the implementation of the latter are;

- → Develop a training plan and schedule;
- → Develop an in-house environmental audit protocol and schedule;
- → Establish a suitable and comprehensive database on environmental issues;
- → Put in place an emergency preparedness system;
- → Establish an ESMP implementation schedule;
- → Establish an incident log book to manage environmental incidents;
- → Establish an environmental management committee to oversee and assist in the implementation of the ESMP.

8.2 Responsibilities in the ESMP

In order to ensure sound development and effective implementation of the ESMP, it is necessary to identify and define the responsibilities and authority of the various persons and organizations that will be involved in the project. Entities that should be involved in the implementation of this ESMP include but are not limited to the following:

- → TWSB;
- → MAWASCO
- → Contractor;
- → Ministry of Environment and Forestry;
- → NEMA;
- → WRMA;
- → Directorate of Occupational Safety and Health;
- → County government of Nyeri; and
- → Local administration.

8.2.1 TWSB/Project Implementation Unit (PIU)

The project implementing agency is TWSB under the Ministry of Environment and Forestry.

TWSB should co-ordinate all aspects of the environment during project implementation and operations (with involvement of MAWASCO). This should include follow up during construction to monitor, review and verify the implementation of the project's ESMP.

8.2.2 Mathira Water and Sanitation Company Limited (MAWASCO).

MAWASCO is a Water Service Provider incorporated in line with the Water Act of 2012 and is charged with the provision of the water and sewerage services in Mathira. The water service provider will be responsible for operation and maintenance (O&M) of the project once commissioned. They will also help TWSB in monitoring the progress of the project during the construction phase.

TWSB signed a Service Provision Agreement (SPA) with MAWASCO. SPA is a tool that is signed between the Water Services Boards (WSBs) and Water Service Providers (WSPs) as provided for in the Water Act, 2002. It sets the conditions on how MAWASCO will provide water services as per the license issued by Water Services Regulatory Board (WASREB). WASREB carries out performance benchmarking and is in charge of approving SPAs. The SPA has targets, e.g. hours of supply, quality of water, and reduction of unaccounted water.

8.2.3 Project Contractor (s)

A project contractor will be appointed by MAWASCO. The contractor must be required to comply with the requirements of the ESIA, the ESMP within this report, develop a CESMP, any EIA license conditions as may be issued with NEMA as well as all relevant legislations.

8.2.4 Ministry of Water

All key government water management and conservation agencies are under the Ministry of Water. The ministry is responsible for overall policy direction and is hence better placed to ensure coordination of the said agencies for the conservation and management of the available natural resources within the Aberdare and Mt Kenya water tower and ensure that a clean environment is sustained throughout the project life.

8.2.5 Water Resources Management Authority (WRMA)

WRMA's sub regional office in Murang'a will be involved in the project through its issuance of project water rights and regulations of water abstraction, study for water resources development and coordination of water use within the Upper Tana catchment area.

8.2.6 NEMA

The responsibility of NEMA is to exercise general supervision and co-ordination over all matters relating to the environment and to be the principal instrument of government in the implementation of all policies relating to the environment. Apart from the national office in Nairobi, NEMA has a local office in the project area at Nyeri town through which environmental supervision of the project will be conducted.

8.2.7 Directorate of Occupational Safety and Health (DOSHS)

Directorate of Occupational Safety and Health (DOSH) will be responsible for registering the project site as a work station and subsequent enforcement of relevant provisions in occupational safety and health in line with occupational safety and Health Act, 2007.

8.2.8 County Government of Nyeri

Nyeri County government is responsible for various environment and public health management issues as provided for in the County Governments Act and should be incorporated to help enforcement of proposed mitigation and monitoring activities within the project.

8.2.9 The Local Administration

The relevant local administrators within Mathira Sub-county should be called upon where necessary during project implementation to provide the necessary advisory services and support to the project implementers.

8.3 Environmental Management Plan: Construction Period

The following were key environmental concerns that need to be addressed during the construction phase of the project. They include:

- → Effects on vegetation loss
- → Efforts on water resources both surface and ground
- → Solid waste management issues
- → Air quality issues
- → Noise and vibrations from construction machineries
- → Visual impacts
- → Occupational Health and Safety risks
- → Land Acquisition and Involuntary Resettlement
- → Effects on Archaeological and other cultural properties
- → Community health and safety
- → Labour and working conditions
- → Child Labor
- → Gender Based Violence
- → Increase in HIV/AIDS prevalence and other STIs
- → Spread of communicable diseases and other infections
- → Risks of temporary project induced labor influx

8.4 Environmental Management Plan: Operation

Operation phase is the most critical stage as it will have long term direct reflection on quality of environment once the project is commissioned. Main concerns during operation phase include.

- → Increased generation of effluent
- → Impacts on drainage and hydrology;
- → Solid waste generation;
- → Emergency preparedness;
- → Operations and maintenance

8.5 Environmental and Social Management Plan (ESMP)

Potential Impact	Proposed Mitigation Measure	Responsible institution for implementation	Estimated cost of implementation in Kshs
Pre - Construction Phase			
Poor designs and lack of approvals leading to stoppage	→ The proponent will comply with donor conditions and national laws and standards and also comply with water provision agreements in place. → Obtain NEMA approval and comely with conditions of license either directly or as a delegated responsibility to the contractor.	Proponent	2,000,000
Noncompliance with standards and laws	→ Obtain NEMA approval and comely with conditions of license for contractors camp and yard. → Obtain a certificate of registration under and comply with all conditions of such registration under the OSHA 2007 for the camp and workplaces. → Insure all workers under Work Injury Benefits Act or an equivalent cover.	Contractor	500,000
Asbestos Pipes in decommissioned sections	→ Carry out proper decommissioning of asbestos pipes and document the procedures taken and file with NEMA.	Proponent	250,000
Communicable diseases and HIV AIDS	→ Commence education programs targeting the community and workers from project inception to completion	Contractor	250,000
Lack of project ownership	→ Involve all stakeholders in planning and execution of the project, employ non skilled workers from the pipeline areas, share work plans and give adequate notice to affected persons.	Proponent	250,000

Potential Impact	Proposed Mitigation Measure	Responsible institution for implementation	Estimated cost of implementation in Kshs
Damage to Sensitive Project Sites	→ Identify suitable camp and storage sites away from heavy settlements and preferably with all services such as water, sewage and roads. Such sensitive sites include schools, hospitals, busy trading centres or busy highways.		
Construction Phase			
Flora and fauna disturbance	→ The contractor should ensure proper demarcation of the project area to be affected by the construction works. This should be aimed at ensuring that any disturbance to flora is restricted to the actual project area and route and avoid spill over effects on the neighbouring areas.	Contactor	Included in the construction budget
Soil erosion and water pollution	→ Slope any overhanging excavations and erect soil erosion structures. → Erect barriers to all open excavations to keep off animals and workers. → Ensure no grease and oil leakages occur from machinery through proper maintenance. → Ensure use of manual labor and hand tools where appropriate to minimize damage to soils → Re-vegetate of all open and disturbed area with fast growing grasses and plants to prevent soil erosion. → Clearance of site for the construction should be minimized by restricting vegetation clearing to marked areas. → Ensure construction of storm water drainage system to prevent sheet soil erosion by surface runoff → No excavated materials or construction materials shall be stockpiled within area prone to flooding or near river/streams.	Contactor	Included in the construction budget

Potential Impact	Proposed Mitigation Measure	Responsible institution for implementation	Estimated cost of implementation in Kshs
	→ Rivers and streams shall not be used for washing of equipment and vehicles → Hazardous materials shall not be stored above flood level and at least 30 meters from any water course → Water containing such pollutants as cement, concrete, lime, chemicals and fuel shall be discharged into conservancy tank for removal from site. → All fuels and oil shall be stored in a fuel store or in an appropriate bundle and secured. → The fuel store should be equipped with suitable impermeable floor to enable waste oil collection → Provide scour checks on over-15% slopes or when working in loose soils; → Manage erosion agents including water by channelling it into predetermined areas; → Use predetermined tracks; → Avoiding machinery working in seasonally marshy areas		
Extraction and use of building materials	→ Source materials from registered quarries which are compliant with NEMA and other environmental laws. → To reduce the negative impacts on availability and sustainability of the materials, the contractor should only order through accurate budgeting and estimation of actual construction requirements. → Ensure that wastage, damage or loss (through run-off, wind, etc) of materials at the construction site is kept minimal. → Consider reuse of construction materials	Contactor	Included in the construction budget
Management of construction	→ Excavated soil should not be disposed from site and instead should be used to back filling other areas. The project should therefore pursue	Contactor	Included in the construction

Potential Impact	Proposed Mitigation Measure	Responsible institution for implementation	Estimated cost of implementation in Kshs
waste	the zero-waste policy on the management of excavated soils and debris. → Construction waste should be reused as much as possible to ensure that materials which would otherwise have been disposed as waste are diverted for productive uses. In this regard, the contractor should ensure that construction materials left over at the end of construction is used in other projects rather than being disposed of → Segregate waste by separating hazardous waste from non-hazardous waste for appropriate disposal → Containers or package for storing hazardous waste including used oil to be securely bonded and labeled as provided for by Regulation 18 under the Waste Management Regulations, 2006 → Contract a NEMA licensed waste transporter to collect solid waste from the site for dumping at an approved site → Contract a NEMA licensed waste oil recycler for collecting used oil from the site for recycling → Minimize waste generated by adopting cleaner production methods such as conserving raw materials, enabling the recovery and re-use of the waste product where possible → Use durable, long- lasting materials that will not need to be replaced as often, thereby reducing the amount of construction waste generated over time. → Provide facilities for proper handling and storage of construction materials to reduce the amount of waste caused by damage or exposure to the elements of nature i.e. sunshine, rain etc → The contractor should put in place measures to ensure that construction materials requirements are carefully budgeted and to		budget

