Ministry of Water, Sanitation and Irrigation

CONDITIONAL LIQUIDITY SUPPORT GRANT (CLSG) II PROJECT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STUDY REPORT

The construction of 20.5km of HDPE pipeline and **Installation of Bulk & Consumer Water Meters in Maragua Ridge, Kambiti & Igikiro**

Murang'a Water and Sanitation Company (MUWASCO) – Murang'a County

DECEMBER 2024

PROPONENT	EIA LEAD EXPERT
Murang'a Water and Sanitation Company (MUWASCO) P.O. BOX 1050 – 10200, Murang'a	Eng. James Wainaina NEMA Reg. No.: 1042 P.O Box 4356 – 00506 Nairobi Tel.+254722987824

CERTIFICATION

This ESIA Report has been prepared in accordance with the Environmental Management and Coordination Act (EMCA) 1999 and the Environmental (Impact Assessment and Audit) Regulations 2003 for submission to the National Environment Management Authority (NEMA).

Report Title: Environmental Impact Assessment (ESIA) Study for the proposed construction of 20.5km of HDPE pipeline and Installation of Bulk & Consumer Water Meters in Maragua Ridge, Kambiti & Igikiro for Murang'a Water and Sanitation Company (MUWASCO)

Proponent: Murang'a Water and Sanitation Company (MUWASCO)

Activity: Preparation of Environmental Impact Assessment (ESIA) Study for the proposed construction of 20.5km of HDPE pipeline and Installation of Bulk & Consumer Water Meters in Maragua Ridge, Kambiti & Igikiro for Murang'a Water and Sanitation Company (MUWASCO)

Name and Address of EIA Expert
Eng. James Wainaina (**NEMA Registration No.:** 1042)
P.O Box 4356 – 00506 Nairobi

Signed: _____ Date: 13/02/2025

Name and Address of Proponent
Managing Director: NGANGA DANIEL
Murang'a Water and Sanitation Company (MUWASCO)
P.O. BOX 1050 – 10200, Murang'a

Signed: _____ **Date:** 13/02/25

i

ABBREVIATIONS AND ACRONYMS

CIDP	County Integrated Development Plan
CLSG	Conditional Liquidity Support Grant
DOSHS	Directorate of Occupational Safety and Health and Services
EIA	Environmental impact assessment
ESA	Environment Social Assessment
ESIA	Environmental and social impact assessment
ESHS	Environmental, Social Health and Safety Guidelines
ESMF	Environment and Social Management Framework
ESMMP	Environmental and Social Management and Monitoring Plan
FGD	Focus Group Meetings
GDP	Gross Domestic Product
GoK	Government of Kenya
GRM	Grievance Redress Mechanism
HASP	Health and Safety Plan
HIV/AIDS	Human Immuno-deficiency Virus
KNBS	Kenya National Bureau of Statistics
LA	Land Act
MUWASCO	Murang'a Water & Sanitation Company
MDG	Millennium Development Goal
MOWSI	Ministry of Water Sanitation and Irrigation
NEMA	National Environment Management Authority
NEP	National Environment Policy
NGO	Non-Governmental Organization
NLC	National Land Commission
OP	Operational Procedures
OS	Operational Safeguards
PAP	Project Affected Person
PPE	Personal Protective Equipment
RAP	Resettlement Action Plan
RPF	Resettlement Policy Framework
SEA	Sexual Exploitation and Abuse
SGBV	Sexual and Gender Based Violence
STDs	Sexually Transmitted Diseases
ToR	Terms of Reference
WASREB	Water Services Regulatory Board
WB	World Bank
WHO	World Health Organization
WRA	Water Resources Authority
WSDP	Water and Sanitation Development Project
WSP	Water Service Provider
WSTF	Water Sector Trust Fund
WTP	Water Treatment Plant

EXECUTIVE SUMMARY

1. PROJECT BACKGROUND

The Ministry of Water, Sanitation and Irrigation (MoWS&I) is implementing the Water and Sanitation Development Project (WSDP) with a credit from the International Development Association (IDA) that aims at improving water supply and sanitation services in selected regions in Kenya through the Water Service Providers (WSPs). The Project Development Objective (PDO) is to improve water supply and sanitation services in select Coastal and Northeastern regions in Kenya and improve the financial performance of Water Service Providers (WSPs) affected by the COVID-19 pandemic. Murang'a Water and Sanitation Company (MUWASCO) has been identified as one of the WSPs with potential to achieve financial recovery within a period of less than 12 months and therefore eligible to receive the support under the Conditional Liquidity Support Grant (CLSG) II Program.

Murang'a Water and Sanitation Company (MUWASCO) was established in 2006 as a body corporate with a mandate of providing water and sewerage services to Murang'a town and its environs. The Water Services Provider (WSP) is wholly owned by the County Government of Murang'a. The core functions of MUWASCO are:

- To source, treat and manage Murang'a Towns water supply & sewerage services as well as in other areas as licensed by WASREB.
- Supplying good quality water in sufficient quantities to meet various needs while ensuring, safe disposal of wastewater and environmental protection.
- Billing and collection of water and sewerage revenues.
- Allocation of water in a sustainable, rational and economic way to customers.

MUWASCO's area of coverage includes Murang'a town and its environs. The total area covered is 195 Kilometers square with an estimated population of about 175,000 people. The area covered includes Mbiri, Township, Kimathi, Mugoiri, Kambiti, Nginda, Ichagaki and parts of Kamahuha wards. Currently, MUWASCO has over 25,137 registered connections out of which 22,344 are active. The main water source is Kiawambeu with a production capacity of 18,800m3/day but currently producing 11000m3/day, Kayahwe which produces 4000m3/day and Gakoigo bulk water treatment plant in Maragua with a production capacity of 15,000 m3/day. The Company operates Karii Sewerage treatment facility which services 4000 sewerage connections. MUWASCO has its head office in Murang'a town, at the junction of Nairobi – Murang'a road and Kangema road.

MUWASCO has proposed the construction of a new 20.5km DN 32-90 HDPE pipeline to serve Maragua Ridge, Kambiti and Igikiro areas of Maragua Sub- County in Murang'a County. The project will also include the supply and installation of 62 No. DN40 – 400 bulk and 1,200No. DN 15 consumer water meters under the CLSG II Program. The implementation of such a development project will generate positive socio-economic benefits but may also have adverse impacts to human community and environment. Thus, in compliance with the requirements of the Environmental Management and Coordination Act (EMCA) 1999, an Environmental and Social Impact Assessment (ESIA) should be prepared which will be approved by NEMA and the World Bank prior to the implementation of the project. The main aim of the ESIA study is to carry out an Environmental and Social Impact Assessment for the proposed project activities. This report presents the findings on the anticipated environmental and social impacts and makes recommendations on the relevant mitigation measures aimed to prevent and reduce adverse impacts. An Environmental, Social Management and Monitoring Plan (ESMMP) has been formulated in this report to ensure that the proposed mitigation measures will be implemented effectively.

2. PROJECT DESCRIPTION/PROJECT ACTIVITIES

Proposed Project Location

The poposed project is located Maragua Sub-County of Murang'a County and will cover Maragua Ridge, Kambiti, and Igikiro areas. The source of water for the proposed pipelines extension is the recently commissioned Gakoigo Bulk Water Treatment Plant with a water production capacity of 15,000M^3/day.

Proposed Scope of Works

The summarized Scope of Works for the proposed project include:

- Construction of 20.5km of HDPE pipeline.
- Installation of 1200nr DN15 Water meters, 62nr DN40-400 bulk meters.

The estimated cost of the proposed project is **KES 21,090,800**

According to the Environmental (Impact Assessment and Audit) (Amendment) Regulations, 2019 the above interventions are Medium Risk projects that will require a Comprehensive Project Report (CPR) to be completed in accordance with the requirements of Part II of the Environmental (Impact Assessment and Audit) Regulations, 2003. Additionally, the identification and management of environmental and social issues associated with the proposed interventions is expected to be in accordance with the triggered World Bank Operational Policies to meet the lender's requirements.

3. OBJECTIVES OF THE ESIA STUDY

The Environmental & Social Impact Assessment (ESIA) is expected to achieve the following objectives:

- Generate baseline data for monitoring and evaluation of how well the mitigation measures will be implemented during the project cycle.
- Communicate the ESIA process for the proposed Project and the alternatives considered.
- Ensure that the impacts identified during the ESIA process are assessed.
- Present the mitigation and enhancement measures which will be implemented by the Project to manage impacts identified.
- Provide a record of comments and responses received from Interested and Affected Parties (I&APs) during the ESIA process.
- Facilitate an informed decision-making process by the relevant authorities.
- Recommend cost effective mitigation measures against the expected impacts.

4. SCOPE OF THE ESIA STUDY

The ESIA study has been undertaken by the Consultant with the intention of collecting enough and relevant information inherent to ensure the production of an ESIA document including an Environmental, Social Management and Monitoring Plan (ESMMP). The scope of the ESIA study is:

- Detailed Project's descriptions.
- Description of the Baseline Environment.
- Stakeholders Engagement.
- Description of the Relevant National and International Legislative and Institutional Regulatory Framework.
- Identify all potential significant environmental and social impacts of the proposed Project and recommend measures for mitigation.
- Cumulative Impact Assessment.
- Assessment of the Project's alternatives.

- Development of Environmental, Social Management & Monitoring plan to avoid, mitigate and where not possible, offset the identified impacts to ensure sustainability of the proposed Project.

5. METHODOLOGY UTILIZED

The general methodology utilized has focused on:

- In-depth review of existing literature on the project.
- Field surveys conducted for gathering baseline conditions on physical, biological, and socio-economic environment.
- Observations for appreciation of impacts likely to be generated during project implementation.
- Consultations with different stakeholders and public for socioeconomic information and getting their opinions and expectations about the project.

6. POLICY-LEGAL AND INSTITUTIONAL FRAMEWORK

The proposed project has undergone a comprehensive review of relevant national laws, policies, plans, and strategies, as well as international conventions to assess their applicability to the project and highlight their relevance. The national statutes and legislation that were reviewed include:

- Constitution of Kenya 2010
- Water Act, 2016
- Environmental Management and Coordination Act (EMCA), 1999
- Occupational Safety and Health Act (OSHA 2007)
- The Public Health Act
- Work Injury Benefit Act 2007
- Labour Relations Act 2012
- Climate Change Act of 2016
- Land Act, 2012
- Public Participation Bill of 2023
- The Environmental (Impact Assessment and Audit) Regulations, 2003
- Environmental Management and Coordination (Water Quality) Regulations, 2006
- (Waste Management Regulations, 2006
- Noise and Excessive Vibration Pollution (Control) Regulations, 2009
- The Environmental Management and Coordination (Air Quality Regulations 2014)

The ESIA Study has considered the World Bank's Safeguards Policies (SPs), which aims to protect the environment and people from potential adverse impacts and ensure the sustainability of project outcomes.

Applicable World Bank Operational Policies

Safeguards Policy	Provision	Relevance to the Project
World Bank OP 4.01 on Environmental Assessment	Provides for 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	An Environmental and Social Impact Assessment of the development/rehabilitation of water supply schemes will be carried out.

World Bank OP 4.11 on Physical Cultural Resources	Provides for measures to protect cultural heritage from the adverse impacts of project activities and support its preservation.	No physical cultural resources were identified within the project areas. However, the ESIA has provided chance find procedures to be adopted by the contractor during civil works.
World Bank OP 4.12 on Involuntary Resettlement	The World Bank Involuntary Resettlement Policy OP 4.12 covers direct economic and social impacts that result from Bank-assisted investment projects.	The pipelines shall be installed along the provided wayleaves on the public roads. Social screenings along the wayleaves have been undertaken and confirmed that the proposed project does not involve any resettlements of PAPs. However, 44 PAPs will be affected during the installation of pipelines due to temporary disruptions of the livelihood income activities. Consultations with Road Agencies (KENHA, KERRA, KURA & County Roads) have been done to establish the requirements for the necessary permits to install pipelines on the road reserves. The application forms and requirements from the Road Authorities have been attached in the ESIA Report as Annex V.

International Conventions and Treaties

Kenya is signatory to several international conventions and treaties that would need to be adhered to in implementing this project and are geared towards environmental protection and conservation. Some of these include:

- International Convention on Biological Diversity (1992)
- Ramsar Convention 1971
- The United Nations Framework Convention on Climate Change (UNFCCC)
- Convention on the Elimination of all forms of Discrimination against Women (CEDAW)

7. BASELINE CONDITIONS IN THE PROJECT AREA

Under this chapter, physical and biological environmental conditions prevailing within the project's circumscription as well as socio-economic profile in the administrative entities covering the project were considered to understand the current conditions of the project areas.

Baseline Bio-Physical Environment:

The baseline bio-physical environment of the project area for the Project comprises various natural features and ecosystems. The following aspects provide an overview of the baseline bio-physical environment:

- Topography and Geology.
- climate, Water Resources.
- Vegetation and Land Cover.
- Biodiversity.

Baseline Socio-Economic Environment:
The baseline socio-economic environment encompasses the social and economic aspects of the project area. The following elements provide an overview of the baseline socio-economic environment:

- Population and Settlements.
- Economy and Livelihoods.
- Infrastructure and Services.
- Social and Cultural Aspects.

8 STAKEHOLDERS AND PUBLIC CONSULTATIONS

As part of the ESIA preparation for the proposed Project, the ESIA Study Team conducted several stakeholder consultations to gather valuable input and address concerns. Public consultation process was undertaken between 16/06/2024 and 19/06/2024 through relevant Key Informant Interviews i and public meetings at Igikiro and Samar Locations in Maragua Sub-County. These meetings were aimed at introducing the project to the residents, gathering their views and concerns related to the project and incorporating their views into the Study Report.

Key Informant Interviews
The key informant consultations were conducted on the 16th & 17th June 2024. The method used to carry out consultations took into consideration the profile of the stakeholders, type of information desired and level of engagement. Each primary key stakeholder was visited at their offices.

Key Informants

- Technical Manager – MUWASCO
- Ward Administrator – Maragua Ridge Ward
- Maragua Sub-County Public Health Officer
- Maragua Sub-County Water Officer
- KENHA Roads Maintenance Engineer – Muran'ga County
- KURA County Roads Engineer – Murang'a County
- KERRA Roads Engineer – Murang'a County
- County Engineer (Roads & Public Works) –Murang'a County
- Area Chiefs &Assistant Chiefs in Maragua Ridge, Gakoigo, Kambiti & Igikiro
- Community Leaders in the Project areas

The outcome of the Key Informant Interviews is summarized below:

	Key informant interviewed	**Summary of remarks**
1	Technical Manager – MUWASCO	- Currently, water is supplied to a few households and the proposed pipeline extension will allow additional connections. - In addition, business premises, public & private institutions in Maragua Town and the environs will be supplied with adequate water.
2	Commercial Manager – MUWASCO	- With the extension of water supply pipelines and installation of meters, revenue generation for MUWASCO will increase.
3	Sub-County Water Officer (Maragua Sub-County)	- The proposed interventions will increase water supply to not only to the area residents, but also to the

		schools, health centres and small businesses such as hotels & bakeries operating in Maragua Town.
4	Sub-County public Health officer (Maragua Sub-County)	- Improved access of clean drinking water for the residents will significantly reduce cases of water borne diseases.
5	Ward Administrator – Maragua Ridge Ward	- Increase water supply will support in the dairy farming which is a source of income for the area residents.
6	KENHA Roads Maintenance Engineer – Muran'ga County	- Enquired if the proposed pipelines will be installed along the Kenol – Murang'a C71 Road - Upon scrutinizing layout plan for the proposed pipelines, confirmed that no pipelines will be installed on KENHA managed roads
7	KURA County Roads Engineer – Murang'a County	- The Project proponent will have to make application to KURA for permit to install the proposed pipelines. - The application should be accompanied with survey plans indicating the actual location of the pipelines and payments to KURA for the permit. - KURA will provide support for the project since the Town needs water for human consumption and other economic activities.
8	KERRA Roads Engineer - Murang'a County	- Noted that most of the proposed pipelines will be installed on the KERRA road reserves. - The roads road reserves have adequate areas for installation of public utility infrastructure. - The proponent to ensure that permits are obtained from KERRA for the various pipelines. - No cutting of the road carriageway will be permitted. For any road crossings, only micro-tunnelling is allowed under the supervisions of KERRA.
9	County Engineer (Roads & Public Works) –Murang'a County	- Some pipelines sections will be installed within County maintained roads. - Requested the proponent to ensure the pipes are installed at the edges of the utility wayleave and at depths exceeding 1m to avoid damages during the maintenance of the rural roads.
10	Chief - Gakoigo Location	- Locals will benefit from employment opportunities during construction of the project. - Since the pipelines will be installed along the road reserve, there shall be no conflicts regarding land matters as it happens with other public projects. - The small businesses within Maragua Town as well as nearby schools will benefit from the project.
11	Representatives of Business Community – Mr Daniel Kairo	- Maragua Town has experienced lack of water for many years forcing many businesses to relocate to Murang'a and Kenol Towns.

		- If water supply can be improved, then more businesses would reopen.
12	Representatives of informal, small & medium business owners within the proposed Project areas.	- Purchase of materials for construction purposes such as sand, building blocks, cement and even PVC pipes should be made from the various hardwares in Maragua Town to boost the traders when the project starts.

Project Areas Community Consultations

Consultations were conducted with local area residents including existing and potential beneficiaries of the proposed Project. This was through public barazas at Igikiro and Samar (Maragua Ridge) on the 19th June 2024. The number of participants at the Igikiro public meeting was 26 while at the Samar public meeting, there were 26 participants. The purpose of these consultations was to ensure that the concerns and perspectives of those directly affected by the project were considered. The stakeholder consultations played a crucial role in the ESIA process, enabling the consulting team to understand the diverse perspectives, address concerns, and incorporate local knowledge and expectations into the environmental and social management planning of the proposed Project. Some of the key concerns and issues raised by stakeholders included:

- Employment opportunities – The local residents demanded that majority of the local youths should be given employment opportunities.
- The Contractor should uplift the area businesses by procuring construction materials such as cement, steel, timber and even water pipes from the local hardware shops.
- Residents wanted to know when the construction of the proposed will begin and if the Government had allocated adequate funds for the Project.
- There is confusion on which Water Services Provider between Murang'a Water & Sanitation Company (MUWASCO and Murang'a South Water & Sanitation Company (MUSWASCO) is mandated to distribute water in Maragua Sub-County.
- Residents wanted to know if water tariffs will be reduced most of the people could not afford the high tariffs and are forced to get untreated water from steams and shallow wells.
- Maragua Town residents wanted to know if there are plans for a sewerage system for the town to handle the increased wastewater from the increased supply of water.
- The local communities fully support the implementation of the proposed project and urged the Government to fast track its implementation.

9. POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS

The observations from field visits and the perspectives of the residents & leadership as well as from other stakeholders were assessed and considered.

Positive Impacts

The positive impacts that the proposed project will bring are summarized in the table below:

Table 0-1 Summary of positive impact due to project implementation Impacts

Impact Category	Positive impacts due to project implementation
Employment Opportunities	- Employment opportunities for unskilled and skilled from local communities during constructions of the proposed Project.

	- Technical skills will be gained by the local people who will be employed by the project, and this is likely to contribute to their enhanced capacity and skills to undertake such construction activities in future.
Project Area Economic Growth	- Market for construction materials such as sand, cement, and ballast for the local hardwares. - Increased property values and attractiveness for investment due to improvement of water supply in the Project areas. - Stimulating growth in related small-scale industries and businesses. - Availability of water will improve livestock watering and milk production in the area hence contributing to improvement in both household income and nutritional security. - Implementation of the project will provide an opportunity to access to improved water supply hence reducing time and distance travelled to fetch the commodity particularly by women and the girl child.
Public Health Improvement	- Improved hygiene conditions and standards among residents through provision of treated safe water. - Increased access to clean and safe water for the local population will contribute to decline in cases of water-borne diseases.

Negative Impacts

Below is a summary of the significant risks and impacts identified, and their proposed mitigation measures:

Table 0-2 Summary impacts and mitigation matrix

Impact	Summary of Mitigations
Slope stability during trenching for pipelines and excavations for construction works.	- Manual labour shall be used for trenching & backfilling for pipelines and other excavation works in the steep slope areas. - Supporting the sides of the excavation with wooden planks to prevent cave-ins.
Soil erosion and Siltation of Surface Water Resources .	- Contractor shall ensure that excavated earth materials are used for backfilling the pipeline trenches. - Dumping any un-used excavated materials in designated offsite grounds.
Air Quality Degradation	- Restricting traffic speed of machines and vehicles as well as regular watering of dusty roads. - The contractor will ensure proper repair and maintenance of vehicles and equipment to minimize exhaust gases. - Construction workers will be provided with dust masks to mitigate against occupational health risks of inhaling exhaust gases and dust.
Noise emissions by construction equipment and activities	- Use of noise abatement equipment for machinery; Limit construction activities to daytime only. - Switch off noisy equipment when not in use. - Provide PPE such as earmuffs to workers at the site as necessary.

Water Quality Degradation	- Oils and greases emanating from repair and maintenance of vehicles & machinery will be collected in containers to avoid entry into local drainage channels. - Water from cleaning of vehicles & equipment will not be discharged into water courses. - Implement soil erosion control measures to prevent pollution of streams and rivers.
Generation of liquid and solid wastes	- Contractor to provide solid waste collection facilities (waste bins) for the temporary storage of wastes prior to disposal at an appropriate and designated location. - The contractor will also liaise with the County government and the local NEMA office for direction on licensed waste collectors and suitable dumping sites for generated wastes. - The contractor will also sensitize construction workers on proper disposal of wastes.
Loss of Flora and Fauna	- Ensure that clearing of any vegetation is limited to the pipeline trench area (i.e. 0.5 meters width maximum) within the road reserve and that transportation of construction materials is done through the existing local roads. - Use of non-mechanized methods of excavations & construction methods whenever possible. - Spare the vegetation that must not necessarily be removed such as trees and shrubs. - Re-plant the indigenous vegetation once work is completed.
Interruption of Existing Infrastructure	- The project proponent will apply for authorization from relevant National & County authorities and other utilities services providers when interfere with existing infrastructure become necessary during the construction activities. - The contractor will immediately restore the damaged sections of roads and water supply networks to pre-construction conditions.
Temporary interruption of business activities during the installation of pipelines and loss of livelihood income to the PAPs.	- Creating awareness, informing all community members along - the pipeline routes. - Preparation PAPs Compensation Entitlement Matrix. - Compensation of the Project Affected Persons.
Temporary removal of assets during the excavations for installation of pipelines.	- Valuation of affected assets. - Full restoration of the affected assets to their original status. - Compensation for the PAPs for non-use of the assets during the interruption period.
Effect on income generating activities	- Compensations for disruption of income generating activities located along the proposed pipelines routes within the road reserves. - Restorations of assets affected during the construction activities along the road reserves.

Impacts on public health and safety (Construction workers & Project areas residents)	- The contractor will erect the appropriate safety signage along the construction routes and sites cautioning against various health and safety risks and prescribing particular mandatory actions. - Contractor will deploy a trained health and safety officer for the duration of the construction works. - Contractor will provide First Aid Kit within the construction sites. - All construction workers will be required to wear Personal Protective Equipment (PPE). - The workers will be sensitized through trainings, on health and safety standards they should observe. - Ensure that all construction machines and equipment are in good working conditions and to manufacturer's specifications to prevent occupational hazards.
HIV /AIDS & other communicable diseases	- A comprehensive HIV/AIDs & other communicable diseases sensitization programme will be formulated to create awareness among construction workers and the local community. - Use of existing clinics to provide VCT services to construction workers.
Sexual Exploitation and Abuse (SEA) & Gender-Based Violence (GBV)	- Contractor to develop and implement code of conduct, signed by all workers. - Contractor to provide training and awareness programs to project contractor's staff, and community members on GBV and sexual harassment prevention and reporting. - Collaborations with local communities, leaders, and women's groups to address concerns related to GBV and sexual harassment. - Collaboration with local law enforcement and authorities to address and prevent GBV incidents. - Implementation of clear and confidential reporting mechanisms for any incidents of GBV or sexual harassment.
Child Labour and Protection	- Ensure no children are employed on site in accordance with national labour laws. - Ensure that any child sexual relations offenses among contractors' workers are promptly reported to the police.
Effects of Immigrant Workers	- Contractor should use the local workforce as much as possible. - Effective community engagement and strong grievance mechanisms on matters related to labour.

10. ENVIRONMENTAL, SOCIAL MANAGEMENT & MONITORING PLAN (ESMMP)

The ESIA study has identified some minor negative social and environmental impacts of the sub-project but also socio- economic benefits to the communities. The potential negative impacts will be minimized through the implementation and rigid monitoring of the recommendations as set out in the ESMMP. The Environmental and Social Management Plan (ESMP) has addressed the environmental and social safeguards issues arising during the implementation of the project and the post construction maintenance period. The ESMMP will be the guidance document to be continually referred to during the construction, maintenance, and operation phases of the project. The ESMP should therefore be included in bidding documents and compliance clearly emphasized in the contract documents.

The contractor will be required to fully comply with implementation of the ESMP. The contractor will be required to submit a detailed Construction Environmental & Social Management Plan (C-ESMP), which comply with the ESMP, prior to mobilization to the construction sites. The Contractors will also be required to prepare constructions Method Statements that will be task-specific after undertaking specific risk assessments. Among the Key Staff of the Contractor will be an Environmental and Social Safeguard officer with the necessary qualifications and experience to manage the implementation of ESMP. The Contractor's E&S officer will full time and site based during the implementation of the Project. Among the key responsibilities of the Contractor's E&S officer will include:

- Managing the implementation of ESMP with strict compliance of the provisions.
- Preparation of regular progress reports (weekly, monthly or quarterly) as applicable, on the implementation of ESIA including incidents reports and mitigations.

The Project Proponent (MUWASCO) shall ensure that the implementation of the Environmental and Social Management Plan (ESMP) is effectively executed and that adequate resources have been provided. MUWASCO have an Environmental and Social Safeguards Officer within its establishment who will be responsible for supervision and monitoring for compliance of the ESMP implementation and reporting. The responsibilities of MUWASCO will include:

- Responsible for day-to-day coordination and implementation of the project & ESMP.
- Ensure the grievance committees are established and working.
- Monitor the ESMP implementation.

Roles of the proponent's Environmental and Social Safeguards Officer:

- Ensure compliance to proposed ESMP by the contractor.
- Ensure review of ESMP is up to date.
- Carry out periodic audits of the ESMP to ensure that its performance is as expected.
- Preparation and submission of ESMP implementation Reports.

Monitoring of the ESMP implementation will include site inspections, reporting and photographic documentation designed to assess and record the contractor's compliance with the ESMP and other applicable regulations. It is also anticipated that additional inspections would be required in response to complaints and issues raised by local communities.

11. PROJECT AFFECTED PERSONS

The total number of Project Affected Persons (PAPs) enumerated along the proposed water pipelines routes is 44 PAPs. The PAPs are mainly those whose businesses will be temporarily interrupted during the installation of pipelines within Maragua Town CBD area due to blockage of access to the business premises. Other identified PAPs are those carrying out various small-scale businesses and a few who have cultivated crops and napier grass on the road reserves. However, loss of land will not be triggered under this Project.

12. PROJECT ALTERNATIVES

Selected Area:

Different potential areas for implementing the project were evaluated. Factors such as proximity to the water source, accessibility, terrain characteristics, and socio-economic considerations were considered.

No-Project Alternative:
The no-project alternative was also assessed as part of the evaluation process. This alternative considers the scenario where the proposed Project is not implemented. The potential consequences, such as the continued lack of access to safe drinking water, socio-economic implications, and environmental impact, were evaluated to highlight the necessity and importance of the project. Based on the evaluation of these alternatives, the preferred option was selected i.e to implement the proposed Project. The chosen design and construction techniques adhere to established standards to ensure the sustainability and longevity of the infrastructure. The project's socio-economic significance, location and the need for improved water infrastructure were key factors that justified the selection of the preferred alternatives.

13. CONCLUSION

The result of the ESIA study has indicated that there are no significant and permanent negative impacts likely to be generated by activities of the proposed project. All potential negative impacts identified are either short-term or may be easily and safely mitigated. The overall positive impacts of water provision to the residents, weighed against the potential negative impacts make this project positive overall. To address the possible negative environmental impacts, the ESIA Study has developed a comprehensive environmental management and monitoring plan that will ensure environmentally sustainable development.

Recommendations

- The project is recommended for implementation provided that the mitigation measures identified in the study for the potential negative impacts are implemented. The recommendations will also form part of NEMA License that will be issued for the Project.
- Compensations for the identified Project Affected Persons be affected prior to commencement of construction works on the Project.
- A Provisional Budget of **KES 2,600,453** that is required for implementation of mitigation measures of potential negative environmental should be included in the Project Implementation costs. This amount includes **KES 610,435** for the restoration of Affected Assets and compensations for PAPs due to loss of livelihood income during installation of pipelines.

CERTIFICATION.....i
ABBREVIATIONS AND ACRONYMS.....ii
EXECUTIVE SUMMARY.....iii
I INTRODUCTION.....1
1.2 JUSTIFICATION FOR THE ESIA.....2
1.3 OBJECTIVES OF THE ESIA STUDY.....2
1.4 SCOPE OF THE ESIA STUDY.....2
1.5 APPROACH AND METHODOLOGY OF THE STUDY.....2
2 PROJECT DESCRIPTION.....6
2.1 PROJECT AREA DESCRIPTION.....6
2.2 PROPOSED PROJECT OBJECTIVES.....7
2.3 DESCRIPTION OF THE PROPOSED PROJECT'S CONSTRUCTION ACTIVITIES 7
2.4 MATERIALS FOR THE CONSTRUCTION WORKS.....9
2.5 ANTICIPATED WASTE MATERIAL AND BY-PRODUCTS.....9
2.6 LABOUR.....9
2.7 CONSTRUCTION MACHINES/EQUIPMENT.....9
2.8 ESTIMATES COST OF THE PROJECT.....10
3 POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK.....11
3.1 POLICY FRAMEWORK.....11
3.2 LEGAL FRAMEWORK.....14
3.3 INSTITUTIONAL STRUCTURE OF THE WATER SECTOR.....17
3.4 INSTITUTIONAL STRUCTURE – ENVIRONMENTAL.....19
3.5 SECTORAL INTEGRATION.....20
3.6 WORLD BANK OPERATIONAL PROCEDURES.....20
3.7 THE WORLD BANK SAFEGUARDS.....21
3.8 RELEVANT INTERNATIONAL CONVENTIONS AND TREATIES.....23
3.9 HARMONIZATION OF BOTH WB AND GOK REQUIREMENTS FOR SOCIAL AND ENVIRONMENTAL SUSTAINABILITY.....24
3.10 PROJECT IMPLEMENTATION INSTITUTIONAL STRUCTURE.....25
4 ENVIRONMENTAL AND SOCIAL BASELINE CONDITIONS.....26
4.1 PROJECT LOCATION.....26
4.2 PHYSICAL ENVIRONMENT.....26
4.3 SOCIAL ECONOMIC SURVEY.....27
5 PUBLIC PARTICIPATION AND CONSULTATIONS.....30
5.1. INTRODUCTION.....30
5.2. STAKEHOLDERS AND PUBLIC CONSULTATIONS OBJECTIVES.....30
5.3 THE CONSULTATIVE PROCESS ADOPTED.....31
5.4 KEY INFORMANT INTERVIEWS.....31
5.5 PROJECT AREA COMMUNITY CONSULTATIONS.....34
5.6 PUBLIC DISCLOSURE OF THE ESIA.....34
6 ENVIRONMENTAL AND SOCIAL IMPACTS.....35
6.1 INTRODUCTION.....35
6.2 TYPES OF IMPACTS.....35
6.3 POTENTIAL IMPACTS IDENTIFICATION AND ASSESSMENT.....36
6.4 POSITIVE IMPACT DURING CONSTRUCTION PHASE.....36
6.5 NEGATIVE SOCIAL IMPACTS DURING CONSTRUCTION PHASE.....37
6.6 IMPACT ENHANCEMENT AND MITIGATION MEASURES.....44
6.7 MITIGATION MEASURES FOR NEGATIVE IMPACTS.....44
7 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP).....48
8 ENVIRONMENTAL AND SOCIAL MONITORING PLAN (ESMoP).....55
9 PROJECT AFFECTED PERSONS.....59

9.1 PAPS ASSESSMENTS 59
9.2 PAPS CATEGORIZATION 59
9.3 ELIGIBILITY FOR COMPENSATION 60
9.4 ASSET VALUATION METHODS AND COMPENSATIONS 60
9.5 INCOME RESTORATION MEASURES 62
9.6 AFFECTED ASSET VALUATION & PAPS COMPENSATION ENTITLEMENT MATRIX 63
9.7 PAPS COMPENSATIONS IMPLEMENTATION ARRANGEMENTS 63
9.8 PAPS COMPENSATIONS IMPLEMENTATION BUDGET 64
9.9 MONITORING AND PAPS COMPENSATIONS AUDIT 64
9.10 CONCLUSION AND PROVISIONS ON PAPs ASSESSMENTS 65
10 GRIEVANCE REDRESS MECHANISM (GRM) 67
10.1 INTRODUCTION 67
10.2 POTENTIAL GRIEVANCES 67
10.3 OBJECTIVE OF A GRIEVANCES REDRESS MECHANISM 67
10.4 GUIDING PRINCIPLES FOR AN EFFECTIVE GRIEVANCE REDRESS MECHANISM 68
10.5 THE PROPOSED GRIEVANCE STRUCTURE 68
11 CHANCE FIND PROCEDURES 70
11.1 PURPOSE OF THE CHANCE FINDS PROCEDURE 70
11.2 RESPONSIBILITY 70
11.3. SCOPE OF THE CHANCE FINDS PROCEDURE 70
11.4. INDUCTION/TRAINING 70
11.5. DETAILS ON CHANCE FIND PROCEDURES 70
12 CONCLUSION AND RECOMMENDATIONS 72
12.1 CONCLUSION 72
12.2 RECOMMENDATIONS 72
REFERENCES 73
ANNEXES 73
ANNEX I: Proposed MUWASCO Water Distribution Pipelines Layout in Maragua Sub County 73
ANNEX II: Cost estimates for the proposed Project 73
ANNEX III: Sample ESIA Questionnaire Responses 73
ANNEX IV: Minutes of Consultations Meetings and Attendance Lists 73
ANNEX V: Road Authorities Wayleaves Application Forms & Guidelines 74
ANNEX VI: ESIA Study Team Leader's NEMA License - 2024 74
ANNEX VII: Selected Photographs of Affected Structures 75

I INTRODUCTION

1.1. PROJECT BACKGROUND

The Ministry of Water, Sanitation and Irrigation (MoWS&I) is implementing the Water and Sanitation Development Project (WSDP) with a credit from the International Development Association (IDA) that aims at improving water supply and sanitation services in selected regions in Kenya through the Water Service Providers (WSPs). The Project Development Objective (PDO) is to improve water supply and sanitation services in select Coastal and Northeastern regions in Kenya and improve the financial performance of Water Service Providers (WSPs) affected by the COVID-19 pandemic. Murang'a Water and Sanitation Company (MUWASCO) has been identified as one of the WSPs with potential to achieve financial recovery within a period of less than 12 months and therefore eligible to receive the support under the Conditional Liquidity Support Grant (CLSG) II Program.

Murang'a Water and Sanitation Company (MUWASCO) was established in 2006 as a body corporate with a mandate of providing water and sewerage services to Murang'a town and its environs. The Water Services Provider (WSP) is wholly owned by the County Government of Murang'a. The core functions of MUWASCO are:

- To source, treat and manage Murang'a Towns water supply & sewerage services as well as in other areas as licensed by WASREB.
- Supplying good quality water in sufficient quantities to meet various needs while ensuring, safe disposal of wastewater and environmental protection.
- Billing and collection of water and sewerage revenues.
- Allocation of water in a sustainable, rational and economic way to customers.

MUWASCO's area of coverage includes Murang'a town and its environs. The total area covered is 195 Kilometers square with an estimated population of about 175,000 people. The area covered includes Mbiri, Township, Kimathi, Mugoiri, Kambiti, Nginda, Ichagaki and parts of Kamahuha wards. Currently, MUWASCO has over 25,137 registered connections out of which 22,344 are active. The main water source is Kiawambeu with a production capacity of 18,800m3/day but currently producing 11000m3/day, Kayahwe which produces 4000m3/day and Gakoigo bulk water treatment plant in Maragua with a production capacity of 15,000 m3/day. The Company operates Karii Sewerage treatment facility which services 4000 sewerage connections. MUWASCO has its head office in Murang'a town, at the junction of Nairobi – Murang'a road and Kangema road.