Potential Impact	Proposed Mitigation Measure	Responsible institution for implementation	Estimated cost of implementation in Kshs
	ensure that the amount of construction materials left on site after construction is kept minimal.		
Dust and exhaust Emissions	→ Workers should be trained on safe work procedures regarding control of hazardous dust exposure by use of personal protective equipment. → Potential pollutants of any form should be stored and used in a manner to ensure containment of emission or spillage → Dust generating activities like excavation, handling and transportation of soil should be avoided during extremely strong and dry winds → Truck drivers should be sensitized to avoid unnecessary racing of vehicle engines at loading/offloading areas, and to switch off or keep vehicle engines at these points	Contactor	Included in the construction budget
Noise and Vibration	→ The contractor should consider labour intensive means of construction against the use of machinery except in case where the use of machinery is dimmed beneficial to the overall project objective → Instruct the drivers to avoid gunning of vehicle engines or hooting especially when passing through sensitive areas such as churches, residential areas and hospitals. → Construction machinery should be kept in good condition to reduce noise generation. → Sensitize workers in the vicinity of high noise level to wear ear plugs as part of personal protective equipment. → Limit construction activities to day-time only (6a.m to 6p.m) → Install portable barriers to shield compressors and other small stationary equipment where necessary; → Use of quiet equipment (i.e. equipment designed with noise control elements); → Limit pickup trucks and other small equipment to minimum idling time	Contactor	Included in the construction budget

Potential Impact	Proposed Mitigation Measure	Responsible institution for implementation	Estimated cost of implementation in Kshs
	and observe a common-sense approach to vehicle use, and encourage workers to shut off vehicle engines whenever possible		
Occupational health and safety	→ Workers should have proper insurance cover such workmen's compensation. → First aid facilities should be availed at the site office. These should include a properly stocked first aid box and persons in charge of first aid box should be competent to handle first aid with a valid practicing certificate. → Document and display site emergency procedures → Contractor should ensure safe and easy passage to other road users. →During the construction period, road users should be warned by suitable signs of the presence of heavy vehicles and equipment and speed limits should be set. →→ All moving parts of machine should be covered with suitable guards.	Contactor	Included in the construction budget

Potential Impact	Proposed Mitigation Measure	Responsible institution for implementation	Estimated cost of implementation in Kshs
	→ Adheres to the occupational health and safety rules and regulations stipulated in the Occupational Safety and Health Act 2007 and the Factories (Building Operations and Works of Engineering Construction) Rules of 1984. → Provide and enforce use of personal protective equipment - during construction all workers should wear protective clothing including overalls, helmets, dust masks, safety boots and gloves among others where necessary. → Ensure proper storage of materials and equipment to avoid accidents occurring from falling. → Provide adequate sanitary facilities and portable water during construction. → Register the construction site with DOHSS and conduct risk assessment and health and safety audit → Train the staff on occupational health and safety through a registered safety advisor and set up a HS committee as required by OSHA 2007. → Maintain environmental management records on site → Provisions for reporting incidents, accidents and dangerous occurrences (general accidents register) should be in place. This should be done in prescribed forms obtainable from the DOHSS office → Provide a well-designed and documented emergency preparedness plans → The contractor in conjunction with line ministries and, organizations such as TWSB, Ministry of Health, NGOs and Community Based Organization (CBO) should be involved in creating awareness on HIV/AIDS and other STDs in order to play a role in the control of the spread of the infectious diseases → → ANY SEVERE INCIDENCE OR ACCIDENT THAT OCCUR ON SITE SHOULD BE REPORTED TO THE CLIENT AND WITHIN 48 HRS THE CLIENT SHOULD REPORT TO THE WB ON THE INCIDENCE/ACCIDENT – WB guidelines to be used		

Potential Impact	**Proposed Mitigation Measure**	**Responsible institution for implementation**	**Estimated cost of implementation in Kshs**
Non-conformance with OSHA leading to exposure of workers to hazards	→ An independent safety officer under the proponent should audit project activities on a daily basis and report monthly to the proponent and the Directorate of occupational safety and health. All accidents and incidents should also be reported to DOSHS and the proponent with recommendations for preventing recurrence tasked to the contractor.	Contractor	Included in the contract
Energy consumption	→ Ensure proper planning of transportation of materials to ensure that fossil fuels (diesel, petrol) are not consumed in excessive amounts. → Monitor energy use during construction and set targets for reduction of energy use	Contactor	Included in the construction budget
Minimization of increased water demand/pollution	→ Contractor should avoid unnecessary wastage of water.	Contactor	Included in the construction budget
Management of underground infrastructure	→ Collect available maps for infrastructure routes in the area from KPLC, Mawasco and Telekom Kenya among others. → Excavate trial pits manually to locate the infrastructure pipes before using mechanical excavation. → Liaise with the affected service provider on repair of any accidentally damaged utility lines	Contactor	Included in the construction budget
Management Of Structures stability	→ Ensure that there are suitable measures for confining vibrations within project sites. These measures should be tailored according to the proximity of buildings to the project sites and earthwork program with an inventory of all structures and their conditions near the project undertaken before commencement of the works.	Contactor	Included in the construction budget
Interruption Of Key Installation and way leaves	→ Formal request for way leave, or permission to cross, break in and lay The water line should be sought from affected property owners; → Formal engagement of key land and other property owners	Contactor	Included in the construction budget

Potential Impact	Proposed Mitigation Measure	Responsible institution for implementation	Estimated cost of implementation in Kshs
	neighbouring the sewer line; → A work plan with clear responsibilities for each party should be developed to ensure smooth execution of the construction; and → On completion of works, each property owner should be contacted again to give views and if complains arise the contractor asked to address the same through the Proponent's community liaison and the Grievance Redress Committee, or Project Implementation Unit. No demolitions are anticipated. The structures are movable structures – what is needed is enforcement to ensure there is no encroachment of structures on the wayleave		
Management of traffic and facilitation of access	→ Traffic department should approve crossing plan prior to construction, and should approve obstruction times during construction. → Access of residents should be facilitated by installing appropriate temporary bridges over the pipeline trenches. Suitable warning signs should be placed at near locations and should be visible at night. → Alternatives access ways should be communicated to the community → Ensure that local residents are not inconvenienced by the offsite movement of construction vehicles. → Spillages of construction materials on the roads should be avoided. When these occur, they should be cleaned immediately. → Notices should be placed on the designated roads during the construction period indicating that heavy vehicles are using the road. → Make sure that construction works do not occupy road reserves and comply with traffic regulations and land demarcation obligations. → Ensure that all vehicles used for the project are in good working condition both legally and commensurate to their intended use → Ensure strict enforcement of on and off -site speed limits as well as limiting unnecessary traffic	Contactor	Included in the construction budget

Potential Impact	Proposed Mitigation Measure	Responsible institution for implementation	Estimated cost of implementation in Kshs
Management of socio-economic impacts during construction	→ Where excessive traffic impacts are anticipated, the construction schedule should be disclosed and communicated to the local community. → Construction contract should include penalties on contractor for unjustified delays	Contactor	Included in the construction budget
Interference with the physical setting	→ The design should in no way propose to implement developments that will hinder drainage, change the topography or introduce physical changes that are not in harmony with the physical setting of the project area. → The structures to be developed should be aesthetically acceptable to blend in with the surrounding. These structures should not form or end up being used by the resident population as access or bridges. → The contractor should as much as possible complete the works in such a way that natural aesthetics is retained at the locations. → Restoration works should be undertaken to ensure that the original setting is as much as possible retained. → Ensure that structures do not create access barriers for residents and local communities but should instead provide protected access where appropriate. This should take cognizance of the aged, young and the disabled people.	Contactor	Included in the construction budget

Potential Impact	Proposed Mitigation Measure	Responsible institution for implementation	Estimated cost of implementation in Kshs
Operation Phase			
Increased water demand	□ There should be due adherence to the safest maximum abstract-able water quantities of throughout the project life; □ Adhere to WRMA water use permits; □ Monitor the hydrology to determine whether there is reduced downstream flow	Proponent	Included in the operation budget
Management of increased domestic wastewater generation	→ Plans should be put in place by the WSPs on how to address sewer and waste water from the expected effluent increase by ensuring that the sewer system is commensurate with water supply system in terms of design capacity. → Ensure proper installation, testing, and inspection of the sewer system → Limit fats, greases, and other debris, which may cause blockages in the sewage collection system; → Prompt response to any clogging incidents → Install oils and solid separators for retaining extra loads of oil and solids. → Frequent flushing of sewers according to recommendations of design engineer. → Carry out timely repairs of the burst sewer lines → Provide adequate operation and maintenance of facilities and equipment; → Maintain an up-to-date map of the collection system showing all sewer line segments and manholes, valves and storm water conveyance facilities; → Have routine preventive operation and maintenance activities by staff	Proponent	Included in the operation budget

Potential Impact	Proposed Mitigation Measure	Responsible institution for implementation	Estimated cost of implementation in Kshs
	and contractors; including a system for scheduling regular maintenance and cleaning of the collection system with more frequent cleaning and maintenance targeted at known problem areas. The Preventative Maintenance (PM) program should have a system of tracking work orders and assessing the success of the PM program.		
Aesthetic/ visual of the disturbed pipeline routes	→ Appropriate landscape the pipeline routes with suitable trees, grass, flowers and proper housekeeping	Proponent	Included in the operation budget
Emergency preparedness	□ Design and implement an emergency response plan; □ Coordinate with aid organizations/agencies such as with the local fire brigade; □ Install fire hydrants within the proposed development	Proponent	Included in the operation budget
Increase in HIV/AIDS prevalence and other STIs	• Selecting appropriate locations away from concentration of human settlements for construction camps; • Education and sensitization of workers and the local communities on STIs including provision of condoms to the project team and the public; • The contractor has to institute HIV/AIDS awareness and prevention • campaign amongst workers for the duration of the contract e.g. erect and maintain HIV/AIDS information posters at prominent locations as specified by the Resident Engineer; • The contractor has to ensure that staff are made aware of the risks of • contracting or spreading sexually transmitted diseases; • The contractor should ensure that the project workers are sensitized on the local culture.	Contractor, Proponent	
Spread of	• Treat affected local and migrant workers which will control the	Contractor,	