MUWASCO has proposed the construction of a new 20.5km DN 32-90 HDPE pipeline to serve Maragua Ridge, Kambiti and Igikiro areas of Maragua Sub- County in Murang'a County. The project will also include the supply and installation of 62 No. DN40 – 400 bulk and 1,200No. DN 15 consumer water meters under the CLSG II Program. The implementation of such a development project will generate positive socio-economic benefits but may also have adverse impacts to human community and environment. Thus, in compliance with the requirements of the Environmental Management and Coordination Act (EMCA) 1999, an Environmental and Social Impact Assessment (ESIA) should be prepared which will be approved by NEMA and the World Bank prior to the implementation of the project. The main aim of the ESIA study is to carry out an Environmental and Social Impact Assessment for the proposed project activities. This report presents the findings on the anticipated environmental and social impacts and makes recommendations on the relevant mitigation measures aimed to prevent and reduce adverse impacts. An Environmental, Social Management and Monitoring Plan (ESMMP) has been formulated in this report to ensure that the proposed mitigation measures will be implemented effectively.

1.2 JUSTIFICATION FOR THE ESIA

The proposed project is classified as a medium risk based on NEMA Public Notice on ESIA and Legal Notice No. 31 thus requiring Comprehensive project report (CPR) and also categorized by the World Bank as category 2 with moderate risk operations likely to cause adverse environmental and social impacts and readily minimized by applying appropriate management and mitigation measures. It is against this backdrop that this ESIA was undertaken in accordance with the regulations and guidelines set out by the National Environmental Management Authority (NEMA), and the World Bank's Safeguard Policies. The ESIA done was to determine the status of the environment, environmental considerations for the project in the design phase, operation phase and the decommissioning phase.

1.3 OBJECTIVES OF THE ESIA STUDY

The Environmental & Social Impact Assessment (ESIA) is expected to achieve the following objectives:

- Generate baseline data for monitoring and evaluation of how well the mitigation measures will be implemented during the project cycle.
- Communicate the results of the ESIA process for the Proposed Water Supply Project and alternatives considered.
- Ensure that the impacts identified during the ESIA process are assessed.
- Present the mitigation and enhancement measures which will be implemented by the Project to manage impacts identified.
- Provide a record of comments and responses received from Interested and Affected Parties (I&Aps) during the ESIA process.
- Facilitate an informed decision-making process by the relevant authorities.
- Recommend cost effective mitigation measures against the expected impacts.

1.4 SCOPE OF THE ESIA STUDY

The ESIA study has been undertaken by the Consultant with the intention of collecting enough and relevant information inherent to ensure the production of an appropriated ESIA document including an Environmental and Social Management Plan (ESMP). The scope of the ESIA study is:

- Detailed Project's descriptions.
- Description of the Baseline Environment.
- Stakeholders Engagement.
- Description of the Relevant National and International Legislative and Institutional Regulatory Framework.
- Identify all potential significant environmental and social impacts of the proposed Project and recommend measures for mitigation.
- Cumulative Impact Assessment.
- Assessment of the Project's alternatives.
- Development of Environmental, Social Management & Monitoring plan to avoid, mitigate and where not possible, offset the identified impacts to ensure sustainability of the proposed Project.

1.5 APPROACH AND METHODOLOGY OF THE STUDY

This ESIA study has followed procedures stipulated in the NEMA EMCA Regulations establishing the list of projects that must undergo an ESIA study, compliance with the World Bank's Environmental and Social safeguards procedures as well as General Guidelines and Procedures for Environment Impact Assessment. The study has adopted the following approach:

a) Scoping study/ preliminary assessment.

b) Review of secondary data on baseline information.
c) Review of Policies, Laws and Regulations.
d) Review of meetings and consultations with stakeholders.
e) Field surveys along the entire project sites, to gather information and collect data on various aspects of the project sites.

1.5.1 Preliminary Assessment/ Scoping Study

A scoping study has been done involving consultation with MUWASCO's senior Technical staff, Key stakeholders including communities within the proposed Project Areas. The scoping exercise entailed a preliminary visit to the various project sites for the following reasons:

- Sites reconnaissance to understand the spatial coverage of the project.
- Identification of the likely stakeholders who will be involved in the public consultations, affected or benefitting from project activities.
- Preliminary findings of the existing environment (physical, biological and socio-cultural environment);
- Preliminary predictions of likely positive and adverse impacts.
- Establishing clear boundaries of the study and focus on the relevant issues concerning the study.

1.5.2 Consultation with stakeholders

Involvement of Stakeholders
The study applied different participatory methods, namely:
(i) Exchange with one-to-one key informant.
(ii) Official meetings with MUWASCO's senior Technical staff.
(iii) Public consultative meetings in the Project areas.

The consultations were first undertaken with MUWASCO's senior Technical staff (Technical & Commercial Managers) in order to get the details of the proposed project activities. Stakeholders have been informed about components and planned activities of the proposed project, the advantages and potential impacts likely to be encountered and proposed mitigation measures. The Consultant has offered to them an opportunity to express their concerns, raising their opinions and worries through questions.

1.5.3 Baseline information gathered on the Project

Information on the physical, biological, socio-economic environment, institutional and legal framework were collected from various sources, namely:

- Concept design of the project.
- Literature review of published and miscellaneous documents.
- Field observations in project's areas.
- Consultations with selected stakeholders and discussions with MUWASCO's senior Technical staff for getting expert opinions.

Field data / information collection

The Consultant accompanied by MUWASCO technical team conducted field surveys in order to capture a broad picture of the prevailing situation at the sites. Among the activities performed include:

- Appraisal of physical and environmental conditions of the project sites and sensitive areas likely to be impacted by project activities.

- Baseline data on climate, topography, soils, drainage/hydrology, flora and fauna etc… have been recorded.
- Appraisal of land use at adjacent areas dedicated to infrastructures construction and assessment of other relevant socio-economic parameters.
- Understanding the detailed project description through comparison of the field survey and the preliminary technical study.
- Collecting opinions and point of views of residents about the proposed project, their expectations and concerns in relation to positive and adverse impacts likely to be generated by implementation of the project and on proposed mitigation measures.

1. 5.4 Impacts identification and assessment

The environmental and social impacts identification and assessment was done by superimposing project elements onto the existing environmental conditions of the project site. Environmental impacts were then identified, their significance assessed, and mitigation/enhancement measures proposed in order to properly eliminate or reduce negative environmental and social impacts and suggest remedial measures for positive impacts. The identification and evaluation of impacts was based on qualitative criteria, and thus the importance of each impact was assessed against the following:

- The degree of sensitivity.
- The occurrence.

The degree of sensitivity or intensity of the environmental and social impact corresponds in this case to the relative importance of the disturbance / alteration induced by a project activity on an environmental or social component. The degree of sensitivity of the impact can be very high, high or low. Regarding the occurrence criterion, this is the probability of the occurrence of the impact over the entire period during which the activity is carried out. In this case, the occurrence is either very limited, limited or permanent for the entire duration of the activity. The assessment criteria and ratings for determining the impact significance are as following:

(i) **Nature or status of the impact:** the type of the effect the activity would have on the environment that can be:

- Positive: has a benefit to the holistic environment
- Negative: has a cost to the holistic environment
- Neutral: has no cost or benefit

(ii) Duration of the impact: the lifetime of the impact:

- Short term: less than 2 years
- Short to medium: 2 to 5 years
- Medium term: 6 to 25 years
- Long term: 26 to 45 years
- Permanent: 46 years or more

(iii) Extent or scale of the impact: the distance from the source that impacts may be experienced:

- Site specific: within the site boundary
- Local: affects immediate surroundings areas
- Regional: extends substantially beyond the site boundary
- National: affects country

(iv) Reversibility of the impact: to what degree its influence on the relevant environment can be negated:

- Completely reversible: reverses with minimal rehabilitation and negligible residual effects
- Reversible: requires mitigation and rehabilitation to ensure reversibility
- Irreversible: cannot be rehabilitated completely/ rehabilitation not viable

(v) Intensity or magnitude of the impact: severity of the negative and magnitude of positive impacts:

- Low: little effect- negligible disturbance/benefit
- Low to moderate: effects observable-environmental impacts reversible with time
- Moderate: effects observable-impacts reversible with rehabilitation
- Moderate to high: extensive effects – irreversible alteration to the environment
- High: extensive permanent effects with irreversible alteration

(vi)The probability of the impact: describes the likelihood of the impact occurring:

- Unlikely: less than 15 % sure of an impact occurring
- Possible: between 15% and 40 % sure of an impact occurring
- Probable: between 40 % and 60 % sure that the impact will occur
- Highly probable: between 60 % and 85 % sure that the impact will occur
- Definite: Over 85 % sure that the impact will occur

1.5.5 ESIA Study Report Structure

This ESIA Study Report is organized in 10 Sections:

1- Introduction
2 – Project description
3 – Policy, Legal and Institutional Framework
4 – Environmental and Social Baseline Conditions
5 – Public Participation and Consultations
6 – Environmental and Social Impacts and Mitigation Measures
7 – Environmental and Social Management Plan (ESMP)
8 – Environmental and Social Monitoring Plan (ESMoP)
9 – Project Affected Persons
10 – Grievance Redress Mechanism (GRM)
11 – Chance Find Procedures
12 – Conclusion and recommendations
References & Annexes

1.5.6 Public Disclosure of the ESIA

This ESIA provides for the below listed provisions with regards to public disclosure:
(i) In accordance with EMCA 1999 Cap 385 and World Bank OP 4.01, the Project Proponent in this case MUWASCO will ensure that the Results of Public Consultations including ESIA area disclosed on NEMA, World Bank, WSTF & MUWASCO websites.
(ii) The Report will also be made available at the Maragua Sub-County as well as at the Kambiti & Gakoigo Wards Offices, Murang'a County, for ease of access by the Project's interested parties at location level.
(iii) At completion of the Project construction works, the EIA/EA Audit Regulations of 2003 requires the Project proponent to undertake a closeout audit after completion of the project and undertake an initial Environment Audit (EA) immediately after commissioning of the project.

2 PROJECT DESCRIPTION

2.1 PROJECT AREA DESCRIPTION

2.1.1 Project location

The proposed water pipeline extension is in Maragua Sub –County in Murang'a County, approximately 80Km from Nairobi City. The proposed Project areas covers Maragua Ridge, Kambiti and Igikiro Locations within the outskirts of Maragua Town. The source of water for this project is the recently commissioned Gakoigo bulk water treatment plant in Maragua with a production capacity of 15,000m^3/day.



Maragua Bulk Water Treatment Plant at Gakoigo – Capacity 15,000m^3/day

2.1.2 Existing water supply networks

2.1.2.1 Kigumo Water Supply Scheme

Kigumo water supply was constructed in the early 1980s and extensions from the distribution system of 280mm diameter Upvc pipeline were laid up to Maragua town. However, the lines have been running dry most of the times due to excessive demand in the upper areas of Kigumo Sub-County and the town has therefore not been receiving enough water from the Kigumo scheme as intended. The little available amount of water directed to the town is through rationing basis and does not cover the area adequately.

2.1.2.2 Irati -Nginda Scheme

The intake works are located near the abandoned Irati Coffee factory near the bridge to Gachocho. Maragua town and its environs is supplied are water from the Nginda tank via 100mm Upvc pipeline that runs along the road reserve.

2.2 PROPOSED PROJECT OBJECTIVES

The principal objective of the project is to improve access to clean water supply in the targeted areas within Maragua Ridge, Kambiti and Igikiro Locations in Maragua Sub-County. The supply of bulk zonal and consumer water meters will contribute to the reduction of Un-accounted for Water (UFW) and Non – Revenue Water (NRW) thereby increasing revenue for MUWASCO. Overall, the proposed Project will contribute to enhanced hygiene and sanitation of the residents of the target areas which are located within some of the driest parts of Murang'a County, hence reducing water borne diseases and contribute to alleviation poverty through improvement of socio-economic activities. The reduction of NRW will result to increased revenues for MUWASCO.

2.3 DESCRIPTION OF THE PROPOSED PROJECT'S CONSTRUCTION ACTIVITIES

The summarized Scope of Works for the proposed project include:

- Construction of 20.5km of HDPE pipeline.
- Installation of 1,200nr DN15 Water meters, 62nr DN40-400 bulk meters.

2.3.1 Mobilization site preparation works

The proposed Project sites will be prepared for constructions. This will involve construction of contractor's camps, mobilization of workers & construction equipment and transportation of construction materials. The contractor will also utilize human labour where necessary to create employment to the local residents especially the youth.

2.3.2 Storage of materials

Construction materials will be stored on sites. Bulky materials such as stones, ballast, sand and steel will be carefully piled at designated areas on the sites. To avoid piling large quantities of materials on site, the contractor will order bulky materials such as sand, gravel and building stones on need basis.

2.3.3 Installation of water pipelines

The distribution network is designed to cover a total length of about 20.1 kilometers, exclusively using HDPE pipes. HDPE pipes are selected for their flexibility, corrosion resistance, and ease of installation, making them suitable for the distribution of treated water. The installed pipelines will be of varying diameter of OD 32-90mm HDPE complete with all fittings. MUWASCO has identified priority pipelines routes that best suit the terrain and intended goal of reaching as many people as possible through individual connections as well as communal water points where necessary.



Proposed pipeline wayleave near Maragua Town. The wayleaves are free of any encumbrances.

Pipeline Construction Sequence

- Surveying and setting out the pipeline's routes. Following this, the pipeline Right of Way (ROW) is cleared and graded to allow the construction crews access along the pipeline route.
- The Right of way allows sufficient space for digging the trench, laying a pipe alongside the trench before installation, storing topsoil and sub-soil separately during installation and enabling access for construction or emergency vehicles.
- Construction related ground disturbance along the route will be limited to the Right of way and other approved or designated areas for pipe yards, disposal areas, access roads etc.
- The construction Right of way will be allowed to re-vegetate after completion of construction activities.
- No permanent structures will be permitted within the permanent easement and deep-rooting trees will be removed.
- Working areas which create a potential hazard to the public will be cordoned off to prevent access by the public during construction.
- In general, the minimum cover will be 0.8m but this will be increased at crossings to provide additional protection to the pipe and reduced in areas of rock, where it is much more difficult to excavate the trench, the minimum cover can be reduced to 0.5m.
- When a section of pipeline has been installed in the trench, the trench can be backfilled.
- All the pipelines will be hydrotested in sections, which is a pressure test using water, to ensure the integrity of the newly constructed pipeline.
- Once the hydro-test is complete and the sections have been tied together, the Right of Way can be reinstated.

The project activities during operations will include the maintenance of pipelines and attending to blockages and breakages along the pipelines and other necessary repairs for the water supply scheme infrastructure.

2.3.4 Installation of Air Valves and Wash Outs for the pipelines

The number of high and low points within the pipelines have been kept at minimum in the pipeline profile design to keep the number of air-valves and washout as low as possible. Several air valves and washouts are proposed for incorporation within the existing network to mitigate the issue of rampant airlocks.

2.3.5 Installation of zonal and consumer water meters

This will involve the installation of zonal and consumer water meters within the water distribution system. The meters complete with associated fittings will be installed inside chambers with lockable covers.

2.3.6 Construction of Valves & Meter Chambers

The installation of new pipelines includes the construction of various types of inspection chambers to enhance the functionality and maintenance of the water supply infrastructure. The project entails the construction of air-release chambers, which release air pockets within the pipeline system to optimize water flow. Additionally, washout chambers will be built to provide access points for pipeline flushing and cleaning, ensuring water quality is maintained. Control valve chambers will house valves to regulate water flow and pressure. Several section valve chambers will be constructed to allow for segmenting the system during maintenance or repairs. Valve chambers will connect the existing water supply system with the new system, ensuring seamless integration. These inspection chambers contribute to the overall reliability,

efficiency, and longevity of the proposed water supply system, providing sustainable and high-quality water supply to the communities it serves. In additional, chambers will be constructed to house the zonal water meters.

2.4 MATERIALS FOR THE CONSTRUCTION WORKS

This will include:

- HDPE, Steel and uPVC pipes.
- Steel valves & fittings.
- HDPE valves & fittings.
- Bulk and consumer water meters.
- Sand, aggregate, cement, water for concrete works on the various chambers.

2.5 ANTICIPATED WASTE MATERIAL AND BY-PRODUCTS

Wastes Generated during Construction Phase:

- **Construction Debris:** During the construction phase, there will be various types of construction debris, such as concrete, bricks, stones, and wood waste among others.
- **Excavated Soil:** Depending on the nature of the project, excavation activities may generate large amounts of soil waste.
- **Packaging Waste:** Construction materials, equipment, and supplies are often delivered in packaging that can contribute to waste generation.
- **Chemical Waste:** Construction activities may involve the use of various chemicals, including solvents, paints, adhesives, and lubricants.

2.6 LABOUR

The project will require both skilled and unskilled labour during construction and operation phases of the project. This will result in migrant labour influx that could trigger Community Health and Safety risks. The entire recruitment process of the workers will be managed by the contractor in accordance with Kenya labor laws following guidance of the Labour Influx Plan. Normal working hours are planned to be from around 08:00-17:00 from Monday to Saturday. Works outside of normal working hours will be sought from the relevant local authorities.

2.7 CONSTRUCTION MACHINES/EQUIPMENT

Some of the main construction machines required for construction activities include:

- Backhoe excavators.
- Compressors.
- Welding equipment.
- Concrete mixers.
- HDPE pipe fusion equipment.
- Pipelines pressure testing equipment.
- De-watering pumps.
- Trucks and pick up vehicles.