communicable diseases and other infections	movement of disease vectors (through contaminated water and between people); • Provision of personal hygiene facilities in good condition with adequate water supply; • Ensure awareness raising on proper sanitation and personal hygiene to promote proper health. • The contractor should also establish a relationship/agreement with local hospitals to have regular checkups and treatment for workers	Proponent	
Gender Based Violence and Sexual Harassment	• Develop a GBV Action Plan • Assessment of capacity and the availability of quality, safe and ethical services for survivors such as health facilities, counselling services • Have project workers sign and understand Codes of Conduct that prohibit GBV. • Have separate, safe and easily accessible facilities for women and men working on the site • Creation and identification of "Safe Spaces" for women and girls • Visibly display signs around the project site (if applicable) that signal to workers and the community that the project site is an area where GBV is prohibited. • As appropriate, public spaces around the project grounds should be well-lit. • Requiring sexual harassment policies for contractors and grantees and establish written procedures for victims to document incidences, and ensure that worker complaints are fully investigated and proper disciplinary action is taken. • Involve women, LGBTI, people living with disabilities, and other marginalized and vulnerable groups in project design to ensure that their needs are represented. • Conduct a comprehensive gender analysis that includes GBV. • Focus on the needs of pedestrians. • Provide safe sanitation facilities. • Conduct a GBV safety audit of the design. • Use contracting mechanisms to enforce correct behavior during implementation. • Provide on-site anti-harassment trainings to create awareness of the harmful effects of GBV, as well as consequences if GBV occurs	• Contractor, Proponent	

	according to the anti-harassment policies. • Promote the use of appropriate response mechanisms for reporting GBV that occurs during the life of the project.		
Archeological and Cultural heritage	The contractor should develop and implement a chance find procedure in case archaeological sites are found during the construction process. Such procedure must incorporate liaison with the National Museum of Kenya.	Contractor, Proponent	
Land Acquisition and resettlement	Implementation of a Resettlement Action Plan (RAP) highlighting the measures adopted for rehabilitation and resettlement of the project affected people in order to sustain their livelihood and ensure zero negative impact on their economic life.	Proponent	
Grievances arising	Establishment of a Grievance Redress Mechanism which will involve; Establishment of Grievance Redress Committees **1. Local Grievance Committees** The membership will include representatives from youth, women, men, local administration, Project staff **2. Second Level: Sub County Mediation Committee,** a. Neutral Third party and **3. Third Level: Resort to Justice** **The process involves the following steps;** 1. Grievance reception/acceptance 2. Acknowledgement, assessment and record 3. Investigation 4. Resolution 5. Complaint satisfaction 6. Documentation management	Proponent, Contractor,	
Child Labor	The client will follow those laws applicable to the client. The client will identify the presence of all persons under the age of 18. Children under the age of 18 will not be employed in hazardous work. All work of persons under the age of 18 will be subject to an appropriate risk assessment and regular monitoring of health, working conditions, and hours of work.	Contractor, Proponent	
Decommissioning			

Potential Impact	Proposed Mitigation Measure	Responsible institution for implementation	Estimated cost of implementation in Kshs
Dilapidated infrastructure	□ Remove exposed pipelines and structures which formed part of the old system. Such include gate valves, metal pipes and concrete manholes among others. □ Remove all structures and excess materials from the contractor camp sites □ Rehabilitate the camp site to the original or better status and draw up a decommissioning plan and submit to NEMA. □ Remove and scrap all unused material and structures on site	Contractor	To be determined
Hazardous asbestos pipes	□ Dispose on surface asbestos lined pipes in line with asbestos disposal guidelines	Contractor	To be determined
Pits and boulders leading to accidents	□ Backfill all excavations and pits and remove all concrete blocks from broken structures such as manholes.	Contractor	To be determined

9.0 MONITORING AND EVALUATION

Monitoring is an important tool in establishing the success or failure of a project in regards to compliance to environmental safeguards. Evaluation is also important in assessing the achievement of the mitigation measures set out in the Environmental and Social Management Plan, performance and efficiency of the project in regards to ESMP.

Monitoring and evaluation process will involve the assessment of the following benchmarks

→ The implementation process of guidelines stipulated in the ESMP
→ Evaluate impact of the project to the environment and social setting of Nyeri County (categorizes and weight positive and negative)
→ Monitoring of the involvement of the community through public consultations in decision making and the implementation of the project.

On each of those parameters and the assessment of overall project implementation, specific monitoring tools need to be developed. The following indicators would be important during monitoring.

- Number of new households connected would indicate how far the project objectives have been met.
- The number and type of complaints received at the reporting desk for the contractor or proponent would indicate numbers affected and how they are affected.
- The response times by the contractor or proponent to complaints would indicate the responsiveness of the project to issues raised by the public on delayed or no action.
- Quarterly and annual environmental audits would give an indication on how the proponent and the contractor have adhered to the ESMP.
- Annual Safety and health audits would indicate the level of compliance with the OSHA guidelines.
- On licensing, the indicators would be the ESIA license issued by NEMA with conditions, Annual OSHA certificate issued by DOSHS and a business permit issued by the county government.

On safety and health monitoring, the project should employ the services of a safety and health advisor or executive to monitor implementation of national and best practice on a daily basis. This would include employee induction, supervision and reporting. This capacity can also be built within the proponent team as an oversight in the project. Safety and health audits, employee training should be included in this function and evidence of this in the form of documentation would be an important monitoring indicator.

9.1 Monitoring and evaluation

Schedule	Activities	Execution	Supervision	Funding	Comments
Year 1. Months 1-3	Prepare site specific ESMP, including contractor's camp and any required material sites.	Contractor	MAWASCO/TWSB	Contract	CESMP submitted together with contract and to be reviewed by the Client and the World Bank before commencement of the works. not later than 2 month after contract notification Final plan before end of month 3.
Construction period	Safe working procedures to be written and followed by contractors	Contractor	MAWASCO/TWSB	Contract	Verify applicability of written safe working procedures. Regular inspection of construction works
	Working areas to be temporarily out of bounds to non-works personnel	Contractor	MAWASCO/TWSB	Contract	Regular inspection of construction sites
	Construction waste to be stored in a secure, designated area prior to removal to a designated waste landfill site	Contractor	MAWASCO/TWSB	Contract	Regular inspection of construction sites
	Daily checks of machinery for leaking oil	Contractor	MAWASCO/TWSB	Contract	Regular inspection of construction sites

	No washing of machinery at	Contractor		Contract	Regular inspection of construction sites

	construction site				
	Regular monitoring of water resources both ground and surface	Contractor	MAWASCO/TWSB	Contract	Water to be analyzed for turbidity, oil and heavy metals
	Separation of topsoil and subsoil during excavation works, with careful replacement of topsoil after pipe is laid	Contractor	MAWASCO/TWSB	Contract	Regular inspection of construction sites
	Works performed strictly during normal weekday working hours to minimize noise nuisance	Contractor	MAWASCO/TWSB	Contract	Regular inspection of construction sites. See also Section Impact Monitoring: Air Quality and Noise
	Minimize dust and traffic emissions by good operation management and site supervision	Contractor	MAWASCO/TWSB	Contract	Regular inspection of construction sites. See also Section Impact Monitoring: Air Quality and Noise
	Apply dust suppression measures (water sprinkling), especially during long dry periods	Contractor	MAWASCO/TWSB	Contract	Regular inspection of construction sites
	If any archaeological artifacts are found, work	Contractor	MAWASCO/TWSB	Contract	Based on the chance find procedures /

	must stop immediately and the respective local authorities and experts informed				information sharing mechanism
	Contractor should on a regular basis collect and address any inquiries and complaints from the public on the project.	Contractor	MAWASCO/TWSB	Contract	Records from water supply management Regular inspection of construction sites
	Minimize time of replacement work and interruptions of water supply	Contractor	MAWASCO/TWSB	Contract	Plan works accordingly in order to have interruptions of minimum times.
	Sensitization on HIV/AIDS and other STIs	Contractor	MAWASCO/TWSB	Contract	Creation of awareness through training. Distribution of condoms.
	No incidences of child labour	Contractor	MAWASCO/TWSB	Contract	Subject to appropriate risk assessment
Operation Phase	No system Leaks	Proponent	MAWASCO	Routine	MAWASCO Budget
	Illegal Connections	Proponent		Routine budget	
	Maintenance and review of connections/payment	Proponent	MAWASCO		
Decommissioning	Asbestos disposal	Proponent	MAWASCO		
	Decommissioning report for camp sites and the dilapidated system	Contractor	Contractor		

10.0 CONCLUSION AND RECOMMENDATION

10.1 Recommendations

The following recommendations are made with respect to the implementation of the proposed project:

→ That owners encroaching on the project site be notified in good time to remove their structures before implementation of the Project. According to the Resettlement Action plan in compliance with OP 4.12 they will be compensated according to the entitlement matrix as specified by the plan. Compensation will be done according to the RAP in accordance with OP 4.12. .

→ That a complete audit be undertaken and submitted to NEMA after commissioning of the project and thereafter regularly on a yearly basis to ensure that all the proposed mitigation measures have been complied with.

→ That construction of all facilities in the proposed Project is carried out in accordance with approved plans, regulations, policies and laws.

→ That the Operation and Maintenance of the Water Supply should comply with the international Best Practices and the principles of environmental management including the principles of sustainability, prevention, precaution, and polluter pay principle and public participation.

→ That since the sum total of impacts from the proposed Project is positive, the proposed Project be authorized by NEMA and allowed to proceed, on condition that strict adherence to the Environmental and Social Management Plan is observed.

→ That the Construction Supervision and Operation Management Teams on this Project should include a Licensed Environmental Lead Expert who shall maintain regular monitoring and evaluation of the project to ensure that it is complying with the World Bank Policies, EMCA, 1999 and other Regulations in force.

→ The Licensed Environmental Lead Expert is involved in every stage of the project implementation and particularly on the management of the anticipated wastes and emissions into the environment as well as other concerns that may touch on the neighbouring facilities,

→ That environmental management issues are considered during annual budgets for sustainability,

→ That the entire project implementation will not cause any unnecessary disruption to public utilities, storm water/surface runoff drainage systems, ecological systems and human settlement. Whenever any of these problems or any other impact highlighted in this report are anticipated, then the management should take appropriate mitigation actions.

→ Take all necessary technological considerations that will prevent wastes/effluent and emissions into the receiving environment. In this regard, the management should be expected to constantly consult with an environmental expert.

→ Ensure that the contractor installs the systems to the specifications developed and agreed upon in the building plan.

10.2 Conclusion

The Environmental and Social Impact Assessment (ESIA) Study was carried based on field assessments and public consultations with the community who are likely to benefit or to be affected by the proposed Project and the proponent in compliance with the World Bank environmental policies, Environmental Management and Coordination Act, 1999 and the Environmental (Impact Assessment and Audit) Regulations, 2003.