2.8 ESTIMATES COST OF THE PROJECT

The estimated cost of the proposed project is **KES 21,090,00** as tabulated below:

Table 2.1: Estimated costs of the proposed Project

1	**Meters Requirement**				
No.	**item description**	**meter size**	**Quantity (No.)**	**Rate (Ksh)**	**Amount (Ksh)**
1	BULK METER	DN 400 mm	1	878,300	878,300
2	BULK METER	DN 350 mm	1	850,000	850,000
3	BULK METER	DN 300 mm	1	685,000	685,000
4	BULK METERS	DN 250 mm	2	545,000	1,090,000
5	BULK METERS	DN 200 mm	1	525,000	525,000
6	BULK METERS	DN 150 mm	8	150,000	1,200,000
7	DMA METERS	DN 100 mm	8	125,000	1,000,000
8	DMA METERS	DN 75 mm	10	79,000	790,000
9	DMA METERS	DN 50 mm	15	65,000	975,000
10	DMA METERS	DN 40 mm	15	31,000	465,000
13	CONSUMER METERS	DN 15 mm	1,200	5,400	6,480,000
	SUB-TOTAL				**14,938,300**
2	**Pipelines**				
	PIPES (PN 12.5)	**Size (mm)**	**Quantity (m)**	**Rate (Ksh)**	**Amount (Ksh)**
1	HDPE PIPES	32	4,000	65	260,000
2	HDPE PIPES	50	7,500	150	1,125,000
3	HDPE PIPES	63	7,000	250	1,750,000
4	HDPE PIPES	90	2,000	525	1,050,000
	SUB - TOTAL				**4,185,000**
3	**Motorcycles**				
	Item Descriptions	**Capacity**	**Quantity (No.)**	**Rate (Ksh)**	**Amount (Ksh)**
	Motorcycles	185 CC	5	393,500.00	**1,967,500**
	GRAND TOTAL				**21,090,800**

3 POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

The activities of the proposed project are regulated by several legal instruments and policies, the main ones being the Environmental Management and Coordination Act (EMC 1999, which sets the requirements and procedures for obtaining operating licenses and permits. This chapter highlights the specific sections of both national and international legal and institutional framework which will enable the proponent, MUWASCO, to be compliant with the law and attain the set standards.

3.1 POLICY FRAMEWORK

The Republic of Kenya has a policy, legal and administrative framework for environmental and social management. The broad objectives of the policy are: -

- To ensure optimal use of natural resources while improving environmental quality.
- To conserve natural resources such that the resources meet the needs of the present without jeopardizing future generations in enjoying the same.
- To develop awareness that inculcates environmental stewardship among the citizenship of the country.
- To integrate environmental conservation and socio-economic aspects in the development process.
- To ensure that national environmental and social goals contribute to international obligations on environmental management and social integrity.
- To achieve the above policy objectives, it is directive that appropriate reviews and evaluations of all forms of developmental project plans and operations are carried out to ensure compliance with the environmental policy and legal frameworks.

The following section provides details of the relevant policies in the country:

3.1.1 The Kenya Vision 2030

Kenya Vision 2030 is the current national development blueprint for period 2008 to 2030. The objective of the vision 2030 is to transform Kenya into a middle-income country with a consistent annual growth of 10 % by the year 2030". One of the aims of the vision is to make Kenya to be a nation that has a clean, secure, and sustainable environment by 2030. This will be achieved through promoting environmental conservation to better support the economic pillar.

Developing and improving basic infrastructure and services namely will achieve Kenya's transformation into a middle-income country: roads, streetlights, storm water drains, footpaths, and water and sanitation facilities among others. Improving pollution and waste management through the application of the right economic incentives in development initiatives is critical.

Relevance

This Project aims at improving access to clean water supply in the targeted areas of Maragua Ridge, Kambiti and Igikiro Locations in Maragua Sub – County. The project will offer an opportunity for the local community to empower themselves economically through securing employment and service provision during the construction and operation phases of the Project.

3.1.2 National Environment Policy (NEP), 2013

Sessional Paper No. 6 of 1999 on Environment and Development since adoption by parliament in 1999 has been in use and influenced the formation of EMCA in 1999 with 2015 amendments but has since been surpassed by time and is therefore under revision to comprehensively cover areas that were previously left

out to augment it. The revised draft of the National Environmental Policy, dated April 2012, sets out important provisions relating to the management of ecosystems and the sustainable use of natural resources, and recognizes that natural systems are under intense pressure from human activities particularly for critical ecosystems including forests, grasslands and arid and semi-arid lands. The objectives of the Policy include developing an integrated approach to Environmental management, strengthening the legal and institutional framework for effective coordination, and promoting environmental management tools.

Relevance
The Project shall implement the Environmental, Social Management and Monitoring Plan (ESMMP) to mitigate the impacts of the resulting impacts during the construction and operational phases of the Project; this will ensure that the sensitive ecosystems are not destabilized by the subsequent Project activities.

3.1.3 The National Water Policy of 2021
The Sessional Paper No. 1 of 2021 was developed in line with the mandate, vision and mission of the Ministry responsible for water affairs in Kenya. The National Water Policy of 2021 build on the achievements of the water sector reforms that commenced with the enactment of the Water Act, 2002, which were based on the principles outlined in the Sessional Paper No. 1 of 1999 on National Policy on Water Resources Management and Development. Therefore, the Policy aims at moving the water sector to the next level of development to contribute to the National Goals, and realization of the Sustainable Development Goals.

The Government of Kenya is committed to ensuring the progressive realization of the human rights to water, and reasonable standards of sanitation through taking steps to protect, respect and fulfil these rights, as required by the Constitution. This is in addition to realization of the human right to a clean environment. This Policy takes into account the need for Kenya, at both levels of government, to take steps, through this Policy, law, institutional mandates, planning and financing, in order to secure universal coverage of the entire population through access to water, and sanitation in accordance with constitutional standards The Government of Kenya is committed to ensuring the progressive realization of the human rights to water, and reasonable standards of sanitation through taking steps to protect, respect and fulfil these rights, as required by the Constitution. This is in addition to realization of the human right to a clean environment. This Sessional Paper considers the need for Kenya, at both levels of government, to take steps, through this Policy, law, institutional mandates, planning and financing, to secure universal coverage of the entire population through access to water, and sanitation in accordance with constitutional standards.

Relevance
The proposed water supply project will comply with this Policy by improving and upgrading water supply networks within the target areas for sustainable access to potable water.

3.1.4 National Climate Change Response Strategy of 2010
The strategy paper recognizes that Kenya is a water scarce Country and offers a variety of strategies for ensuring that the resource is utilized in ways that recognize that it is a finite resource. The strategy paper also argues that interventions in the water sector should take a participatory approach involving different water users including gender groups, socioeconomic groups, planners and policy makers in water resource management.

Relevance
The source of water for the proposed pipelines extension is surface water (Maragua & Irati Rivers) which experience low flow during the dry spells. There is need to conserve water and reduce water wastages. The ESIA has proposed measures to be complied with during the proposed Project's operation by MUWASCO to reduce water loses that through illegal connections and leakages.

3.1.5 Public Health Policy
The public health policy calls upon the project proponents to ensure that buildings are adequately provided with utilities so that they are fit for human habitation.

Relevance
The Contractor's site office must be provided with all amenities/utilities that are essential for safeguarding public health for all people using the facilities.

3.1.6 Occupational Health and Safety Policy
This policy is intended to protect safety and health of workers in workplaces.

Relevance
The proposed Project will provide employment opportunities to many workers in various categories during construction and operation. The contractor will be expected to comply with the requirements of this policy when engaging workers in various construction activities. The environmental management provides mitigation measures that can be undertaken to ensure compliance with the requirements of this policy.

3.1.7 HIV/AIDS Policy
The policy identifies HIV/AIDS as a global crisis that constitutes one of the most formidable challenges to development and social progress. The Pandemic heavily affects the Kenyan economy through loss of skilled and experienced manpower due to deaths, loss of man hours due to prolonged illnesses, absenteeism, reduced performance, increased stress, stigma, discrimination and loss of institutional memories, among others.

Relevance
Due to the large number of workers who will be involved in the project and the associated social issues with projects of such as scale, HIV/AIDS has been considered as one of the potential impacts, but adequate mitigation measures have also been proposed to that effect.

3.1.8 Gender Policy
The overall goal of this Policy Framework is to mainstream gender concerns in the national development process to improve the social, legal/civic, economic, and cultural conditions of women, men, girls, and boys in Kenya. An important priority is to ensure that all ministerial strategies and their performance frameworks integrate gender equality objectives and indicators and identify actions for tackling inequality. In addition, each program will develop integrated gender equality strategies at the initiative level in priority areas. Within selected interventions, the policy will also scale-up specific initiatives to advance gender equality.

Relevance
This policy will be referred to during Project implementation especially during hiring of staff to be involved in the project, procuring of suppliers and sub consultants and sub-contractors to the project. The construction Contractor shall be expected to consider men, women and the youth for employment and business opportunities arising during the implementation of the proposed project.

3.2 LEGAL FRAMEWORK

3.2.1 Constitution of Kenya

Article 42 of the Bill of Rights of the Kenyan Constitution provides that 'every Kenyan has the right to a clean and healthy environment, which includes the right to have the environment protected for the benefit of present and future generations through legislative and other measures.

Further, Article 70 states that if a person alleges that a right to a clean and healthy environment recognized and protected under Article 42 has been, is being or is likely to be, denied, violated, infringed, or threatened, the person may apply to a court for redress.

Relevance
The Constitution of Kenya provides for sound management and sustainable development of all of Kenya's Projects, both public and private investments. It also calls for the duty given to the Project proponent to cooperate with State organs and other persons to protect and conserve the environment as mentioned in Part II.

The proponent should ensure compliance with the constitution in so far as equitable sharing of the available water resources, within the supply areas without discrimination. Further, the proposed Project should ensure the sustainability of livelihoods and biological resources within the project areas are protected. Any development proposals should also be cognizant of the increased powers under the Constitution given to communities and individuals to enforce their rights through legal redress.

3.2.2 The Environment Management and Co-ordination Act, 1999

The Act provides for the establishment of a legal and institutional framework for the management of the environment and for matters connected therewith and incidental thereto. Just as in the New Constitution, Part II of EMCA confers to every person the right to a clean and healthy environment and to its judicial enforcement. The new Constitution and EMCA therefore obligates the project's Executing Agency and Contractor to work in a clean environment and not to contravene the right of any person within its zone of influence, to this entitlement.
EMCA has provided for the development of several subsidiary legislations and guidelines, which govern environmental management and are relevant to the project implementation. These include:

i. The Environmental (Impact Assessment and Audit) Regulations, 2009 Legal Notice No. 101.
ii. The Environmental Management and Coordination (Waste Management) Regulations, 2006 Legal Notice No. 121.
iii. The Environmental Management and Coordination (Water Quality) Regulations, 2006 Legal Notice No. 120.
iv. The Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009 Legal Notice No. 61.
v. The Environmental Management and Coordination (Air Quality Regulations 2014)

vi. The Environmental Management and Coordination (Conservation of Biological Diversity and Resources, Access to Genetic Resources and Benefit Sharing) Regulations, 2006 Legal Notice No. 160.
vii. Environmental Management and Coordination (Wetlands, Riverbanks, Lake Shores and Sea Shore Management) Regulation, 2009.
viii. The Environmental Management and Coordination (Controlled Substances) Regulations, 2007 Legal Notice No. 73.

Relevance to the Project
The EMCA and the above listed regulations will form the main statutory instruments which will guide the implementation of the project so that any likely adverse impacts that could be caused by the project are promptly mitigated as recommended in this study.

3.2.3 Water Act 2016
The Water Act 2002 was amended in the year 2016 to align to the Kenyan Constitution 2010, the Act vest the responsibility of developing water and Sanitation infrastructure (sewerage and water supply) to the water service boards and ownership and management to the WSPs that acts as the agent for the board Section 73 of the Water Act allows a person with a license to supply water (licensee) to make regulations for purposes of protecting against degradation of sources of water, which he is authorized to take. Under the Act, the licensee could be a local authority; a private Trust or an individual and the law will apply accordingly under the supervision of the Regulatory Board.

Section 75 and sub-section 1 of the Water Act allows a licensee for water supply to construct and maintain drains, sewers, and other works for intercepting, treating, or disposing of any foul water arising or flowing upon land for preventing water belonging to the licensee or which he is authorized to take for supply from being polluted. However, if the proposed works will affect or is likely to affect any body of water in the catchment, the licensee shall obtain consent from the Water Resources Management Authority. Section 76 states that no person shall discharge any trade effluent from any trade premises into sewers of a licensee without the consent of the licensee upon application indicating the nature and composition of the effluent, maximum quantity anticipated, flow rate of the effluent and any other information deemed necessary. The consent shall be issued on conditions including the payment rates for the discharge as may be provided under section 77 of the same Act.

Relevance to the Project
This Act will be relevant during construction of the project whereby the contractor will be required from time to time ensure that Project activities do not pollute water resources in the project area. The Contractor will also be required to comply with the effluent discharge requirements during construction of the project, which will require that the contractor obtain relevant permits from Water Resource Authority (WRA) on case-by-case basis when required.

3.2.4 County Government Act No. 17 of 2012
Part II of the Act empowers the county government to oversee function described in Article 186 of the constitution, (county roads, water and Sanitation, Health). Part XI of the Act vest the responsibility of planning and development facilitation to the County Government with collaboration with the National Government.

Relevance to the Project

The project will be implemented by Murang'a Water & Sanitation Company Limited (MUWASCO) which is a water utility, wholly owned by Murang'a County Government. The Project once complete will be managed by MUWASCO for operations and maintenance. This Legislation calls for effective and coordinated public participation during the planning of public projects. The ESIA study has complied with this Legislation through consultations with relevant National & County Governments Departments and the other Project's stakeholders including the target beneficiaries.

3.2.5 Physical and Land Use Planning Act 2019

Section 56 of the said Act empowers the County Governments to reserve and maintain all land planned for open spaces, parks, urban forests and green belts as well as land assigned for public social amenities. The Project identified will be implemented as provided by Kiambu County Government and Land Use Plan for Urban areas.

Relevance to the Project

As the Act directs, regulates, and harmonizes development and use of land in the Country. The proposed pipelines extensions have been designed within the public road reserves (wayleaves for public utilities). This was to avoid cases of acquisition of private property and resettlement complications. Any issues that may be encountered with will be dealt with on a case-by-case basis.

3.2.6 Occupational Health and Safety Act (OSHA 2007)

This legislation provides for protection of workers during construction and operation phases. It is tailored at implementation of the EHS plan in compliance with the relevant sections of this Act. The ESMP prepared under this assessment has provided for specific health and safety aspects to be complied with during implementation of the project.

Relevance to the Project

The Act provides EHS guidelines which shall be followed by both the contractor and supervising consultant during implementation of the project to avoid injuries and even loss of life to workers and neighbouring community.

3.2.7 The Public Health Act (Cap 242)

Part IX section 115 of the Act states that no person/institution 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 and include nuisances caused by accumulation of materials or refuse which in the opinion of the medical officer of health is likely to harbour rats or other vermin.

Relevance to the Project

The Act provides guideline to the contractor on how he shall manage all wastes (Liquid and Solid Wastes) emanating from the project in a way not to cause nuisance to the community. This Act, during construction shall be read alongside the Waste Management Regulations of EMCA 2015 for utmost compliance.

3.2.8 Work Injury Benefits Act, (WIBA 2007)

This is an Act of Parliament to provide for compensation to employees for work related injuries and diseases contracted in the course of their employment and for connected purposes. An employee is a person who has been employed for wages or a salary under a contract and includes apprentice or indentured learner.

Relevance to the Project

The proposed project will adhere to the provisions of this act throughout the construction period of the project.

3.2.9 Land Act, 2012 (Revised 2016)

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 public.

Relevance to the Project

The proposed Project will be implemented within the existing road reserves. Therefore, no land will be acquired.

3.2.10 Labour Relations Act 2012

An Act of Parliament to consolidate the law relating to trade unions and trade disputes, to provide for the registration, regulation, management and democratization of trade unions and employers organizations or federations, to promote sound labour relations through the protection and promotion of freedom of association.

Relevance to the Project

This act will be applied by labour force on site in addressing disputes related to working conditions.

3.2.11 Sexual Offences Act, 2006

An Act of Parliament that makes provision about sexual offences aims at prevention and the protection of all persons from harm from unlawful sexual acts and for connected purposes. Section 15, 17 and 18 focuses mainly on sexual offenses on the children.

Relevance to the Project

This law will govern the code of conduct of the Contractor's staff and provide repercussions of any wrongdoing. The labour management plan will ensure that sexual rights are protected.

3.3 INSTITUTIONAL STRUCTURE OF THE WATER SECTOR

The Water Act 2016 aligns Water Services Management to the Kenyan Constitution 2010.The Ministry of water, sanitation & 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:

3.3.1 Water Sector Trust Fund

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:

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

3.3.2 Water Services Regulatory Board (WASREB)

Section 70 of the Water Act 2016 provides for establishment of Water Services Regulatory Board, this assessment assumes that the current Water Services Regulatory Authority (WASREB) will assume the roles proposed in the Water Act 2016. 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:

i. Regulating the provision of water and sewerage services including licensing, quality assurance, and issuance of guidelines for tariffs, prices and disputes resolution.
ii. 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,
iii. Monitoring the performance of the Water Services Boards and Water Services Providers,
iv. Establish the procedure of customer complaints,
v. Inform the public on the sector performance,
vi. Gives advice to the Minister in charge of water affairs.

3.3.3 Water Resources Authority (WRA)

Section 11 of the Water Act 2016 provides for establishment of Water Resources Authority, this assessment assumes that the current Water Resources Authority (WRA) will assume the roles proposed in the Water Act 2016. The authority is responsible for sustainable management of the Nations Water Resources:

i. Implementation of policies and strategies relating to management of water resources.
ii. Develop principles, guidelines, and procedures for the allocation of water.
iii. Development of Catchments level management strategies including appointment of catchments area advisory committees.
iv. Regulate and protect water resources quality from adverse impact.
v. Classify, monitor and allocate water resources.

3.3.4 Water Works Development Agencies (WWDAs)

Section 65 of the Water Act 2016 provides for establishment of Water Works Development Agencies (WWDAs). The WWDAs are responsible planning and development of water and sewerage services infrastructure in their areas of jurisdiction. In Murang'a County, the relevant WWDA is the Athi Water Works Development Agency (AWWDA), which is mandated to:

i. Develop the facilities, prepare business plans and performance targets.

ii. Planning for efficient and economical provision of Water and sewerage services within their areas of jurisdiction.

3.3.5 Water Services Providers (WSPs)

The Kenyan Constitution Article 186 and 187 and corresponding further schedule item 11(b) mandates the county government to oversee Water and Sanitation in their respective counties. The County Government Act of 2012-part II provides a more elaborate interpretation of the function. They have vested this mandate to Water Service Providers, which are utilities or water companies. They are County Government 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. In Kiambu County there are various WSPs mandated to provide water and sanitation services in different areas of their jurisdictions. Kiambu water and Sewerage Company (KIWASCO), is the mandated WSP that provides water in Kiambu Town and its environs.