The proposed project is step towards providing water to the people of Nyeri County and in that case, there is overwhelming acceptance of the project by the local community (97.5% of the surveyed population). Negative environmental and social impacts identified in the report can be mitigated as illustrated in the Environmental and Social Management Plan and proper monitoring throughout construction and operation phases of the project is advised. It is important to allocate and utilize the budget for implementation of the ESMP provisions to ensure sustainability of the project.

This report presents findings of the assessment which are summarized in an Environmental and Social Management Plan (ESMP) and fulfills the requirements of EMCA and the World Bank Operational Procedure 4.01 on Environmental Assessment. The policy, legal and institutional framework described in this report relates to the water sector in the country. Overall no adverse environmental impacts are foreseen that cannot be mitigated. Provided implementation is done with due attention to the mitigation and management measures outlined, the proposed project will have a positive impact on both the bio-physical and socio-economic environment of the project area.

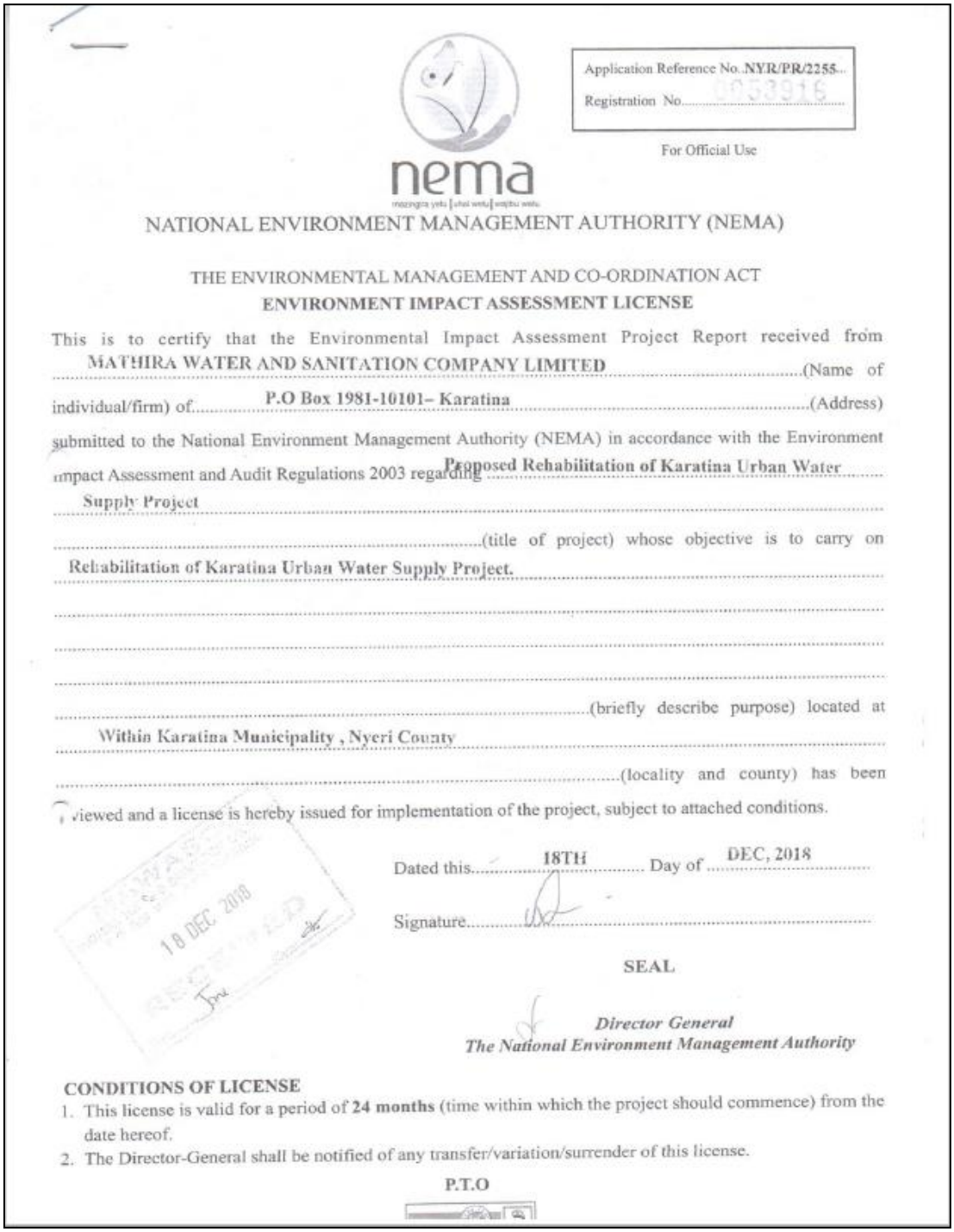
In summary, the potential negative impacts of the project can be handled through the recommended mitigation measures, hence should not prevent the project from proceeding. The positive impacts and the benefits to the country are immense and welcome. It is recommended, therefore, that the project proceed with the outlined mitigation measures put in place.

REFERENCES

- Environmental Management and Coordination (Conservation of Biological Diversity) Regulations, 2006. Government Printer, Nairobi.
- Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009. Government Printer, Nairobi.
- Environmental Management and Coordination Act, 1999.
- Guidelines for Prevention and Control of Soil Erosion in Road Works, 2010.
- IDP Act: Protection and Assistance to internally Displaced Persons and Affected Communities Act, 2012.
- International Conventions.
- Kenya Gazette Supplement Acts Public Health Act (Cap. 242). Government Printer, Nairobi.
- Kenya Gazette Supplement Acts Water Act, 2002. Government Printer, Nairobi.
- Kenya Gazette Supplement Acts. Environmental Management and Coordination (Water Quality) Regulations, 2006. Government Printer, Nairobi.
- Kenya gazette supplement number 56. Environmental (Impact Assessment and Audit) Regulations, 2003.Government Printer, Nairobi.
- Kenya Gazette Supplement Number 69. Environmental Management and Coordination (Waste Management) Regulations, 2006. Government Printer, Nairobi.
- Kenya Roads Act, 2007.
- Kenya Vision, 2030.
- Occupational Safety and Health Act, 2007.
- Penal Code Cap 63.
- Physical Planning Act Cap 6 of 1996. Public Roads and Roads Access (Cap 399).
- Sessional Paper No. 1 of 1999. Government Printer, Nairobi.
- Sessional Paper No. 6 of 1999. Government Printer, Nairobi
- The Land Titles Act (Cap 282).
- The Lands Act, 2012.
- The National Biodiversity Strategy and Action Plan, 2007. Traffic Act (Cap 403).
- Water Resources Management Rules, 2007.

APPENDICES

APPENDIX 1: NEMA ENVIRONMENTAL IMPACT ASSESSMENT LICENSE



Application Reference No. NYR/PR/2255
Registration No. 0053916
For Official Use

nema
mazingira yetu | utxi wetu | wejitu wetu

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY (NEMA)

THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT
ENVIRONMENT IMPACT ASSESSMENT LICENSE

This is to certify that the Environmental Impact Assessment Project Report received from MATHIRA WATER AND SANITATION COMPANY LIMITED (Name of individual/firm) of P.O Box 1981-10101– Karatina (Address) submitted to the National Environment Management Authority (NEMA) in accordance with the Environment Impact Assessment and Audit Regulations 2003 regarding Proposed Rehabilitation of Karatina Urban Water Supply Project (title of project) whose objective is to carry on Rehabilitation of Karatina Urban Water Supply Project. (briefly describe purpose) located at Within Karatina Municipality , Nyeri County (locality and county) has been reviewed and a license is hereby issued for implementation of the project, subject to attached conditions.

18 DEC 2018

Dated this 18TH Day of DEC, 2018

Signature

SEAL

Director General
The National Environment Management Authority

CONDITIONS OF LICENSE

1. This license is valid for a period of **24 months** (time within which the project should commence) from the date hereof.
2. The Director-General shall be notified of any transfer/variation/surrender of this license.

P.T.O

APPENDIX 2: CONSENT LETTER

COUNTY GOVERNMENT OF NYERI

P.O. BOX 1112 - 10100
Telephone 061 2030700
NYERI

Email: *nyerigovernorsoffice@gmail.*

OFFICE OF THE GOVERNOR

Ref: CGN/GVN/WAT/1/30/83

23rd July, 2018

The Managing Director
Water Sector Trust Fund
P.O.Box 49699-00100
NAIROBI- KENYA

23 JUL 2018

Dear Sir,

RE: NO OBJECTION LETTER TO THE FUNDING PROPOSAL FOR KARATINA URBAN WATER REHABILITATION PROJECT

Mathira Water & Sanitation Company which is one of our water Companies has applied for a World Bank output Based Program (OBA).

We are seized of the need to expand the water services to the residents of Mathira and consequently give a No Objection to the said facility.

Yours,

H.E. Mutahi Kahiga
Governor, Nyeri County

APPENDIX 3: WRMA ABSTRACTION PERMIT

REPUBLIC OF KENYA WRMA 5

WATER RESOURCES MANAGEMENT AUTHORITY
TANA CATCHMENT AREA

PERMIT
(Issued under the Water Act 2002)

PERMIT No WRMA/TC/04750

Main Division	Main Subdivision	Minor Subdivision
4	B	B

Drainage Area **4BB**

Body of Water **RAGATI RIVER**
Class of project **PUBLIC**
By virtue of the authority vested in us by the Water Act, we the Water Resources Management Authority, do hereby grant unto
(1) **TANA WATER SERVICES BOARD (MATHIRA WATER AND SANITATION COMPANY)**

Of P.O. BOX 1981-10100 KARATINA herein after called the permit holder Executors, administrators and assigns permission to **abstract from** the above-mentioned body of water in
Accordance with the plans hereinafter below referred to and subject to the conditions and restrictions
Contained in the Water Act, the Rules thereunder, and the stipulations and conditions following hereafter and endorsed hereon and attached hereto:

1. Land(s) undertaking to which this permit is appurtenant Comprising about-**N/A** hectares.
2. Enabling title of landholder(s) **N/A**
3. Point of diversion/storage: GRID REFERENCE: **955605 ON MAP SHEET 121/3**
4. Plan(s) registered numbers **WAB Nos. 5269**
5. DAM. – Materials of construction (4) **N/A** as shown on plan(s) W.A.B. No.(s) **N/A**
   Greatest height above river bed level **N/A** metres.
   Capacity at full supply level N/A
6. Method of diversion and description of works **Weir 1.5m and two gravity pipeline**

1

[P.T.O]

7. The particular user(s) for which this permit is granted **public and industrial use (washing and pulping of coffee)**
8. The quantities of the normal flow and flood water which may be diverted for any purpose shall not exceed the respective percentages (shown in the Schedule) of the stream measured at the point of diversion at the time diversion is taking place.