3.4 INSTITUTIONAL STRUCTURE – ENVIRONMENTAL

3.4.1 National Environmental Management Authority (NEMA)

The government established the National Environmental Management Authority (NEMA) as the supreme regulatory and advisory bodies on environmental management in Kenya under EMCA 1999. NEMA is charged with the responsibility of coordinating and supervising the various environmental management activities being undertaken by other statutory organs. NEMA also ensures that environmental management is integrated into development policies, programs, plans and projects.

3.4.2 County Environmental Committees

The County Environmental Committees also contribute to decentralized environmental management and enable the participation of local communities. These environmental committees consist of the following:

i. Representatives from all the ministries.
ii. Representatives from local authorities within the county.
iii. Two farmers / pastoral representatives.
iv. Two representatives from NGOs involved in environmental management in the county.

3.4.3 Public Complaints Committee on Environment

The Public Complaints Committee (PCC) is established under Section 31 of EMCA. The PCC is concerned with the investigation of complaints relating to environmental damage and degradation generally. The PCC has powers to investigate complaints against any person or even against NEMA or on its own motion investigate any suspected case of environmental degradation. The PCC is required by law to submit reports of its findings and recommendations to NEC. The law, however, is weak in that it does not provide PCC with the mandate to see its recommendations carried through. Further, NEC is not specifically required to do anything regarding the reports submitted by the PCC and will often note and adopt the same without any further follow up action. So far, the PCC has experienced challenges such as failure to honour summons, hostility between parties, hostility directed at PCC investigators, lack of understanding of EMCA and abdication of duty by Lead Agencies.

3.4.4 Standards and Enforcement Review Committee

The Standards and Enforcement Review Committee (SERC) is a committee of NEMA and is established under Section 70 of EMCA. This is a technical Committee responsible for formulation of environmental standards, methods of analysis, inspection, monitoring, and technical advice on necessary mitigation measures. The Permanent Secretary under the Minister is the Chairman of the Standard and Enforcement

Review Committee. The members of the SERC are set out in the third schedule to EMCA. They consist of representatives of various relevant government ministries and parastatals that are Lead Agencies as well as those responsible for matters such as economic planning and national development, finance, labour, public works, law and law enforcement, etc. Other members are drawn from public universities, and other government institutions.

3.4.5 National Environmental Tribunal (NET)

The NET is established under Section 125 of EMCA for the purpose of hearing appeals from administrative decisions by organs responsible for enforcement of environmental standards. An appeal may be lodged by a project proponent upon denial of an EIA License or by a local community upon the grant of an EIA License to a project proponent. NEMA may also refer to any matter that involves a point of law or is of unusual importance or complexity to NET for direction. The proceedings of NET are not as stringent as those in a court of law and NET shall not be bound by the rules of evidence as set out in the Evidence Act. Upon the making of an award, NET's mandate ends there as it does not have the power to enforce its awards. EMCA provides that any person aggrieved by a decision or award of NET may within 30 days appeal to the High Court.

3.4.6 Land and Environment Court

The new constitutional dispensation has provided for the creation of land and environment courts for specific handling of land and environmental related disputes and grievances.

3.5 SECTORAL INTEGRATION

This integration encourages provision of sustainable development and a healthy environment to all Kenyans. The key functions of NEMA through the NEC include policy direction, setting national goals and objectives and determining policies and priorities for the protection of the environment, promotion of cooperation among public departments, local authorities, private sector, non-governmental organizations and such other organizations engaged in environmental protection programs and performing such other functions as contained in the act. Other stakeholder authorities include Murang'a County, Ministry of Water, Sanitation, and Irrigation, WSTF and the local community.

3.6 WORLD BANK OPERATIONAL PROCEDURES

Like in any project financed by, or with financial participation of, the World Bank, the environmental and social safeguards as defined in the Bank's Operational Procedures will be respected for the purposes of this project implementation. The World Bank classifies its projects into three Environmental Assessment categories according to the likely impacts on the environment they will have. This classification is as below:

Category A: The proposed project is likely to have significant adverse environmental impacts that are sensitive, diverse, or unprecedented. These impacts may affect an area broader than the sites or facilities subject to physical works. For a Category A project, the Proponent is responsible for preparing an EIA report.

Category B: The proposed project has potential adverse environmental impacts on human populations or environmentally important areas such as wetlands, forests, grasslands, and other natural habitats – but these are less adverse than those of Category A projects. These impacts are site-specific; few if any of them are irreversible; and in most cases, mitigation measures can be designed more readily than for Category A projects. Like Category A the environmental assessment examines the project's potential negative and

positive environmental impacts and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance.

Category C: The proposed project is likely to have minimal or no adverse environmental impacts. Beyond screening, no further environmental assessment action is required for a Category C project.

This Project has been categorized as B.

3.7 THE WORLD BANK SAFEGUARDS

3.7.1 OP/BP 4.01 (Environmental Assessment)

The World Bank has well-established environmental assessment procedures, which apply to its lending activities and to the projects undertaken by borrowing countries, to ensure that development projects are sustainable and environmentally sound. Although its operational policies and requirements vary in certain respects, the World Bank follows a relatively standard procedure for the preparation and approval of an environmental assessment study, which:

i. Identifies and assesses potential risks and benefits based on proposed activities, relevant site features, consideration of natural/human environment, social and trans-boundary issues.
ii. Compares environmental pros and cons of feasible alternatives.
iii. Recommends measures to eliminate, offset, or reduce adverse environmental impacts to acceptable levels (sitting, design, technology offsets).
iv. Proposes monitoring indicators to implement mitigation measures.
v. Describes institutional framework for environmental management and proposes relevant capacity building needs.

Relevance to the Project

An Environmental and Social Impact Assessment (ESIA) Study shall be carried out on this Project.

3.7.2 OP/BP 4.04 (Natural Habitats)

The policy is designed to promote environmentally sustainable development by supporting the protection, conservation, maintenance and rehabilitation of natural habitats and their functions. The policy seeks to ensure that World Bank-supported infrastructure and other development projects consider 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).

Relevance to the Project

This project has no notable interaction with notable natural habitats apart from limited localized riverine aquatic systems.

3.7.3 OP/BP 4.11 (Physical Cultural Resources)

This policy is meant to assist in preserving physical cultural resources including the movable or immovable (above or below ground, or under water) objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance including sites and unique natural values. Physical cultural resources are important as sources of valuable scientific and historical information, as assets for economic and social development, and as integral parts of a people's cultural identity and practices. The objective of this policy is to avoid or mitigate adverse impacts on physical cultural resources from development projects.

Relevance to the Project
There are no cultural features at the site. However, a chance to find cultural features during construction analysis has been discussed under the section on Impacts and mitigation measures.

3.7.4 OP/BP 4.12 (Involuntary Resettlement)
The policy states that "Where large-scale of population displacement is unavoidable, a detailed resettlement plan, timetable, and budget are required. Resettlement plans should be built around a development strategy and package aimed at improving or at least restoring the economic base for those relocated. Experience indicates that cash compensation alone is normally inadequate. Voluntary settlement may form part of a resettlement plan, provided measures to address the special circumstances of involuntary resettlers are included. Preference should be given to land-based resettlement strategies for people dislocated from agricultural settings. If suitable land is unavailable, non-land-based strategies built around opportunities for employment or self-employment may be used".

Relevance to the Project
The proposed project is on public land reserved for the water pipelines. Social screenings along the wayleaves have been undertaken and although there are no permanent re-locations of persons and assets, there are 44 PAPs whose livelihoods will be temporarily affected during the installation of pipelines. A list of the PAPs and inventory of the affected assets as well as the compensations dues has been prepared and included in this ESIA Report.

3.7.5 OP/BP 4.36 (Forests)
The policy on forest safeguards seeks to realize the potential of forests to reduce poverty in sustainable manner, integrate forests effectively into sustainable economic development and protect the vital local and global environmental services and values of forests. Among the principles is to screen as early as possible for potential impacts on forest health and quality and on the rights and welfare of the people who depend on them.

Relevance to the Project
Not applicable. The proposed project site has no forest.

Table 3.1: Applicable World Bank Operational Policies

Operational Policy	Provision	Relevance to the Project
World Bank OP 4.01 on Environmental Assessment	Provides for 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	An Environmental and Social Impact Assessment of the development/rehabilitation of water supply schemes will be carried out.
World Bank OP 4.11 on Physical Cultural Resources	Provides for measures to protect cultural heritage from the adverse impacts of project activities and support its preservation.	No physical cultural resources were identified within the project areas. However, the ESIA has provided chance find procedures to be adopted by the contractor during civil works.

World Bank OP 4.12 on Involuntary Resettlement	The World Bank Involuntary Resettlement Policy OP 4.12 covers direct economic and social impacts that result from Bank-assisted investment projects.	The pipelines shall be installed along the provided wayleaves on the public roads. Social screenings along the wayleaves have been undertaken and confirmed that the proposed project does not involve any resettlements of PAPs. However, 44 PAPs will be affected during the installation of pipelines due to temporary disruptions of the livelihood income activities. Consultations with Road Agencies (KENHA, KERRA, KURA & County Roads) have been done to establish the requirements for the necessary permits to install pipelines on the road reserves. The application forms and requirements from the Road Authorities have been attached in the ESIA Report as Annex VI.

3.8 RELEVANT INTERNATIONAL CONVENTIONS AND TREATIES

Conventions are agreements that are legally binding on states that have become parties to them. Kenya is signatory to several international conventions and treaties that would need to be adhered to in implementing this project and are geared towards environmental protection and conservation. Some of these include:

3.8.1. International Convention on Biological Diversity (1992)

The convention promotes the protection of ecosystems and natural habitats, respects the traditional lifestyles of indigenous communities, and promotes the sustainable use of resources.

Relevance to the Project

The Contractor will adhere to this Convention during the clearing of pipelines routes and excavations works for pipelaying.

3.8.2. Ramsar Convention 1971

The convection governs wetlands of international importance. The convention was entered into force in Kenya in 1990 and it governs Lake Nakuru, Lake Baringo, and Lake Natron, which is a shared ecosystem between Kenya and Tanzania. Kenya is therefore committed to avoid degradation of wetlands under its jurisdiction. Kenya has also ratified the Agreement of the Conservation of Eurasian Migratory Water Birds (2001) and the African Convention on the Conservation of Nature and Natural Resources (1968), the Convention on International Trade in Endangered Species of Wildlife Fauna and Flora (CITES) 1973 which prohibits trade in species such as Dugongs and in Ivory.

Relevance to the Project

The proponent will need to ensure that these important conventions are not violated during construction, operation or decommissioning of the proposed projects.

3.8.3. The United Nations Framework Convention on Climate Change (UNFCCC)

This is an international environmental treaty produced at the United Nations Conference on Environment and Development (UNCED), informally known as the Earth Summit, held in Rio de Janeiro from 3rd to 14th June 1992. The objective of the treaty is to stabilize greenhouse gas concentrations in the atmosphere

at a level that would prevent dangerous anthropogenic interference with the climate system. The treaty itself sets no mandatory limits on greenhouse gas emissions for individual countries and contains no enforcement mechanisms. In that sense, the treaty is considered legally non-binding. Instead, the treaty provides for updates (called "protocols") that would set mandatory emission limits. The principal update is the Kyoto Protocol, which has become much better known than the UNFCCC itself.

Relevance to the Project
This Convention is relevant due to the significancy of climate change on existing water sources and water resources management.

3.8.4 Convention on the Elimination of all forms of Discrimination against Women (CEDAW)
The Convention on the Elimination of all forms of Discrimination against Women (CEDAW) places explicit obligations on states to protect women and girls from sexual exploitation and abuse. Universal Declaration of Human Rights (Article 7), the UN Charter (Articles 1, 13, 55, and 76) and the International Covenant on Civil and Political Rights (Article 24) reaffirm the freedoms and rights of all children, including internally displaced children. Gender balance should be given priority when hiring employees for the project implementation. Children should not be engaged in any form of employment.

Relevance to the Project
This Convention will be applicable in the employment of construction workers to avoid discrimination against any gender and hiring of children.

3.9 HARMONIZATION OF BOTH WB AND GOK REQUIREMENTS FOR SOCIAL AND ENVIRONMENTAL SUSTAINABILITY
The World Bank (WB) and Government of Kenya (GoK) require that Projects of such nature are subjected to environmental and social impact assessment as stipulated under EMCA Cap 387 and its tools; the same process simultaneously fully resolves requirements of OP 4.01 generally, both requirements are aligned in principle and objective in that:

- Both require Environmental Assessment before project implementation leading to development of comprehensive Environmental and social Management plans to guide resolution of social and environmental impacts as anticipated.
- While OP 4.01 of World Bank stipulates different scales of Project Report for different category of projects, EMCA requires Project Report for all sizes of projects, which are required to be scoped as relevant.
- Where EMCA requires consultation of Lead Agencies comprising of relevant sectors with legal mandate under GoK laws, the WB has equivalent safeguards for specific interests.
- The Bank requires that stakeholder consultations be undertaken during planning, implementation, and operation phases of the project, which is equivalent to the statutory annual environmental audits at the operation phase of projects in Kenya.

The understanding of this Project Report study is that pursuit of an in-depth Project Report process as stipulated by EMCA Cap 387 is adequate to address all World Bank requirements in the OP. This is a major guiding principle in this study. Therefore, in keeping with this trend, public consultation has been done to the stakeholders, and their comments have been incorporated in the final Environmental Assessment and final design of the project. In addition, the Environmental Assessment report will be made

publicly available to all stakeholders through disclosure at the project's proponent website, NEMA, and WB website, as well as copy of the report available at the project site.

3.10 PROJECT IMPLEMENTATION INSTITUTIONAL STRUCTURE

3.10.1 Murang'a Water & Sanitation Company Limited (MUWASCO)

MUWASCO will be the Project's proponent and shall therefore ensure that the implementation of the Environmental and Social Management Plan (ESMP) is effectively executed and with adequate resources provided. MUWASCO have an Environmental and Social Safeguards Officer within its establishment who will be responsible for supervision and monitoring for compliance of the ESMP implementation and reporting.

The responsibilities of MUWASCO will include:

- Responsible for day-to-day coordination.
- and implementation of the project.
- Oversee the contractor's work.
- Ensure the grievance committees are established and working.
- Monitor the ESMP implementation.

Roles of the proponent's Environmental and Social Safeguards Officer:

- Ensure compliance to proposed ESMP by the contractor.
- Ensure review of ESMP is up to date.
- Carry out periodic audits of the ESMP to ensure that its performance is as expected.
- Preparation and submission of ESMP implementation Reports.

3.10.2 The Contractor

The contractor will be required to fully comply with implementation of the ESMP. The contractor will be required to submit a detailed Construction Environmental & Social Management Plan (C-ESMP), which comply with the ESMP, prior to mobilization on the construction site. The Contractor should establish, implement, and maintain procedures to identify potential emergency situations and potential accidents that can have an impact on the environment, surrounding communities, the employees, and/or the public.

Among the Key Staff of the Contractor will be an Environmental and Social Safeguard officer with the necessary qualifications and experience to manage the implementation of ESMP. The Contractors will also be required to prepare constructions Method Statements that will be task-specific after undertaking specific risk assessments.

Contractor's Responsibilities:

- ESMP Implementing contractor for the project.
- To ensure strict compliance of environmental specifications in the ESMP.

4 ENVIRONMENTAL AND SOCIAL BASELINE CONDITIONS

4.1 PROJECT LOCATION

Project Location Murang'a County is one of the five counties in the Central region of the Republic of Kenya. It is bordered to the North by Nyeri, to the South by Kiambu, to the West by Nyandarua and to the East by Kirinyaga, Embu and Machakos Counties. It lies between latitudes 0° 34‟ South and 10 7‟ South and Longitudes 36° East and 37° 27‟ East. Murang'a County occupies a total area of 2,558.8 Km2 . The County lies between 914m above sea level (ASL) in the East and 3,353m above sea level (ASL) along the slopes of the Aberdare Mountains in the West. The highest areas in the west have deeply dissected topography and are drained by several rivers. All the rivers flow from the Aberdare ranges to the West, South Eastward to join Tana River. The County is divided into seven constituencies (Sub-Counties): - Kiharu, Kangema, Mathioya, Gatanga, Kigumo, Kandara, and Maragua. The project site lies within Maragua constituency with a total population of 57,252 according to the census conducted in 2019.

4.2 PHYSICAL ENVIRONMENT

4.2.1 Climate

There are two rainfall seasons in the County i.e. Long rains (March –May) and Short rains (October – November). The highest potential areas receive an average annual rainfall of between 1400mm and 1600mm. Low potential receive rainfall less than 900mm per annum. Rainfall in high and medium potential areas is reliable and well distributed throughout the year and is adequate for cultivation. However, on low potential areas rainfall is unevenly distributed and therefore unsuitable for cash crop production. Temperatures vary with altitude. The mean annual temperature ranges from 13 C -28 C, minimum annual temperatures range between 14°C and 18°C and the mean maximum temperature ranges from 26-30 C ideal conditions for rearing of livestock and farming.

4.2.2 Geology

The geology of the County consists of volcanic rocks of the Pleistocene age and basement system rock of Achaean type. Volcanic rocks occupy the western part of the County bordering the Aberdares while rocks of the basement system are in the eastern part. Porous beds and disconformities within the volcanic rock system form important aquifers, collecting and moving ground water, thus regulating water supply from wells and boreholes. As a result, most parts of the area have a high-water table. The project area is prone to landslides. This is due to the high, mechanically unstable slopes of deeply weathered volcanic soil and a high sorption capacity of the surface soil layer.

4.2.3 Hydrology

The proposed project study area is rich in water resources. However, much of it has not been harnessed to benefit the areas development. The key water sources in study area are: -

• Rivers • Boreholes • Rainwater harvesting; • Unsecured Springs; and • Shallow wells.

Water is used for multiple purposes among them being domestic, agriculture and industry (coffee processing). The impacts of water use and demand have affected the water quality through pollution and siltation due to poor farming methods. There are cases of river pollution especially from domestic waste and sewer from the market centres. This is due to the lack of a proper sewer system in the project area. Swamps and wetlands have also been encroached on especially for growing food for domestic consumption during drought. This affects the volumes especially during drought.

4.2.4 Topography

The project area's high-altitude areas are at the foot of the Aberdare Ranges, which starts at about 1800 masl and terminates at about 1350 masl as shown on figure 5. The land then slopes towards the east and is characterized by numerous hills and steep valleys. Streams and small rivers run through the valleys which even out at about 1500 masl. The major physical features are the hills and valleys with few major rivers including Maragua and Irati. The rivers flow from the Aberdare ranges to the West, South Eastward to join Tana River. More than 95% of the land is generally mountainous landscape.