SCHEDULE

Purpose	Quantity of Water which may be Diverted		Percentage of Water diverted which must be returned to the stream to be not less than
	Normal Flow	Flood Flow	
(a) Domestic……..	……m^3/day	……m^3/day	……per cent
(b) Public……..	**7000m^3/day**	……m^3/day	NIL per cent
(c) Minor Irrigation…...	……m^3/day	……m^3/day	……per cent
(d) Industrial……..	**2500m^3/day**	……m^3/day	……per cent
(e) Power [(7) ..B.H.P.]	……m^3/day	……m^3/day	……per cent
(f) General Irrigation….	……m^3/day	……m^3/day	……per cent
(g) (8) ……..	……m^3/day	……m^3/day	……per cent
……..	……m^3/day	……m^3/day	……per cent
Being a total diversion of…	**9500m^3/day**	……m^3/day	……per cent
Or…… ……	(6)……m^3/day	(6)……m^3/day	……per cent

9. Special Conditions:-
   This permit is issued in conjunction with the special conditions on page 3 attached.
10. The permit will lapse on **13th September, 2007**

Dated at Embu this **13th September day of Two thousand and Six**

REGIONAL MANAGER,
W.R.M.A. – TANA CATCHMENT,
For: CHIEF EXECUTIVE OFFICER,
WATER RESOURCES MANAGEMENT AUTHORITY.

SPECIAL CONDITIONS

Notwithstanding anything in this permit contained the permit-holder is warned that under Section No. **35**of the Water Act **2002** the **WATER RESOURCES MANAGEMENT AUTHORITY** reserves the right to specify from time to time the percentage of normal (of flood) flow of the river, which may be diverted.

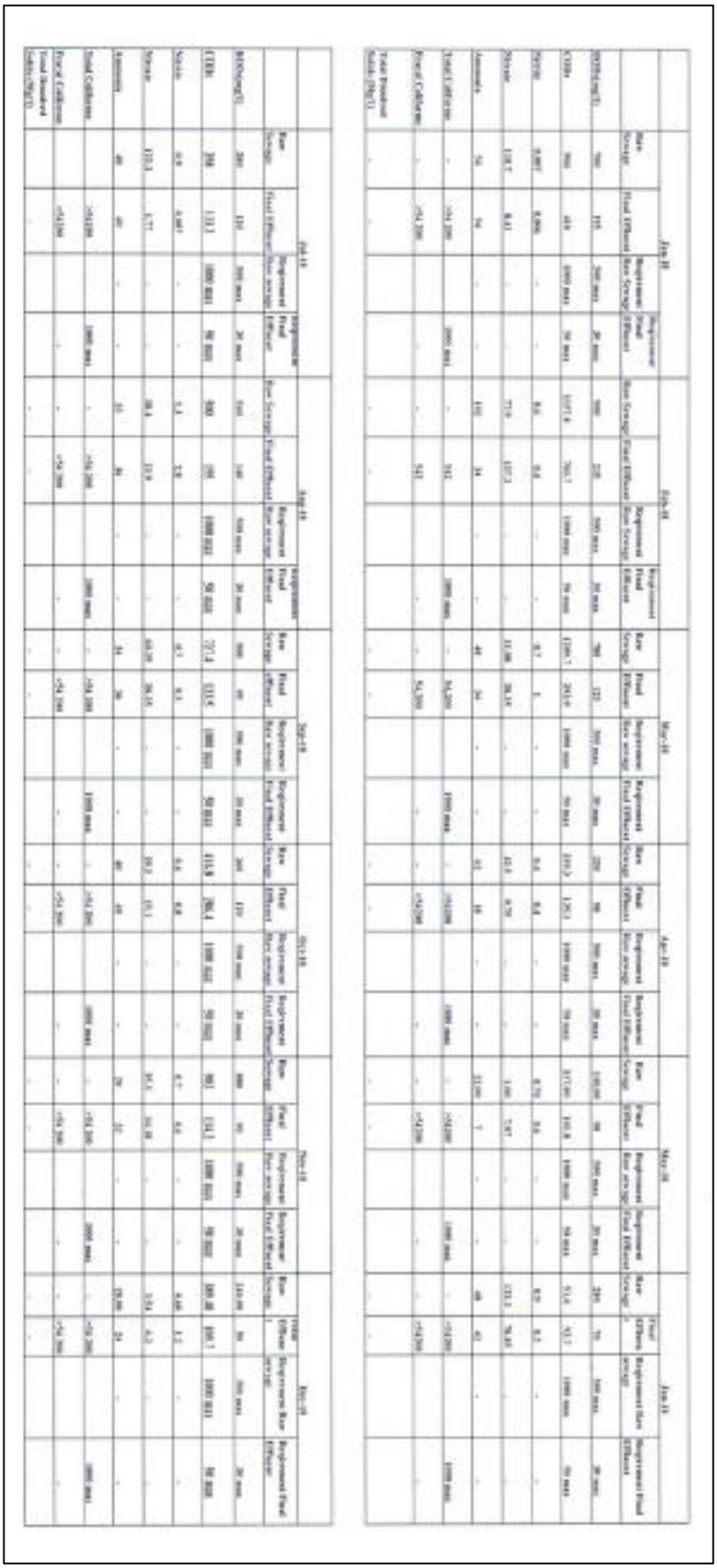
Notwithstanding anything in this permit contained, this permit is issued subject to availability of flow.

The Permit-holder shall install a Measuring and Controlling Device designed to the satisfaction of the **Chief Executive Officer, Water Resources Management Authority.**

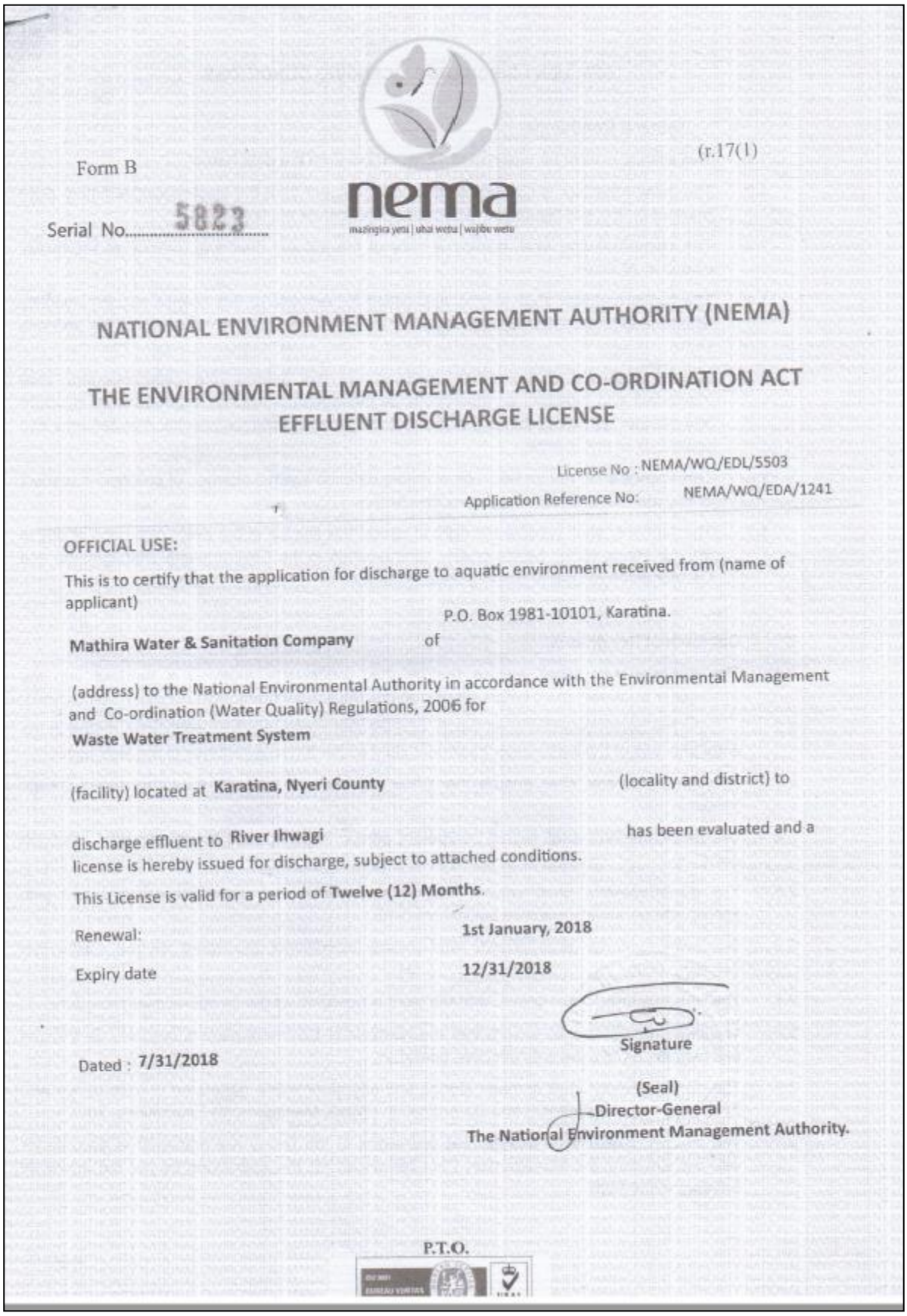
Notwithstanding anything in this permit contained, the Board may in its absolute discretion, by written order require the permit-holder to cease diverting water for irrigation purposes until such time as the order is cancelled.

This permit will be automatically be cancelled when the authorized period expires without any further reference to you unless extension of time limit is applied for prior to date of expiry

APPENDIX 4: EFFLUENT AND INFLUENT WATER QUALITY PARAMETERS



APPENDIX 5: NEMA EFFLUENT DISCHARGE LICENSE



Form B (r.17(1))

Serial No. 5823

nema
mazingira yetu | uhai wetu | wajibu wetu

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY (NEMA)

THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT
EFFLUENT DISCHARGE LICENSE

License No : NEMA/WQ/EDL/5503

Application Reference No: NEMA/WQ/EDA/1241

OFFICIAL USE:

This is to certify that the application for discharge to aquatic environment received from (name of applicant)

Mathira Water & Sanitation Company of P.O. Box 1981-10101, Karatina.

(address) to the National Environmental Authority in accordance with the Environmental Management and Co-ordination (Water Quality) Regulations, 2006 for

Waste Water Treatment System

(facility) located at **Karatina, Nyeri County** (locality and district) to

discharge effluent to **River Ihwagi** has been evaluated and a license is hereby issued for discharge, subject to attached conditions.

This License is valid for a period of **Twelve (12) Months**.

Renewal: **1st January, 2018**

Expiry date **12/31/2018**

Signature

Dated : **7/31/2018**

(Seal)
Director-General
The National Environment Management Authority.

P.T.O.

APPENDIX 6: CHANCE FINDS PROCEDURES

Contracts for civil works involving excavations should normally incorporate procedures for dealing with situations in which buried physical cultural resources (PCR) are unexpectedly encountered. The final form of these procedures will depend upon the local regulatory environment, including any chance find procedures already incorporated in legislation dealing with antiquities or archaeology.

Note: The case for which the general guidance below is provided applies where there will be an archaeologist on call. In exceptional situations in which excavations are being carried out within PCR-rich areas such as a UNESCO World Heritage site, there will often be an archaeologist on site to monitor the excavations and make decisions on-site. Such cases would require a modified version of these procedures, to be agreed with the cultural authorities.

Chance finds procedures commonly contain the following elements:

1. PCR Definition
This section should define the types of PCR covered by the procedures. In some cases, the Chance finds procedure is confined to archaeological finds; more commonly it covers all types of PCR. In the absence of any other definition from the local cultural authorities, the following definition could be used: "movable or immovable objects, sites, structures or groups of structures having archaeological paleontological historical architectural religious, aesthetic, or other cultural significance".

2. Ownership
This paragraph should state the identity of the owner of the artifacts found. Depending on the circumstances, the owner could typically be, for example, the state, the government, a religious institution, the land owner, or would be left for later determination by the concerned authorities.

3. Recognition
This is the most difficult aspect to cover. As noted above, in PCR-sensitive areas, the procedure may require the contractor to be accompanied by a specialist. In other cases, the procedures may not
specify how the contractor will recognize a PCR, and a clause may be requested by the contractor
disclaiming liability.

4. Procedure upon Discovery
Suspension of Work
This paragraph may state that if a PCR comes to light during the execution of the works, the contractor shall stop the works. However, it should specify whether *all works* should be stopped, or only the works immediately involved in the discovery, or, in some cases where large buried structures may be expected, all works may be stopped within a specified distance (for example, 50 metres) of the discovery. This issue should be informed by a qualified archaeologist from the National Museums of Kenya.

After stopping work, the contractor must immediately report the discovery to the Resident Engineer.

The contractor may not be entitled to claim compensation for work suspension during this period.

The Resident Engineer may be entitled to suspend work and to request from the contractor some excavations at the contractor's expense if he thinks that a discovery was made and not reported.

Demarcation of the Discovery Site
With the approval of the Resident Engineer, the contractor is then required to temporarily demarcate, and limit access to, the site.

Non-Suspension of Work
The procedure may empower the Resident Engineer to decide whether the PCR can be removed and for the work to continue, for example in cases where the find is one coin.

Chance Find Report
The contractor should then, at the request of the Resident Engineer, and within a specified time period, make a Chance Find Report, recording:

- Date and time of discovery;
- Location of the discovery;
- Description of the PCR;
- Estimated weight and dimensions of the PCR;
- Temporary protection implemented.

The *Chance Find Report* should be submitted to the Resident Engineer, and other concerned parties as agreed with the cultural authority, and in accordance with national legislation.

The Resident Engineer, or other party as agreed, is required to inform the cultural authority accordingly in this case **the Ministry of Sports and Heritage**.

Arrival and Actions of Cultural Authority

The cultural authority undertakes to ensure that a representative will arrive at the discovery site within an agreed time such as 24 hours, and determine the action to be taken. Such actions may include, but not be limited to:

- Removal of PCR deemed to be of significance;
- Execution of further excavation within a specified distance of the discovery point;
- Extension or reduction of the area demarcated by the contractor.

These actions should be taken within a specified period, for example, 7 days.

The contractor may or may not be entitled to claim compensation for work suspension during this period.

If the cultural authority fails to arrive within the stipulated period (for example, 24 hours), the Resident Engineer may have the authority to extend the period by a further stipulated time.

If the cultural authority mils to arrive after the extension period, the Resident Engineer may have the authority to instruct the contractor to remove the PCR or undertake other mitigating measures and resume work. Such additional works can be charged to the contract. However, the contractor may not be entitled to claim compensation for work suspension during this period.

Further Suspension of Work

During this 7-day period, the Cultural authority may be entitled to request the temporary suspension of the work at or in the vicinity of the discovery site for an additional period of up to, for example, 30 days.

The contractor may, or may not be, entitled to claim compensation for work suspension during this period.

However, the contractor will be entitled to establish an agreement with the cultural authority for additional services or resources during this further period under a separate contract with the cultural authority.

APPENDIX 7: RESETTLEMENT ACTION PLAN

This section describes the resettlement issues related to the construction of the pipeline and provides the abstract of the Resettlement Action Plan (RAP) highlighting the measures adopted for rehabilitation and resettlement of the project affected people in order to sustain their livelihood and ensure zero negative impact on their economic life.

Objectives of the Resettlement Action Plan

The purpose of the RAP was to identify Project Affected Persons (PAPs) and their assets/properties, value them and provide a strategy for resettlement compensation to ensure that the PAPs' livelihoods are restored or improved. The RAP also puts in place appropriate remedial measures, including grievance channels, for the PAPs and other community members.

The main objectives of the RAP are:

(a) To identify PAPs and their properties and determine the extent of involuntary resettlement/displacements and restricted access impacts associated with the project implementation and put in place measures to minimise and/or mitigate such impacts;
(b) To value PAPs' property and assets (compensation costs, livelihood/disturbance allowances and other assistance values) and provide a strategy for the compensation of PAPs;
(c) To set out strategies for the implementation of the RAP, including the process through which to acquire the necessary land and easements for the implementation of the project activities; and
(d) To carry out consultations with community members and other stakeholders, including PAPs, and make them aware of the project and to obtain their concerns regarding the economic and social impacts of the proposed project and mitigation measures.

Project Description

Mathira Water and Sanitation Company is one of the Water Service Providers (WSP) contracted by the Tana Water Services Board (TWSB) to provide water and sanitation services in Mathira West and Mathira East Sub-county. The area of service is an area of approximately 320km^2. The current population in the WSP area is estimated to be about 148,847 people. The WSP supplies 57,192 people (38.4% as at September 2018).

The WSP is served by water supplies originating from different water sources namely:

a) Rural Water Supply – old system originating from Ragati River (cross weir constructed in 1970s)
b) Ragati Water Supply- constructed in 2008 originating from Ragati dam to Canteen and Karindundu localities where it joins the old system.
c) Hombe Water Supply – Has a pipeline originating from Hombe dam to Tumutumu tank (Mbogoini area). Currently this dam is not in use due to quality of water
d) Urban Water Supply – old system from Ihwagi treatment works to Karatina Municipality

The production capacity is about **11,000m3** per day against a current demand of **20,000m3** per day. The treated water is released to the distribution system through pumping. As a result of the rapid increase in population of Karatina Town caused by the construction of a training institute among other factors, the water demand has significantly grown and out stretched the supply. Consequently, the water company has been supplying water on a rationed programme for a maximum of 12-hours per day.

To alleviate this shortage, MAWASCO intends to mitigate the above challenges and overhaul the entire networks and augment the distribution system especially to reach the low income areas which are normally hard hit in times of water shortage. The proposed project is expected to inject additional 2,500 m3 of water per day into the distribution system. The targeted areas are those exhibiting low income characteristics and mainly mapped in Maji data and include:

Karindundu, Mathaithi, Jamaica etc. The estimated current total population in Katratina Urban is **23,278**.

The Legal and Institutional Framework

This is the legal operating environment for acquisition of land as anticipated in the implementation of the Project. Kenya's constitutional provisions related to land use, planning, acquisition, management and tenure, and more specifically the legislations related with land expropriation or acquisition, land valuation and land replacement include;

a) The National Land Policy
b) The Constitution of Kenya, 2010
c) The Land Act, 2012
d) The Land Laws (Amendment) Act 2016
e) National Land Commission Act 2012
f) The Valuers Act
g) Evictions Guidelines 2010
h) Child Rights Act 2012
i) Matrimonial Property Act No 49 of 2013
j) World Bank Safeguard Policy on Resettlement

Methodology and Approach

The methodology and approach adopted in preparing this RAP is consistent with the laws of Kenya as well as World Bank OP. 4.12. A registered land valuer and cadastral surveyor identified, surveyed and valued the property of the PAPs. A sociologist led the PAP census and community consultations. The following approach was used:

a) The PAP study design employed both qualitative and quantitative methods of data collection and stakeholder consultations.
b) The PAP census data was collected through the household interview with all PAPs' households.
c) Information on ownership of affected property was collected through the identification and verification of ownership (buildings and other properties), ownership verification from tenants, neighbours and local leaders.
d) Quantitative PAP census data was analysed using the Statistical Package for Social Sciences (SPSS).

Community Participation and Consultation

DATES	VENUE	NO.OF PARTICIPANTS
11th August 2018	Gathugu Market – Local community	23
13th August 2018	Industrial Area Market	48

Community meetings covered the following issues: description of the project objectives, components and implementation activities; property and livelihood impacts associated with project implementation; the resettlement/compensation alternatives and strategies available for PAHs; the rights of PAHs; Grievance redress; RAP preparation; valuation principles and procedures; RAP disclosure; and the approval process. PAHs were mainly concerned about the likely impact of the Project activities on their livelihood with respect to displacement on the encroached ROW and damage to the developments/structures, trees and crops on their land and sustenance derived from roadside enterprises such as kiosks/stalls/sheds.