4.2.5 Soils

Variations in altitude, rainfall and temperature between the highland and lowland coupled with the differences in the underlying geology of both volcanic and basement system rocks give rise to a variety of soil types. Highland areas have rich brown loamy soils suitable especially for tea, coffee, maize, and dairy farming. Soils in the lower areas are predominantly black cotton clay soils with seasonal impended drainage. The proposed site is located on an area of medium potential and can be described by above facts. 3.3 Biological Environment There is no significant wildlife in the project areas, due to the natural vegetation being significantly altered (plantation forest is slowly replacing the natural forest, and grasslands have been converted for agriculture).

4.3 SOCIAL ECONOMIC SURVEY

This process involved economic and social survey conducted on both the Project Affected Persons and general community through direct interactions with the local communities and other stakeholders and through questionnaire administration. A quantitative survey was conducted using structured questionnaire and it was designed to generate the required information. The information was used to answer questions related to status of social and economic parameters within the project site including, the availability or lack of social service facilities, existing levels of access to education, health, potable water and related services, local market prices as well as agricultural production and productivity, all of which were useful in valuation of assets and computation of compensation rates. A series of consultations were held using both formal and informal meetings with carefully selected members of the communities and all PAPs. The purpose of this survey was to identify types of impact and accordingly categorize displaced persons, develop entitlements, and prepare resettlement plan for each family.

The following information about each family was collected:

- Human resource base of each family.
- Economic status of each individual member of the family.
- Ownership of property – movable and immovable.
- Property including lands, structures, trees, and houses either occupied or owned with tenancy rights or even as encroachers or those de-facto in possession.
- Means of livelihood due to stagnation of developmental activities soon after the project, loss of property, loss of access to clientele, loss of jobs due to physical re-location, loss of gainful employment, loss of access to income generating resources.
- Community life, community properties and resource base, community amenities and services, socio-cultural value.
- Loss of habitats and lands, degradation of land and water resources, environmental degradation, adverse impact on health etc. as an after effect of the proposed Project.

4.3.1 Socio-Economic Survey Findings

During the study, socio-economic survey carried out targeted household heads. Random sampling was used to select the respondents from the project areas along the proposed pipelines routes and those

expected to benefit from the project. A sample size of 86 questionnaires was administered. This reasonable response rate was successful because the respondents were visited in their households. 25 No. (29%) of the respondents came from Kambiti Ward, 28 No. (33 %) from Gakoigo Ward and 33 No. 38% from Maragua Ridge Ward.

4.3.2 Population

According to the 2019 population census, Maragua constituency had a total population of 57,252. The numbers of females were slightly higher than their male counterparts. The population which is expected to benefit from the proposed project in Maragua Ridge, Kabiti and Igikiro Wards is approximately 6,950 people.

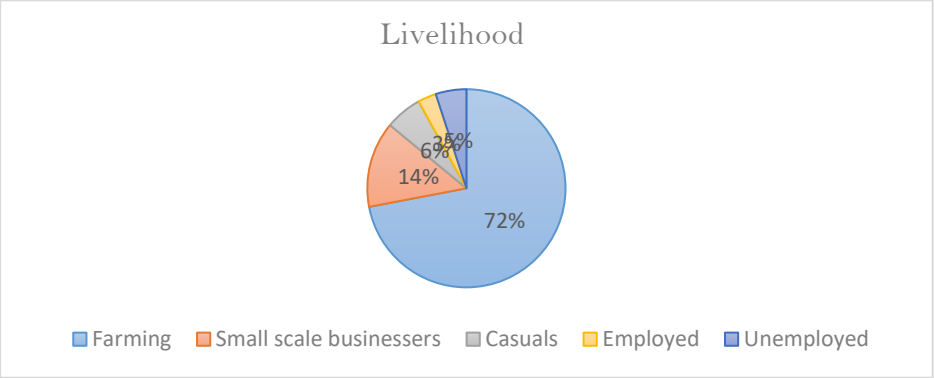
4.3.3 Land and Land use

Land in Murang'a County is classified into freehold or leasehold land. An individual holds freehold land for an unspecified period while leasehold is given by the government to an individual or organization over a specified period and is expected to remit rent to the government. Most part of the project area is comprised of agricultural land owing to its wide Agro Ecological Zone range from Tropical Alpine Zone (TA). The people are predominantly farmers and apart from crops, they also practice animal husbandry. The animals reared include dairy animals, poultry, and pigs on a smaller scale.

4.3.4 Livelihoods

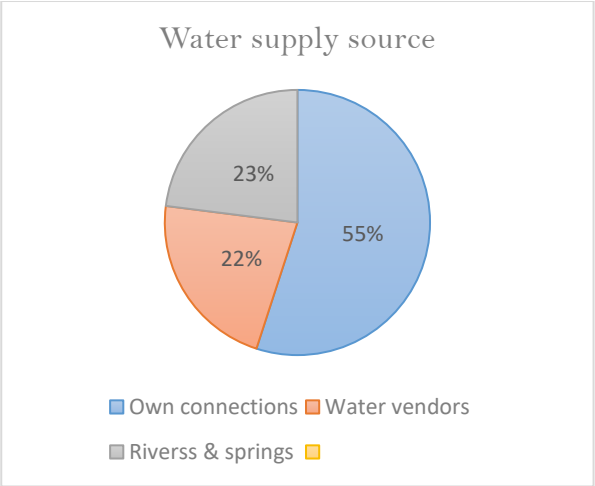
Maragua Sub – County is predominately an agricultural area where farmers are involved in cash crop farming, subsistence farming, livestock keeping and fish farming. The cash crops farmed in the County include coffee, avocado, mangoes, macadamia and horticulture crops, among others. Horticultural crops include tomatoes, cabbages, kales, spinach, and French beans while food crops include maize, beans, bananas, sweet potatoes and cassava. The urban areas residents are involved in commercial activities like rental housing, transport, and trade within markets and shops. This increases the demand for water especially for activities dependent on water to run their business.

The Study team carried out administration of the socio-economic questionnaires to establish the livelihood activities within the project area. Majority of the respondents (72%) are engaged in farming while 14% are in small scale businesses. Only 3% of are in permanent employment, 6% of the respondents are engaged in casual labour while 5% reported to be unemployed.



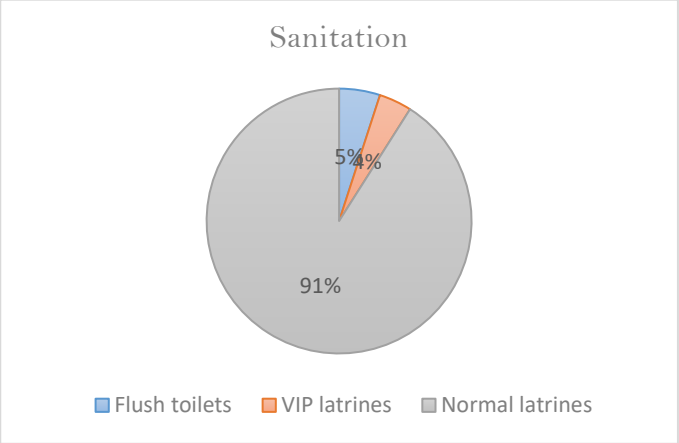
4.3.5 Water supply

38% of the respondents reported to be getting from the Murang'a South Water and sanitation Company (MUSWASCO), 17% from MUWASCO, 22% purchase water from vendors while the rest (23%) fetch water from rivers and springs in the area.



4.3.6 Sanitation

About 99.78 per cent of the households in the County use toilet facilities. Out of these, 4.97per cent use flush toilets, 3.97per cent use VIP latrines while the others use ordinary pit latrines. Most people living in the market and trading centres use ordinary pit latrines.



4.3.7 HIV and AIDs, Malaria, and other diseases

HIV and AIDS are considered a threat to the development of Kenya. The prevalence rate in Maragua Sub – County stands at 3.7 percent. AIDS related deaths are common and those mainly affected are within the productive age group of 15-49 years of age. It was also noted that the number of HIV/AIDS orphans is on the increase. Poverty is viewed as a major cause of HIV/AIDS. Poverty increases vulnerability of people with HIV, hence there is need to redirect resources towards support services to poor households. The situation is further aggravated by the fact that HIV/AIDS mostly affects people in the productive age leaving minors and the elderly people to take care of households. Progressive gains on poverty reduction may be reversed if concerted efforts are not urgently put in place to bring the HIV/AIDS pandemic under control. Implementation of the project thus needs to create comprehensive HIV/AIDS awareness among the workers along the project area.

5 PUBLIC PARTICIPATION AND CONSULTATIONS

5.1. INTRODUCTION

The overall objective of the exercise is to involve citizens in project formulation and implementation at the local level. More specifically, the objective is to put in place a durable system of intra-community co-operation through collective action, which creates communal discussion forums for the implementation of development activities. The foregoing is particularly pertinent in the context of Article 35 of the Constitution of Kenya which, provides that 'every citizen has the right of access to information held by the state; and information held by another person and required for the exercise or protection of any right or fundamental freedom'. For instance, a question would arise about a project such the construction of new pipelines and how it affects the local people's right to a clean and healthy environment enshrined in Article 42 of the Constitution of Kenya. This was determined inter alia through subjecting the project to public participation and consultation that is the subject of this chapter.

The Environmental Management and Coordination Act (EMCA) of 1999, calls for effective stakeholder participation and public consultation in the ESIA Study process. EMCA requires a project proponent to seek the views of persons/communities that may be affected by the project to be consulted, at least explain project potential impacts and obtain oral/written comments, which will be included in the ESIA for implementation by the proponent. Consultation and participation is a process through which stakeholders influence and share control over development initiatives, and participate in decisions on resources that affect them. It is a two-way process where the executing agencies, policy makers, beneficiaries and affected persons discuss and share their concerns in a project process. According to the World Bank's policies, project affected persons and host communities are to be meaningfully consulted early in the planning process and encouraged to participate in all stages up to the implementation of the project.

During ESIA scoping and sites visits, consultations were held with potential Project Affected Persons, neighboring communities of the project areas, local leaders and the Project's Proponent senior officers. The stakeholders and public consultations were carried out in accordance with the provisions of EMCA which has established the list of projects to be the subject of an environmental impact study, instructions, conditions and procedures to carry out the environmental impact assessment.

This Section highlights the need for stakeholder participation and the consultative process adopted during the study and summary results of the process.

5.2. STAKEHOLDERS AND PUBLIC CONSULTATIONS OBJECTIVES

The principal objective of these consultations is to inform, consult and involve the stakeholders at different levels concerned by the project to ascertain their sensitivity to the project (acceptance, reluctance, nature of fears and requirements), the needs of the actors and their recommendations in view of good environmental performance of the project. The specific objectives of the ESIA stakeholders and public consultations process are:

- Identification of significant impacts.
- Identification of public's interest and values.
- Identification of priorities for assessment.
- Encouraging public understanding of the proposed project.
- The public can contribute local knowledge and values to the prediction, evaluation and mitigation of impacts.
- Improvement in quality and acceptability of ESIA Report.

- Public comments on acceptability of project impacts.
- Public evaluate impacts that occur and support project environmental management processes.
- Provide a platform for future consultation by:
    - Reducing conflict through early identification of contentious issues.
    - Improving transparency and accountability of decision making.
    - Facilitating participation to increase public confidence in the ESIA process.
    - Identifying stakeholders with who further dialogue will be constructive in subsequent stages of the project.

5.3 THE CONSULTATIVE PROCESS ADOPTED

The environmental survey team recognized the significance of the assignment findings to intended project users and in this regard, considered active involvement of all potential project stakeholders. To attain this objective, the consultant adopted a participatory approach in the identification of environmental and social impacts that are related to the project cycle. The stakeholder Analysis involved the following process:

- Identification and Mapping of Key Stakeholders.
- Defining the mode of consultation and engagement.

Several methods were used to engage stakeholders in the process of capturing their views, issues and concerns on the proposed project during data collection. The levels of project stakeholder engagement during data collection approaches and procedures were through household questionnaire data collection, key informant interview with selected leaders and through community meetings at Igikiro Centre and Samar Areas on 19/06/2024. Respondents for the structured questionnaire were picked randomly from the various areas covering the proposed project.



Administering the questionnaire for the household survey to respondents within Samar area

5.4 KEY INFORMANT INTERVIEWS

Key Informant Interviews

The key informant consultations were conducted on the 16th & 17th June 2024. The method used to carry out consultations took into consideration the profile of the stakeholders, type of information desired and level of engagement. Each primary key stakeholder was visited at their offices.

Key Informants

- Technical Manager – MUWASCO
- Ward Administrator – Maragua Ridge Ward
- Maragua Sub-County Public Health Officer
- Maragua Sub-County Water Officer
- KENHA Roads Maintenance Engineer – Muran'ga County
- KURA County Roads Engineer – Murang'a County
- KERRA Roads Engineer – Murang'a County
- County Engineer (Roads & Public Works) –Murang'a County
- Area Chiefs &Assistant Chiefs in Maragua Ridge, Gakoigo, Kambiti & Igikiro
- Community Leaders in the Project areas

The outcome of the interviews is summarized in Table 5-1:

Table 5.1: Summary of Key Informant Interview

	Key informant interviewed	**Summary of remarks**
1	Technical Manager – MUWASCO	The recently commissioned Gakoigo Bulk Water Treatment Plant has designed production capacity of 15,000m^3/day with good quality water. Currently, water is supplied to a few households and the proposed pipeline extension will allow additional connections. In addition, business premises, public & private institutions in Maragua Town and the environs will be supplied with adequate water.
2	Commercial Manager – MUWASCO	With the extension of water supply pipelines and installation of meters, revenue generation for MUWASCO will increase.
3	Sub-County Water Officer (Maragua Sub-County)	The proposed interventions will increase water supply to not only to the area residents, but also to the schools, health centres and small businesses such as hotels & bakeries operating in Maragua Town.
4	Sub-County public Health officer (Maragua Sub-County)	Improved access of clean drinking water for the residents will significantly reduce cases of water borne diseases.
5	Ward Administrator – Maragua Ridge Ward	Increase water supply will support in the dairy farming which is a source of income for the area residents.
6	KENHA Roads Maintenance Engineer – Muran'ga County	- Enquired if the proposed pipelines will be installed along the Kenol – Murang'a C71 Road - Upon scrutinizing layout plan for the proposed pipelines, confirmed that no pipelines will be installed on KENHA Managed areas.
7	KURA County Roads Engineer – Murang'a County	- 2 sections of pipelines (each approx. 400m) will be installed within Maragua Town CBD area. - The roads were recently rehabilitated and the storm water drainage system rehabilitated.

		- The CBD roads are narrow and the wayleave provided for utilities already have existing water pipelines and telecommunication cables. - The project proponent will have to make application to KURA for permit to install the proposed pipelines. The application should be accompanied with survey plans indicating the actual location of the pipelines. - KURA will provide support for the project since the Town needs water for human consumption and other economic activities.
8	KERRA Roads Engineer - Murang'a County	- Noted that most of the proposed pipelines will be installed on the KERRA road reserves. - The roads road reserves have adequate areas for installation of public utility infrastructure. - The proponent to ensure that permits are obtained from KERRA for the various pipelines. - No cutting of the road carriageway will be permitted. For any road crossings, only micro-tunnelling is allowed under the supervisions of KERRA.
9	County Engineer (Roads & Public Works) –Murang'a County	- Some pipelines sections will be installed within County maintained roads. - Requested the proponent to ensure the pipes are installed at the edges of the utility wayleave and at depths exceeding 1m to avoid damages during the maintenance of the rural roads.
10	Chief - Gakoigo Location	- Locals will benefit from employment opportunities during construction of the project. Since the pipelines will be installed along the road reserve, there shall be no conflicts regarding land matters as it happens with other public projects. - The small businesses within Maragua Town as well as nearby schools will benefit from the project.
11	Representatives of Business Community – Mr Daniel Kairo	- Maragua Town has experienced lack of water for many years forcing many businesses to relocate to Murang'a and Kenol Towns. - If water supply can be improved, then more businesses would reopen.
12	Representatives of informal, small & medium business owners within the proposed Project areas.	- Purchase of materials for construction purposes such as sand, building blocks, cement and even PVC pipes should be made from the various hardwares in Maragua Town to boost the traders when the project starts

5.5 PROJECT AREA COMMUNITY CONSULTATIONS

The community consultation was held in addition to Key informant interviews and household survey as a means of seeking the opinion of community members regarding the proposed project. The consultation meetings were organized by the area chief in consultation with the Ward Administrator and were held at Igikiro Centre and Maragua Ridge Areas on 19/06/2024.

The main objective of the public consultations with the affected project area residents was to gather information on their concerns, perceptions, reactions and fears of the livelihood changes to be brought about because of the proposed Project implementation. Other specific objectives were the following:

- Explain the proposed project's scope of works and the construction activities in details to the local people.
- Gathering information on socio- economic and environmental information on the community and project sites.

During the presentation session, the residents were given detailed information about the project by the consultant team. The presentation highlighted the project background, components, objectives, expected upcoming activities, potential socio-economic and environmental impacts. After the presentations, the community was given opportunity to give their views, comments and queries. The general point of view expressed by local community was that the project is really needed in their living environment. Questions were answered, clarifications offered and their recommendations recorded.



Community engagement at Igikiro Trading Centre



Community engagement at Maragua Ridge Area

COMMUNITIES' CONCERNS

Some of the issues and concerns raised by the residents regarding the implementation of the proposed project are summarized below:

Table 5.2: Issues and concerns raised during the meeting at Igikiro Market Centre and Maragua Ridge Stakeholders meetings.