Project Impacts

The activities highlighted in the scope of works above will take place within the existing road reserves of the Government of Kenya also known as the Right of Way1(ROW) and in privately owned land. In the project's area of influence, i.e. (ROW and private land) PAHs are

[1] Right of way as defined by the Roads Act 2007

engaged in commercial activities which include ownership of movable (mobile) temporary structures (kiosks/sheds and stalls).

The project will lead to acquisition of land through easement (in locations where the pipeline traverses private land) as well as loss of crops and trees. In all the other remaining routes, the project will lead to loss of income of traders on the ROW during the construction period scheduled to take approximately 3-5 days.
Structures used by the traders are movable and temporary and will not be destroyed by the construction activities. PAHs with these types of structures on the ROW will move them away from the pipeline route temporarily until the excavation and laying of pipeline is completed after which they will move back to their original trading locations. The impact will thus be temporary economic displacement/relocation with no destruction of structures. There are no crops or trees or communal assets on the ROW where the traders are domiciled.

The project will therefore lead to physical and economic displacement of **5 PAHs** who are categorized as private land owners with formal title to the land as well as **264 PAHs** who are categorized as encroachers whose assets are on the RoW**.**

The physical and economic displacement of the encroachers is temporary with the PAHs in this category expected to reclaim their trading spots after the laying of pipes. They will be compensated for the loss of income for the number of days that they are unable to operate on the ROW.

The 5 land owners will also be physically and economically displaced because the project will not permanently acquire the land. By way of easements, the PAHs will be compensated for loss of uses to the land, however, they will be able to continue cultivation of crops and trees after the pipes have been laid. They will be compensated for loss of crops and trees as well as for restricted use on the area of land where the pipes will be laid.

The project will affect a total of **269** PAHs. **264 PAHs are categorized as encroachers. Out of the 264 PAHs, 6 are institutions while 258 are individual households**. There are 5 PAHs who have recognized land rights. A summary of project impacts in terms of number of PAHs affected by zone/area is presented in **tables below**.

Table 0-1: Summary of the affected persons

Description	**Number of PAHs**
Length of Pipelines (cumulative) in kilometers	64
Number of affected PAHs	269
Number of PAHs who lose land only	05
Number of Vulnerable persons	02
Loss of trees and crops	01
Partial Loss of land (Easement)	05
Cost of RAP	**Kshs. 928,800.00**

A summary of project impacts in terms of number of PAHs affected by zone/area is presented in the **Tables below;**

Table 0-2: Number of Project Affected Persons

Area	**Category of PAH**	**# of PAHs**
Blue Valley	Structure and Business Owners	03
Commercial	Structure and Business Owners	29
Gathugu	Land, Crop, Structure and Business Owners	29
Giakairu	Structure and Business Owners	42

Industrial Area	Structure and Business Owners	82
Kariandudu	Structure and Business Owners	08
Market	Structure and Business Owners	08
Sofia	Structure and Business Owners	68

Table 0-3: Number of Affected Land Parcels in Pipeline Route

LOCATION	SIZE OF LAND PARCELS (Ha)
Gathugu	0.198 Ha
Total Affected Land Size (Ha)	0.198

Impact on Community Access to Infrastructure and Social Services

The project route will have no impact on community access to infrastructure and social services.

Vulnerable Groups

Vulnerable PAHs are defined as individuals, groups, households, or communities who by virtue of gender, locality, age, physical or mental disability, economic disadvantage, or social and cultural status who may require additional support or assistance and will need help adjusting to changes introduced by the Project. Assistance will take the following forms, depending on vulnerable people's requests and needs:

- Additional 10 days income restoration compensation to cater for any construction related delays estimated to take 3 days.
- Assistance in the compensation payment procedure;
- Assistance in the post payment period to secure the compensation money;
- Assistance in moving: providing vehicle, driver and facilitation at the moving stage, providing ambulance services for disabled or inform persons during moving, and;
- Health care if required at critical periods;
- Priority in processing disbursement of compensation packages
- Moving and transition support or allowance during the relocation period.
- In the context of the Project, vulnerable people identified included the following as shown in Table 4 and 5 below:

Table 0-4: Vulnerable PAHs

VULNERABILITY	No.
Total PAHs	269
Vulnerable PAHs	02
Non Vulnerable PAHs	267

Table 0-5: Forms of Vulnerability

FORMS OF VULNERABILITY	No.
Single parent	00
Chronic Illness	00
Elderly	02
Disabled	00
Widow	00

Under the provisions of the RAP, vulnerable households will be provided with targeted assistance.

Grievance Management and Redress

Grievance Redress and Resettlement Committees

This RAP prefers the first level of grievance or conflict redress on RAP related issues as a result of this project and handles all forms of grievances in an amicable manner and as an alternative dispute resolution to judicial process, which is normally lengthy and costly. Grievances not resolved by the village level committees will be taken to the second level. In the affected villages as described above there will be a Village Grievance and Resettlement Committees and the membership will include:

- The sub locational chief,
- Assistant chiefs,
- One project affected youth,
- One project affected woman,
- One project affected male
- A representative of vulnerable PAHs,
- Business representative.
- MAWASCO representative
- Contractor representative (Works and Supervising Engineer)

Second Level: Sub County Mediation Committee
There will be a mediation committee at the Sub County level to handle grievances that cannot be resolved by the site level committees and membership will include:

1. One representative of the Administration; - National Government
2. One representative of County Administration; - County Government
3. One representative of MAWASCO;
4. One representative of the construction contractor, acting as an observer
5. Three representatives of the affected people, amongst them at least one woman, chosen i.e. from community-based organizations, elders, traders.

Neutral 3rd Party
The RAP proposes a neutral third party for resolving of grievances before resorting to third level of dispute resolution (justice). The RAP proposes the Commission For Administration of Justice/Ombudsman or Kenya National Commission for Human Rights (KNCHR) as the neutral third party arbitrator of disputes arising from this RAP implementation.

Third Level: Resort to Justice
In case this mechanism will not allow an amicable agreement to be reached, the complainant or the defendant can resort to Justice (and could at any time even without going through the established committees).

National Land Commission (NLC)
The Land Act 2012 empowers NLC to manage public land and carry out compulsory acquisitions of land for specified public purposes. NLC has been constituted and thus legally, NLC is supposed to provide approval to the request made by MAWASCO to acquire land. NLC is also expected to notify landholders in writing of the intention to acquire land; assist in resolving disputes related to compensation; undertake public consultation on intended acquisition; receive money from MAWASCO for actual payment of entitlement awards to PAHs. NLC holds the authority to execute compulsory acquisition in Kenya. The Government of Kenya bears the authority for land acquisition, which is vested on the NLC by legislation. It is important to note that the NLC also has statutory powers to prescribe criteria and guidelines for land acquisition.

The NLC has a grievance redress process mainly triggered at the time of award of compensation following public hearings. If a PAH is dissatisfied with the awards given by NLC, they have a right to appeal and NLC would look into the matter and determine justification. In the event that a PAH is not satisfied with the appeal made to NLC and the

resolution thereof, then dispute is resolved by resorting to the legal justice system where PAH could go to the environment and land court.

APPENDIX 8: LIST OF PEOPLE INTERVIEWED

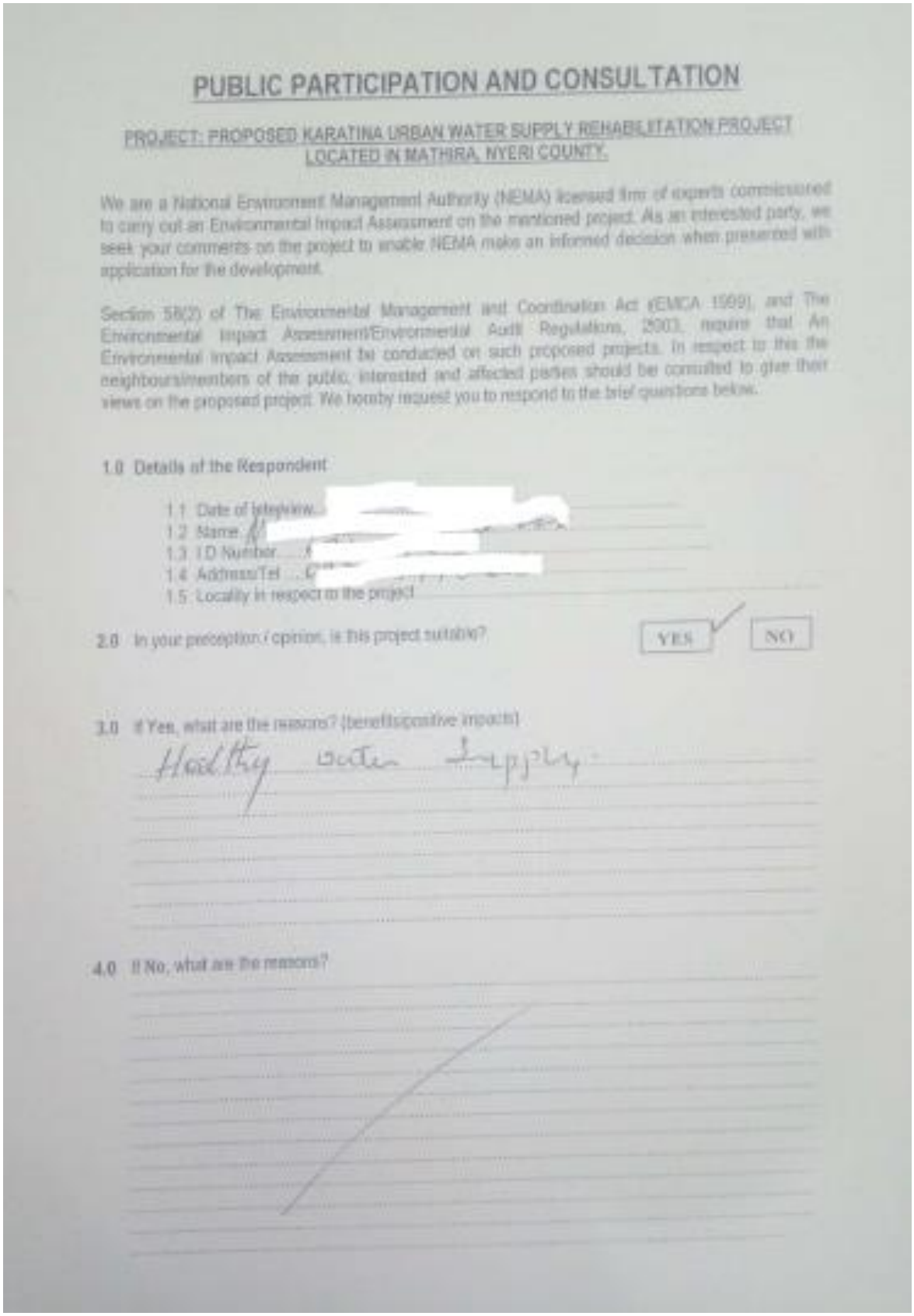
LIST OF PEOPLE/ INSTITUTIONS INTERVIEWED FOR THE PROPOSED KARATINA URBAN WATER SUPPLY REHABILITATION PROJECT