	Comment/ Question	Response
1	Mr. Charles Kamau (Igikiro) - When will the project start and who is the Contractor?	**MUWASCO** The installation of pipelines from Maragua to Igikiro will commence once all the preparations are complete including the preparation of the ESIA Study Report and its approval.
2	Ms. Esther Rueri (Igikiro)– There are pipelines in the area which were installed many years back. Why not use them instead of installing new ones?	**MUWASCO** Most of PVC pipes were damaged during the construction of the road. The remaining pipes are in poor condition and cannot be relied on to deliver water to consumers.
3	Mr. Kariuki Motoku (Maragua) – Could the residents be briefed on the proposed project since very few people have any knowledge about it.	**ESIA Consultant** The ESIA Consultant presented the Scope of Works on the proposed project. The works will involve the installation of about 20Km of water pipelines to cover Maragua Ridge, Igikiro and Kambiti areas within Maragua Sub – County and installation of 2,000 consumer water meters.
4	Ms. Edith Githuita (Samar Area) What will be the cost of water connection and monthly bills? The people with water connections have been complaining of high-water bills and most of the local people may not afford.	**MUWASCO** The water tariffs are as approved by the Water Services Regulatory Board and are quite reasonable. The monthly bills depend on one's consumptions averaging between Ksh 500 -1,000 for most of the rural households. A technical assessment will be

		carried out once an application has been done and the consumer informed of the charges to pay for connection.
5	Mr. Elias Chomba (Maragua) - Wanted to know whether they will get opportunities to supply construction materials.	**ESIA Consultant** The contractor will be encouraged to source construction materials locally if available in the right quality and quantities.
6	Mr. Samuel Irungu (Igikiro) - Wanted to know who will be responsible for water distribution in the area. Is it MUWASCO or MUSWASCO?	**ESIA Consultant** Based on the layout plan for the proposed pipelines from MUWASCO, all the pipelines will be installed on road reserves and no private land will be affected.
7	Mr. John Ndegwa (Samar) – Some existing pipes and even water tanks have been constructed on private farms. Will this project have pipelines laid in their farms and how will they be compensated.	**ESIA Consultant** The contractor will abide by the Kenyan laws and international standards including the Work Injury Benefit Act (WIBA) which caters for any work-related injuries.
8	Ms. Mary Wangui (Gakoigo) – Will residents get water to their homes this time or is it another campaign promise as has happened before?	**MUWASCO** The proposed project will be implemented as planned since the funds are available.
9	Ms Lillian Njeri (Gakoigo) – Will the local people benefit during the construction of the project and how?	**ESIA Consultant** The Contractor will utilize local labour force especially the youth for excavations for pipe installations. Local people with skills in pipe fixing, masonry, carpentry will aso be considered. The contractor will source some construction materials locally subject to availability.
10	Mr. Harun Muchina (Igikiro) - Was concerned that in the event the contractor decides to use machines such as excavators to do the work, employment opportunities for the locals would diminish.	**ESIA Consultant** The selected Contractor will be encouraged to use manual labour as much as shall be practical and economical so that local people could benefit from employment opportunities.
11	James Ngugi (Maragua) – Are there plans to have sewerage in Maragua Town now that more water will be distributed?	**MUWASCO** Planning and engineering designs are currently on-going for a sewerage system for the Town.

All issues that were raised during the public and stakeholders' consultations were recorded and the mitigation measures have been included in this ESIA Study.

5.6 PUBLIC DISCLOSURE OF THE ESIA

This ESIA provides for the below listed provisions with regards to public disclosure:

(i) In accordance with EMCA 1999 Cap 385 and World Bank OP 4.01, the Project Proponent in this case MUWASCO will ensure that the Results of Public Consultations including ESIA area disclosed on NEMA, World Bank, WSTF & MUWASCO websites.

(ii) The Report will also be made available at the Maragua Sub-County offices as well as at the Kambiti & Gakoigo Wards Offices, Murang'a County, for ease of access by the Project's interested parties at location level.

(iii) At completion of the Project construction works, the EIA/EA Audit Regulations of 2003 requires the Project proponent to undertake a closeout audit after completion of the project and undertake an initial Environment Audit (EA) immediately after commissioning of the project.

6 ENVIRONMENTAL AND SOCIAL IMPACTS

6.1 INTRODUCTION

The objective of the identification and assessment of impacts is to provide accurate information on the effects of activity execution to human beings and environment in general, which will allow the competent authority to take decision as whether the activity will be authorized subject to mitigate proposed measures or rejected. Impacts are defined as the changes in an environmental parameter that result from undertaking an activity. These changes are the difference between effects on an environmental parameter where the activity is undertaken compared to that where the activity is not undertaken and occur over a specific period and within a defined area.

This section entails assessment of impacts of the proposed Project. The proposed project has potential to cause positive as well as adverse impacts on the biophysical and socio-economic environment. The magnitude of potential impacts will vary between the phases of project implementation. The assessment of the project impacts given below is for the proposed Project which comprise the construction of main infrastructures namely: installations of pipelines and water meters.

During all phases of the project implementation, MUWASCO in collaboration with the contractor shall implement all measures necessary to avoid undesirable adverse environmental and social impacts wherever possible, restore work sites to acceptable standards, and abide by any environmental performance requirements specified in the Environmental and Social Management Plan. More specifically, the contractor shall ensure that the negative impacts are minimized, mitigated or avoided.

6.2 TYPES OF IMPACTS

Different types of impacts may occur from the implementation of this type of project, which may be positive or negative, and can be categorized as being either direct (primary), indirect (secondary) or cumulative.

6.2.1 Direct impacts

Direct impacts are impacts that caused directly by the activity and generally occur at the same time and at the place of the activity (for example, dust generation excavation activities). These impacts are usually associated with the construction, operation or maintenance of an activity and are generally obvious and quantifiable.

6.2.2 Indirect impacts

Indirect impacts are induced changes that may occur because of the activity (for example the use of water from a natural source at the activity will reduce the capacity for supply to other users). These types of impacts include all the potential impacts that either does not manifest immediately when the activity is undertaken, or which occur at a different place because of the activity.

6.2.3 Cumulative impacts

Cumulative impacts are impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities (for example, removal of vegetation may cause soil erosion, leading to excessive sediments in receiving stream, leading to reduced sunlight penetrating the water and thus reducing dissolved oxygen in the water and adversely affecting aquatic life and water quality). Cumulative impacts can occur from the collective impacts of individual minor actions over a period and can include both direct and indirect impacts.

6.3 POTENTIAL IMPACTS IDENTIFICATION AND ASSESSMENT

Potential impacts associated with the project were identified based on the qualitative information and data on cause-and-effect relationship. The identification considers the sources of impacts and relates them to the environmental or social characteristics and conditions; hence concluding if the source of impact affect or not the specific environmental or social components of the project activities. The impacts identification considers the various stages of the proposed project including:

- Construction
- Operational
- Decommissioning phases.

The methodology used for impacts assessment in this report is related to risk assessment:
(i) Whereby certain impacts to the environment are identified.
(ii) Risk evaluation.
(iii) Risk management relating directly to applicable mitigation measures to be implemented to manage a risk of an impact in the best interest of the project beneficiaries and surrounding communities.

6.4 POSITIVE IMPACT DURING CONSTRUCTION PHASE

The proposed Project implementation will result in many social-economic benefits for the beneficiaries and surrounding communities of the project. In general, it is expected that the project will result in better access to safe drinking water and sanitation facilities leading to improved standards of living in terms of reduction of diseases, creation of temporary employment during construction and other economic development upon commissioning of the improved infrastructure. The following section highlights the potential positive socio-economic impacts likely to be generated by the project:

Creation of temporal employment opportunities at the construction site

- The local people during community consultations reported anticipating for creation of employment at the construction site from the opportunities presented by the project activities. It was observed by the community that local youth will be given priority for any opportunities either at the construction phase of the project or during the operation of the proposed water supply system. Though there are fears of either use of machines for excavations or migrant labourers.

Creation of markets for project construction materials

- It was evident from the discussions with the community that there shall be creation of markets for project construction materials which should be sourced locally from those who can supply. The contractor shall therefore be required to float open tendering to the local community with an objective of identifying such suppliers.

Access to water

- It was apparent during the study that local people sometimes face challenges of access water especially during droughts when the existing streams dry up. Potable water sources are limited in most parts of the study area. Implementation of the project will provide an opportunity to access to improved water supply hence reducing time and distance travelled to fetch the commodity particularly by women and the girl child.

Dairy farming

- Availability of water will improve livestock watering and milk production in the area hence contributing to improvement in both household income and nutritional security. The local people reported drought as one of those factors that affect milk production but with availability of sustainable source of water, the impacts will be reduced.

Increased access to clean water

- To the local population that shall impact on personal and food hygiene and decline in cases of water-borne diseases.
- Increased revenue to MUWASCO who will distribute water at the approved tariff.

Improved Water Reliability:

- The proposed pipelines extensions to Maragua Ridge, Kambiti and Igikiro areas will improve the reliability of the existing water supply scheme through a cost effective and climate proof technology for sustainability.

Improved living conditions

- Through elimination of water fetching chores for women and children who can then focus on income-generating activities and education respectively, in view of the time saved because of the water supply source being closer to their homes and more reliable.
- The vulnerable groups in the community make tremendous physical and financial efforts to access potable water services. They often resort to unsafe sources to obtain this valuable commodity therefore the project will come in hand to improve access to safe source.

Reduce child mortality

- Access to clean water is also anticipated to reduce the mortality rate, particularly among children, and helping to increase life expectancy within the environs of the proposed project area.

Improved hygiene

- Increased access to improved sanitation to the local population will impact on hygiene and decline in cases of water-borne diseases.

Knowledge transfer

- Technical and planning skills will be gained by the local people who will be employed by the project, and this is likely to contribute to their enhanced capacity and skills to undertake such construction activities in future.

6.5 NEGATIVE SOCIAL IMPACTS DURING CONSTRUCTION PHASE

Negative Impacts

The Project will involve the following activities:

Table 6.1: Activities to be undertaken under the project

Phase	Activities
Construction	- Delivery of construction pipes and fittings to the construction site. - Manual and mechanical excavation of trenches. - Cutting of trenches across road sections or micro-tunnelling of the road sections. - Temporary stockpiling of soils, sub-soils and stones along the trenches.

	- Delivery of material for bedding of concrete joints and associated valve chambers (e.g. sand, cement, and concrete). - Delivering pipeline sections and culverts to the construction sites if need be. - Jointing of the pipeline sections. - Backfilling of the trenches. - Rehabilitation of the project sites.
Operation	- Repair and maintenance of sections of the pipelines. - Connection of new customers to the pipelines.
Decommissioning	- Excavation works. - Cutting/ sawing of pipe sections. - Temporary stockpiling of soils, sub-soils and stones along the trenches. - Demolition of concrete joints and other civil works. - Transportation of pipe sections and fittings from the pipeline sites. - Removal of solid wastes (i.e. earth material and civil wastes) from the pipeline sites. - Rehabilitation of the project sites

The following negative impacts are associated with the construction, operation and decommissioning phases of the project:

Negative Impacts during the Construction Phase

1. Partial loss of land use

During construction phase, it will be impossible to grow crops along the way leaves before the actual laying of pipeline. It should however be noted that the project does not lead to physical displacement of persons and the process of construction will take a very short time; say one season of crop growing.

2. Slope stability

Cases of landslides, mainly triggered by rainfall and human activities have been reported in the past and of recent in Murang'a County. Moreover, the areas along the pipeline route, especially in Kiharu & Maragua Sub-Counties are characterized by highly mountainous landscapes with ragged terrain. Trenching activities during construction phase might interfere with dormant shear zones there thus leading to land damages where volumes of soil being transported downhill where proper care is not taken.

3. Soil erosion and siltation of Surface Water Resources

The proposed project will involve activities that will require vegetation clearance which may loosen the soil hence making it vulnerable to erosion due to wind and surface water run-off. Excavated soils could be swept into surface water bodies by storm water floods during rains. This will increase the turbidity and sediment loads of the water bodies thereby increasing the cost of water treatment.

4. Air Quality Degradation

Potential air quality degradation will occur because of vehicular and equipment emissions/ exhaust gases. Generation of dusts from trucks and vehicles accessing the construction areas and camp sites as well as piling of material is expected to degrade the local air quality.

5. Interruption of Existing Infrastructure and Services

The pipeline route traverses an existing road reserve, but some sections will cross tarmacked and feeder roads. Construction work will interfere with existing supply and distribution pipeline networks thereby

interrupting water supply services. These services are critical and have implications with spill-over effects on the social and economic performance.

6. Effect on Socio-Economic Activities
During the construction phase, any crops in the farmlands that encroached on the road reserve will be cleared to make way during the construction of the pipeline. Visits to the project area revealed minimal encroachment by way of farmlands and live fences to the road reserve. This impact will therefore have minimal adverse effect to the local communities.

7. Loss of Flora and Fauna
There are no trees established within the road reserve; there are also no habitats for rare/ extinct faunal species. The reserve harbours scattered shrubs and grasses. Construction activities will therefore have minimal impact on flora and fauna characteristic of the area.

8. Increased Vehicular and Human Traffic
During the construction phase of the project, there will be an influx of construction workers to the project sites. This might contribute to the disruption of social order within the local communities. Increased vehicular traffic during the transportation of construction materials might result in the destruction of light traffic roads and increase the risk of transportation accidents.

9. Generation of solid wastes
Project construction activities will generate various solid wastes ranging from earth material, pipe and fitting debris, wrappings, equipment oils and greases, waste asphalt concrete, human wastes to food wastes. Poor handling and disposal of such waste will lead to environmental pollution. Such wastes have the potential to enter and clog the local drainage channels thereby causing flooding.

10. Health and Safety Hazards
Construction workers and the local community will be susceptible to health and safety hazards during the construction phase of the project. Inherent occupational risks include muscular-skeletal injuries, falls into un-marked/ uncovered trenches and accidents from construction vehicles. The influx of construction workers may put pressure on existing local resources, cause social conflicts, promiscuity and the related sexually transmitted diseases. During the operation phase of the project, pipe bursts and movements during pipeline maintenance activities may trigger land damages that might cause destruction of private property and loss of lives.

11. Water quality degradation
The construction phase will be undertaken with limited usage of heavy machinery and extensive application of manual labor. However, small hand equipment will used to assist in the manual labor. The leakage of oils and greases and spillage of fuel, however at a lesser degree, will pollute the local surface water resources. This will consequently reduce the desirability of the water.

12. labour influx
The project will need to employ labourers and although most of the unskilled and semi-skilled labour requirements could be filled locally (from within the project areas), congregation of potential labourers from outside the project areas is likely, as they seek employment opportunities. This has the potential to result in a strain on local social dynamics including increased competition for local social and health services, other goods and services, increased crime

rates and illicit behaviour, social conflicts, and the risk of spread of communicable diseases. There may also arise complaints and dissatisfaction among the communities affected by the project if recruitment of workers is perceived to be biased and without local representation.

13. HIV /AIDS & other communicable diseases

Indirect impacts on the community can be the introduction of new communicable diseases such as HIV/AIDS due to in-migration for job opportunities, poverty, and prostitution. The extent of disease transmission between the communities and in-migrants would depend on the level of interaction between the two, the workforce size and health status of the workforce and casual migrants, and their susceptibility to disease infection.

14. Child Labour

Due to provision of cheap labour and differentiation in bargaining power, the underage workers may be employed leading to exploitation.

15. Sexual Exploitation and Abuse (SEA)

Due to vulnerability of women, they could be taken advantage of in the Project workplace in order to receive what is due to them or favours.

16. Gender-Based Violence (GBV)

This may occur at Project sites and at community level due to the cash flow within the communities during the construction phase.

Negative Impacts during the Operation Phase

1. Slope stability

Murang'a County is susceptible to landslides. The operation phase of the project will be characterized by periodic excavation to repair the pipeline to connect new distribution networks. Excavation along existing shear zones within the Project areas may trigger landslides. Furthermore, pipe bursts and water leakages from the pipeline system may also cause soil liquefaction and slope instability leading to lands damages.

2. Soil erosion and Siltation of Surface Water Resources

Earth material excavated during repair and maintenance of the pipeline may be carried away by wind and surface water run-off. Excavated soils could be swept into surface water bodies by storm water floods during rains. This will increase the turbidity and sediment loads of the water bodies thereby increasing the cost of water treatment.

3. Risk of illegal connection to the new pipeline

Illegal connections are common in low-income areas where residents connect to water supply pipes illegally to avoid paying connection fees and monthly service levies. This minimize will lead to Non-Revenue Water (NRW) and loss of revenue to MUWASCO. Loss of revenue will impact on the cash-flow of the company.

4. Generation of liquid and solid wastes

The increased supply of water to the Project areas and its environs will lead to increased generation of wastewater. Maragua Town doesn't have a sewerage system in-place; this will present a public health challenge to the residents of the town. Pipeline repair and maintenance activities will generate various solid wastes ranging from earth material, pipe and fitting debris, and wrappings that if poorly disposed will pollute the local environment.

5. Health and Safety Hazards
During the operation phase of the project, pipe bursts and movements during pipeline maintenance activities may result in land damages (both on land and crops) that might cause destruction of private property and loss of lives. During repair and maintenance activities, the project proponents' staff will also face various OHS risks that include muscular-skeletal injuries and accidents.

Negative Impacts during the Decommissioning Phase
1. Reduced availability of potable water to beneficiaries
The termination of the project at the end-of-project life will reduce the amount of potable water available to the established beneficiaries. This will cause increased competition for the water resources available at the time. Consequently, water- related conflicts and utilization of contaminated sources will occur.

2. Slope stability
The decommissioning phase will involve excavation of the pipeline to remove pipe sections and fittings. Excavation activities might interfere with dormant shear zones thereby triggering water land inflicted damages.

3. Soil erosion and Siltation of Surface Water Resources
Excavation activities during decommissioning will loosen soil thereby making it vulnerable to erosion due to wind and surface water run-off. Excavated soils could be swept into surface water bodies by storm water floods during rains. This will increase the turbidity and sediment loads of the water bodies thereby increasing the cost of water treatment.

4. Air Quality Degradation
Potential air quality degradation will occur because of vehicular and equipment emissions/ exhaust gases. Generation of dusts from trucks and vehicles accessing the project site and camp sites as well as piling of excavated material is expected to degrade the local air quality.

5. Interruption of Existing Infrastructure and Services
The pipeline route traverses an existing road reserve but some sections will cross tarmacked and feeder roads. Construction work will interfere will existing supply and distribution pipeline networks thereby interrupting water supply services. These services are critical and have implications with spill-over effects on the social and economic performance.

6. Effect on Socio-Economic Activities
During the decommissioning phase, any crops in the farmlands that encroached on the road reserve will be cleared to make way for decommissioning activities. Visits to the project area revealed minimal encroachment by way of farmlands and live fences to the road reserve. This impact will therefore have minimal adverse effect to the local communities.

7. Loss of Flora and Fauna
There will be no trees established within the road reserve during the operational phase of the project other than shrubs and grasses. Decommissioning activities will therefore have minimal impact on flora and fauna.

8. Increased Vehicular and Human Traffic

An influx of workers to the project sites will be experienced during the decommissioning phase of the project. This might contribute to the disruption of social order within the local communities. Increased vehicular traffic during the transportation of decommissioning wastes and salvaged materials might result in the destruction of light traffic roads and increase the risk of transportation accidents.