NAME	CONTACT	LOCATION
EDITH WAMBUI MURIUKI	0720336340	GATHUGU
VERONICA WANJIKU MUROKI	0714975410	GATHUGU
PETERSON MAINA	0725320237	GATHUGU
RICHARD MIANO	0724985616	GATHUGU
EVA NDIRANGU	0706738926	GATHUGU
MARY WANGECHI MURIITHI	0722499400	GATHUGU
ALICE NYOKABI	0725589831	MUTHUA
DENNIS MURIGU GATHU	0710345196	MUTHUA
GITHINJI .A. MURIITHI	0732733156	IRIA-INI
GEORGE KATHURIMA	0720412729	RAGATI ROAD
MERCY WANGECHI	0721524308	RAGATI ROAD
MIRIAM NJOKI	0724771124	KIAWARIGI ROAD
MURIUKI WERU	0719107498	MUTHUA
DAVID MURAGE MAINA	0722080509	KIAWARIGI ROAD
BONIFACE MATHENGE	0714025215	KIAWARIGI ROAD
FREDRICK WAHOME	0724773454	GATHUGU
JAMES MURAGURI	0703516772	UPPER GATHUGU
MARY IRUNGU	0718819835	RAFINA
HANNAH GATHII MUTHEE	0719306044	GATHUGU
PETER MUTHEE MWANGI	162-KARATINA	GATHUGU/MUTHUA
ALICE WAMUYU WANJOHI	0726808503	MUTHUA
JACKLINE NDUTA	0727759966	GATHUGU
DANIEL GACHANJA	114-KARATINA	UPPER MUTHUA
FRANCIS MWARIRI MWANGI	0704713627	KARINDUNDU ZONE
GRACE WANGU	0722649422	GATHUGU
JULIUS NDERITU KIRAKURA	0722595948	SOPIA
JACKSON MURIUKI MAINA	0720478925	MUTHUA
SAMUEL MWANGI MURIUKI	0728260524	MUTHUA
GLADYS MURIUKI	0729063006	MUTHUA
PATRICK KINGAU	0722661132	MUTHUA
JAMES WARUI	0724742314	IHWAGI
MARY WAMUYU	0728809843	MUTHUA
WACHIRA KAGOTHO	130 KARATINA	SIRON(GENERAL HOSPITAL)
DANCAN KIHATO	1470 KARATINA	GATHUGU
RUFUS MUTAHI MAHUGU	0722694121	KARINDUNDU
JUSTUS NJAGI	0725859312	KARATINA TOWN
NJERU DANIEL	0710305693	KARATINA

IRENE MAINA	0721986996	KARATINA
ANTHONY KARIUKI	0736780032	KARATINA TOWN
FRANCIS MUTHEE	0711657190	KARATINA TOWN
NDIRANGU SAMUEL	0721891001	KARATINA TOWN
DANIEL MWANGI	0710490898	KARATINA TOWN
WILSON .N. MATU	0722792544	KARATINA TOWN
WILFRED NDURIA KARANGI	0722309885	KARATINA
LILIAN MUTHONI	0727551381	KARATINA
JULIUS KARURUA	0708910692	KARATINA TOWN
WILSON MATHENGE	0724460828	SAIGON
NJERI WACHIRA	0727790431	KARATINA TOWN
NICHOLAS MUCHOKI	0722640980	COMMERCIAL STREET
ANTHONY MUTAHI	0727348552	BAKERY STREET
SUSAN WANGUI	1234 KARATINA	MUTHUA
SAMUEL GITHUI	0727571488	RAGATI
CHARLES WAMAI	0722512199	CHURCH ROAD
MARGARET MAINA	0725437127	KARATINA TOWN
BENSON MAINA	0728809828	CHURCH ROAD
CHARLES WAMBUGU	0711540966	KARATINA
CHARLES GITHEMA	1551 KARATINA	TOWN CENTER
MARY NJERI	0717285400	KARATINA
MARY N KINYUA	0717963213	KARATINA TOWN
PAUL K MURIITHI	0727327127	KARINDUNDU
MERCY WAMUYU	0729768646	UNJIRU
JOSEPH MARARO	0715390121	KIBAKI ROAD
CRISPUS NDII	0725865398	KARATINA TOWN
ANNLILY K MURIITHI	0720424712	KARATINA TOWN
	0724520788	RAGATI ROAD
WILLIAM MACHARIA	0711330917	KARATINA
STEPHEN WACHIRA M	0721896561	MUTHUA
HANNAH WANJIRU	0714189125	KARATINA TOWN
CLEMENT MAINA	0722802523	KARATINA TOWN
LUCY WANJIRU	0723835920	KARATINA CENTER
MAMA HUSSEIN	0714335576	KARATINA
PATRICK GICHIMU	1645 KARATINA	UPPER MUTHUA
JOHN GIKANDI	711 KARATINA	KARINDUNDU
SIMON MAINA	0720131214	MUTHUA
WACHIRA KAGOTHO	130 KARATINA	SIRON
CELESTINE MUNG'ALA	1369-01000	RAGATI
DUNCAN MULEI	501-10101	RAGATI
EVELYNE KIMARU	0700529343	SLAUGHTER HOUSE
PETER MWANGI	1470	KARATINA TOWN

PETERSON WAMWEA		RAGATI
JOHN MWANGI KAROKI	1297	KARATINA
MARTIN KAGENI	0729676676	KIE/SOPHIA ZONE
JARED ONDIEK	0720966851	RAGATI ROAD
WILSON ONYANGO	0703424035	RAGATI ROAD
JOYCE NYARUAI	0720691436	RAGATI ROAD
JANET WAMBUI	0710180461	RAGATI ROAD
DAVID MURIUNGI (ELEPHANT CASTLE)	0721377598	RAGATI ROAD
PETER CHEGE(STARBUCKS No 152)	0721466577	KARATINA TOWN
JAMES M ISSAC	732 KARATINA	KARINDUNDU
JOHN NJUE	0720098230	KARINDUNDU
GODFREY MUTAHI	0736536080	KARINDUNDU
JAMES NGARI	110 KARATINA	KARINDUNDU
TABITHA NYOKABI	0723156385	KARATINA TOWN
STEPHEN NDII(HOSTEL BROOKLYN)	0728363004	KARINDUNDU
LILIAN MAINA	0706955909	KARINDUNDU
LUCY WAMUYU	74 KARATINA	KARATINA TOWN
WARUTERE NGATIA	0722349066	KARATINA TOWN
LUCY WAMUCII	0727259622	KARATINA TOWN
EDITH MBOGO	0710181712	CHRISCO LINE
MIRIAM MAINA	0725884489	KARINDUNDU
GRACE WANGECHI	0727007939	CHRISCO LINE
LOISE MAINA	0720588780	SALAMA MILLERS
PAUL MAINA WANGECHI	0720954822	MWANDA
GLADYS NGENDO	0720834541	KARINDUNDU
ESTHER KIRAGU	1030 KARATINA	KARINDUNDU
W MUCHIRI	1819 KARATINA	GATHUGU
JANET WANGUI	0714519600	KARINDUNDU
JUDY MURUGI	0712960323	KARATINA TOWN

APPENDIX 9: QUESTIONNAIRE



PUBLIC PARTICIPATION AND CONSULTATION

PROJECT: PROPOSED KARATINA URBAN WATER SUPPLY REHABILITATION PROJECT LOCATED IN MATHIRA, NYERI COUNTY.

We are a National Environment Management Authority (NEMA) licensed firm of experts commissioned to carry out an Environmental Impact Assessment on the mentioned project. As an interested party, we seek your comments on the project to enable NEMA make an informed decision when presented with application for the development.

Section 58(2) of The Environmental Management and Coordination Act (EMCA 1999), and The Environmental Impact Assessment/Environmental Audit Regulations, 2003, require that An Environmental Impact Assessment be conducted on such proposed projects. In respect to this the neighbours/members of the public, interested and affected parties should be consulted to give their views on the proposed project. We hereby request you to respond to the brief questions below.

1.0 Details of the Respondent

1.1 Date of Interview...
1.2 Name ...
1.3 I.D Number ...
1.4 Address/Tel ...
1.5 Locality in respect to the project

2.0 In your perception / opinion, is this project suitable? YES ✓ NO

3.0 If Yes, what are the reasons? (benefits/positive impacts)

Healthy water supply.

4.0 If No, what are the reasons?

5.0 Do you think the project will have any adverse Negative (Harmful) Effect on any of the following items?

ITEMS	YES	NO
a) Local residents		✓
b) Natural ecology of the area		✓
c) Areas of historic or cultural importance, Recreational and leisure facilities (if any)		✓
d) Public health and safety (noise levels, wastewater, emissions to the air, dust or smells)		✓
e) Water resources and quality		✓
f) Socio – Economic activities		✓
g) Infrastructures (transport, energy etc)		✓
h) Others		✓

If your answer to any of the above questions is YES, state the reason

.....

6.0 Give any additional comments concerning the project. If any alternatives possible, please suggest

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Sign .....

Thank you for your participation

Mazigira and Engineering Consultants Limited
P.O. Box 0857 01000
Tel: 0721203099
Email Mazigiramd@gmail.com