9. Generation of solid wastes

Decommissioning activities will generate various solid wastes ranging from earth material, pipe and fitting debris, wrappings, equipment oils and greases, waste asphalt concrete, human wastes to food wastes. Poor handling and disposal of such waste will lead to environmental pollution. Such wastes have the potential to enter and clog the local drainage channels thereby causing flooding.

10. Health and Safety Hazards

Workers and the local community will be susceptible to health and safety hazards during the decommissioning phase of the project. Inherent occupational risks include muscular-skeletal injuries, falls into un-marked/ uncovered trenches and accidents from construction vehicles. The influx of construction workers may put pressure on existing local resources, cause social conflicts, promiscuity and related sexually transmitted diseases.

Impact Assessment Matrix

An assessment on all the potential impact has been done as summarized below:

Table 6.2: Impacts Assessment Matrix

Impact	Nature of Impact				Occurrence			
	Positive/ Negative	Direct/ In-direct	Temporary/ Permanent	Significance level (High, Moderate, Low)	Pre-construction	Construction	Operation	Decommissioning
1. Increased reliability of water supply to the residents within the Project areas	Positive	Direct	Permanent	High			√	
2. Creation of employment opportunities for residents of the project area	Positive	Direct	Temporary	Moderate		√		
3. Improved Service Delivery by the County Government	Positive	In-direct	Permanent	Moderate			√	

4. Increased revenue generation by National Government	Positive	In-direct	Permanent	Moderate	√	√	√	√
5. Injection of Money to the Local Economy	Positive	In-direct	Temporary	High		√	√	
6. Benefits from Capacity Building	Positive	Direct	Permanent	High		√	√	
7.Slope in-stability	Negative	Direct	Permanent	Moderate	√	√	√	√
8. Soil erosion and siltation of surface water resources	Negative	Direct	Temporary	Moderate		√	√	√
9. Air Quality Degradation	Negative	Direct	Temporary	Moderate		√	√	√
10. Risk of illegal connection to the new pipelines	Negative	Direct	Permanent	Low			√	
11. Interruption of Existing Infrastructure	Negative	Direct	Temporary	Moderate		√	√	
12. Effect on Socio-Economic Activities	Negative	Direct	Temporary	Low		√	√	
13 Loss of Flora and Fauna	Negative	Direct	Temporary	Low		√	√	√
14. Increased Vehicular and Human Traffic	Negative	Direct	Temporary	Moderate		√	√	√
15. Generation of liquid and solid wastes	Negative	Both	Both	High		√	√	√

16. Health and Safety Hazards	Negative	Direct	Both	Moderate		√	√	√
17. Degradation of water quality	Negative	Direct	Temporary	Moderate		√	√	√

6.6 IMPACT ENHANCEMENT AND MITIGATION MEASURES

Preamble

In the context of sustainable development, projects should be implemented in a manner to enhance the living standards of the targeted beneficiaries and the resident communities. The consultant was guided by the principles of sustainability in the formulation of practical mitigation measures for potential impacts identified through stakeholder engagement, public consultation and expert knowledge. The main objective was to maximize social, environmental and economic benefits of the project and to minimize any associated adverse impacts. This chapter presents the proposed enhancement and mitigation measures of potential impacts for the project.

Enhancement Measures for Positive Impacts

Enhancement refers to the deliberate attempts taken in the design and subsequent phases of the project to ensure the success of a wider range of direct and indirect positive outcomes to communities and/or the biophysical environment. This can be in the form of opportunities for social and community development, improved health and wellbeing, improved biodiversity, restored ecosystems and landscape character, and protected and respected cultural heritage.

The project will strive to enhance the positive impacts envisaged. The proponent will support the implementation of the ESMP at construction and operation phases of the project. Any impacts not envisaged under the ESMP will be identified through structured monitoring and evaluation under the project. The proponent will improve the experience its customers through better water supply services and expansion of coverage area. The contractor will maximize the utilization of local labour for construction activities to enhance the socio-economic status of the local communities.

6.7 MITIGATION MEASURES FOR NEGATIVE IMPACTS

1. Slope stability

The contractor shall avoid the usage of heavy excavation machinery along the pipeline route. Manual labour shall be used for trenching and backfilling during construction in addition to supporting the sides of the excavation with wooden planks to prevent cave-ins. During the operation phase of the project, repair and maintenance staff shall drain the pipeline sections to be worked on to avoid spillage of water. Any pipeline leakages or bursts shall be swiftly repaired to avoid triggering land-damages on steep slopes.

2. Soil erosion and Siltation of Surface Water Resources

The project contractor shall ensure that excavated earth materials are used for backfilling the pipeline trenches. The backfilled soil will also be sprinkled with water and compacted to a similar density to the existing ground. The cleared sites will be re-vegetated to improve ground cover and minimize soil erosion and improve on aesthetics of the project area.

The contactor will also ensure proper channeling of surface water runoff away from the pipeline route and where necessary install silt traps to reduce the volume of sediments directly entering drainage channels.

3. Air Quality Degradation

The following measures will be observed during the construction and decommissioning phases of the project to mitigate against the degradation of local air quality.

- Supply and construction vehicles will only use the designated transport routes. The drivers will also be advised to stick to prescribed speed limits.
- The contractor will ensure proper repair and maintenance of vehicles and equipment to minimize exhaust gases.
- The contractor shall ensure appropriate vehicle speeds road sections that will be used by construction vehicles on a needs basis to eliminate the creation of dusts.
- Construction workers will be provided with dust masks to mitigate against occupational health risks of inhaling exhaust gases and dust.

4. Water Quality Degradation

The contractor will maintain all site vehicles and equipment is a serviceable state. Oils and greases emanating from repair and maintenance activities will be collected in containers to avoid entry into local drainage channels. Water from cleaning of equipment will be utilized within the project site and will not be discharged into water courses.

5. Risk of illegal connection to the new pipeline

The project proponent will ensure that communities living along the pipeline route are adequately served with piped water to reduce the urge for illegal connections. The proponent will also conduct water balance studies and NRW audits to identify and plug points of water loss along the pipeline.

6. Interruption of Existing Infrastructure

The project proponent will apply for authorization from relevant National & County authorities and other utilities services providers when interfere with existing infrastructure become necessary during the construction activities. The contractor will immediately restore the damaged sections of roads and water supply networks to pre-construction conditions.

7. Effect on Income Generating Activities

The Project Proponent will compensate PAPs for the temporary disruption of income generating activities and businesses that are located along the proposed pipelines routes within the road reserves during the implementation of the proposed Project. Restorations of assets affected during the construction activities along the road reserves will be carried out by the Contractor.

8. Loss of Flora and Fauna

The proponent shall ensure that clearing of any vegetation is limited to the pipeline trench area (i.e. 0.5 meters width) within the road reserve and that transportation of construction materials is done through the existing local roads. The areas to be cleared for the pipeline trench, campsite and materials holding yard shall be identified and marked out prior the start of construction activities. In addition, clearance of vegetation on riparian land will be avoided.

The construction workforce will be sensitized on the importance of environmental conservation and ecological protection to prevent the exploitation of natural resources around the project area and destruction of ecosystems. On completion of the construction work, the trenched pipeline areas will be allowed to re-vegetate with fibrous rooted vegetation species.

9. Increased Vehicular and Human Traffic

Transportation of construction material to specific sites will be done through the existing local roads where possible. The contractor will rehabilitate the local roads that will be damaged during construction activities. Any detours and diversions that will be necessary during construction will be done in-consultation with the local communities. Vehicular and human traffic shall be restricted to the road reserve as much as possible. Drivers/ operators of vehicles will be advised to comply with prescribed speed limits to reduce the risk of road accidents.

10. Generation of liquid and solid wastes

The project proponent should strive to construct a functional sewerage system for Maragua town as a long-term mitigation measure against increased volume of waste- water due to increased water supply and population. As a short-term intervention, Sub- County public health officers should enforce the construction and usage of septic-tanks for disposal of wastewater by the residents of the town. The project contractor will provide solid waste collection facilities (waste bins) for the temporary storage of wastes prior to disposal at an appropriate and designated location. The contractor will also liaise with the County government and the local NEMA office for direction on licensed waste collectors and suitable dumping sites for generated wastes. The contractor will also sensitize construction workers on proper disposal of wastes.

11. Health and Safety Hazards

The following measures will be observed/ implemented to reduce/ eliminate potential health and safety risks for construction workers and the communities in the Project sites:

- The contractor will erect the appropriate safety signage along the construction sites cautioning against various health and safety risks and prescribing particular mandatory actions. Road signs will also be erected to warn pedestrians and motorists of construction activities and diversions at road sections where the pipeline will cross.
- The contractor will provide adequate first-aid facilities in the project sites to handle medical emergencies during construction. A standby vehicle will also be provided to swiftly transport ill/ injured staff and members of community to the nearest medical facility.
- All construction workers will be required to wear Personal Protective Equipment (PPE) i.e. helmets, gloves and safety boots during the construction phase. The workers will also be sensitized on health and safety standards they should observe. During the operation phase of the project, repair and maintenance staff will also be required to use PPEs.
- The contractor shall provide an isolated material holding yard that is well secured, aerated, lit and with serviceable materials handling equipment.
- During the operation phase of the project, repair and maintenance staff shall drain the pipeline sections to be worked on to avoid spillage of water. Any pipeline leakages or bursts shall be swiftly repaired to avoid triggering land- slides.

12. **labour influx and effects of immigrat workers**

- Contractor should use the local workforce as much as possible (preference to local community members on skills locally available).
- Effective community engagement and strong grievance mechanisms on matters related to labour
- All workers to sign an employment contract including a Code of Conduct governing appropriate behaviour.
- The workforce should be sensitized to local social and cultural practices and be educated on the expected behaviour and conduct.
- Contractor should prepare and implement a gender action plan.

13. HIV /AIDS & other communicable diseases

- A comprehensive HIV/AIDs sensitization programme will be formulated to create awareness among construction workers and the local community.
- The programme will be supported by a qualified community health practitioner who will also offer testing and counselling services.
- Information fliers and protection will also be made freely available during the construction phase.

14. Child Labour

- The contractor will comply with national and international labour laws in recruiting construction staff.
- All workers will be required to produce their national identification cards to confirm their age.
- Ensure no children are employed on site in accordance with national labour laws. This can be done through incorporating prohibitive provisions in the code of conduct and having the recruitment policies that prohibits child labour.
- Ensure that any child sexual relations offenses among contractors' workers are promptly reported to the police.

15. **Sexual Exploitation and Abuse (SEA) & Gender-Based Violence (GBV)**

- Develop and implement code of conduct, signed by all workers.
- Provide training and awareness programs to project contractor's staff, and community members on GBV and sexual harassment prevention and reporting.
- Collaborate with local communities, leaders, and women's groups to address concerns related to GBV and sexual harassment.
- Collaborate with local law enforcement and authorities to address and prevent GBV incidents.
- Implement clear and confidential reporting mechanisms for any incidents of GBV or sexual harassment.
- Contractor should prepare and enforce a No Sexual Harassment and Non-Discrimination Policy.

7 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

The purpose of the ESMP is to ensure that environmental and social impacts and risks identified during the ESIA are effectively managed during the construction, operation and decommissioning of the proposed project. The ESMP specifies the mitigation and management measures for each impact/ risk, party allocated responsibility, means of monitoring and frequency, objective verifiable indicators and an indicative budget. The ESMP also establishes a monitoring plan, capacity building plan and institutional arrangements to support its implementation.

The project proponent shall avail this ESMP to the successful contractor awarded the tender for construction work for this project. The contractor will be required to formulate a more specific ESMP and work methods that will ensure construction of the project in compliance with established standards and legislation. The contractor will factor the costs of implementing the ESMP into their budget. The project proponent will take the necessary steps to ensure that the ESMP is fully implemented.

TABLE 7.1: ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

Project Activities	**Environmental / Social Impact**	**Mitigation measure**	**Responsibility**	**Approx. Cost (KES)**
CONSTRUCTION PHASE				
Installation of pipelines, water meters and construction of valve/meter chambers	Slope stability during trenching for pipelines and excavations for construction works.	- Manual labour shall be used for trenching & backfilling for pipelines and other excavation works in the steep slope areas. - Supporting the sides of the excavation with wooden planks to prevent cave-ins.	Contractor Supervising E&S Officer (MUWASCO)	270,000
	Soil erosion and Siltation of Surface Water Resources .	- Contractor shall ensure that excavated earth materials are used for backfilling the pipeline trenches. - Dumping any un-used excavated materials in designated offsite grounds.	Contractor Supervising E&S Officer (MUWASCO)	250,000
	Air Quality Degradation	- Restricting traffic speed of machines and vehicles as well as regular watering of dusty roads. - The contractor will ensure proper repair and maintenance of vehicles and equipment to minimize exhaust gases. - Construction workers will be provided with dust masks to mitigate against occupational health risks of inhaling exhaust gases and dust.	Contractor Supervising E&S Officer (MUWASCO)	160,000
	Noise emissions by construction equipment and activities	- Use of noise abatement equipment for machinery; Limit construction activities to daytime only. - Switch off noisy equipment when not in use.	Contractor Supervising E&S Officer (MUWASCO)	100,000

		- Provide PPE such as earmuffs to workers at the site as necessary.		
	Water Quality Degradation	- Oils and greases emanating from repair and maintenance of vehicles & machinery will be collected in containers to avoid entry into local drainage channels. - Water from cleaning of vehicles & equipment will not be discharged into water courses. - Implement soil erosion control measures to prevent pollution of streams and rivers.	Contractor Supervising E&S Officer (MUWASCO)	150,000
	Generation of liquid and solid wastes	- Contractor to provide solid waste collection facilities (waste bins) for the temporary storage of wastes prior to disposal at an appropriate and designated location. - The contractor will also liaise with the County government and the local NEMA office for direction on licensed waste collectors and suitable dumping sites for generated wastes. - The contractor will also sensitize construction workers on proper disposal of wastes.	Contractor Supervising E&S Officer (MUWASCO)	110,000
	Loss of Flora and Fauna	- Ensure that clearing of any vegetation is limited to the pipeline trench area (i.e. 0.5 meters width maximum) within the road reserve and that transportation of construction materials is done through the existing local roads. - Use of non-mechanized methods of excavations & construction methods whenever possible. - Spare the vegetation that must not necessarily be removed such as trees and shrubs. - Re-plant the indigenous vegetation once work is completed.	Contractor Supervising E&S Officer (MUWASCO)	175,000
	Temporary interruption of business activities during the installation of pipelines and loss of livelihood income to the PAPs.	- Creating awareness, informing all community members along the pipeline routes. - Preparation PAPs Compensation Entitlement Matrix.	MUWASCO	542,237

		- Compensation of the Project Affected Persons.		
	Temporary removal of assets during the excavations for installation of pipelines.	- Valuation of affected assets. - Full restoration of the affected assets to their original status. - Compensation for the PAPs for non-use of the assets during the interruption period.	Contractor MUWASCO	68,216
	Disputes arising from the implementation of ESMP including PAPs compensations & restoration of affected assets.	- Establishment and operationalization of Grievance Redress Mechanism (GRM).	MUWASCO	95,000
	Interruption of Existing Infrastructure	- The project proponent will apply for authorization from relevant National & County authorities and other utilities services providers when interfere with existing infrastructure become necessary during the construction activities. - The contractor will immediately restore the damaged sections of roads and water supply networks to pre-construction conditions.	MUWASCO Contractor Supervising E&S Officer (MUWASCO)	220,000
	Impacts on public health and safety (Construction workers & Project areas residents)	- The contractor will erect the appropriate safety signage along the construction routes and sites cautioning against various health and safety risks and prescribing particular mandatory actions. - Contractor will deploy a trained health and safety officer for the - duration of the construction works. - Contractor will provide First Aid Kit within the construction sites. - All construction workers will be required to wear Personal Protective Equipment (PPE). - The workers will be sensitized through trainings, on health and safety standards they should observe. - Ensure that all construction machines and equipment are in good working conditions and to - manufacturer's specifications to prevent occupational hazards.	Contractor Supervising E&S Officer (MUWASCO)	300,000

	HIV /AIDS & other communicable diseases	- A comprehensive HIV/AIDs & other communicable diseases sensitization programme will be formulated to create awareness among construction workers and the local community. - Use of existing clinics to provide VCT services to construction workers.	Contractor Supervising E&S Officer (MUWASCO)	80,000
	Sexual Exploitation and Abuse (SEA) & Gender-Based Violence (GBV)	- Contractor to develop and implement code of conduct, signed by all workers. - Contractor to provide training and awareness programs to project contractor's staff, and community members on GBV and sexual harassment prevention and reporting. - Collaborations with local communities, leaders, and women's groups to address concerns related to GBV and sexual harassment. - Collaboration with local law enforcement and authorities to address and prevent GBV incidents. - Implementation of clear and confidential reporting mechanisms for any incidents of GBV or sexual harassment.		80,000
	Child Labour and Protection	- Ensure no children are employed on site in accordance with national labour laws. - Ensure that any child sexual relations offenses among contractors' workers are promptly reported to the police.	Contractor Supervising E&S Officer (MUWASCO)	No additional costs
	Effects of Immigrant Workers	- Contractor should use the local workforce as much as possible. - Effective community engagement and strong grievance mechanisms on matters related to labour.	Contractor Supervising E&S Officer (MUWASCO)	No additional costs
Cost Estimates for the construction Phase				**2,600,453**
OPERATIONAL PHASE				
Operations of the constructed project	Illegal connection to the new pipeline	- The project proponent will ensure that communities living along the pipeline route are adequately served with piped water. - The proponent will also conduct water balance studies and NRW	MUWASCO	Proponent cost

		audits to identify and plug points of water loss.		
	Generation of liquid and solid wastes	- The County Government of Murang'a & MUWASCO to expand the sewerage system in Maragua Town. - Solid wastes generated during repair and maintenance activities will be collected and disposed-off in designated manner.	County Government of Murang'a MUWASCO	Proponent cost
	Health and Safety Hazards	- Provide standard operation manual inclusive of Health and Safety Plan (HASP) for all operation and maintenance activities. - Provide workers with appropriate personal protective equipment (PPEs). - Provide First Aid Kit within the workstations. - Train all workers on Health, Safety and Environment (HSE) with an aim of improving awareness. - The proponent will erect appropriate safety signage during repair and maintenance activities.	MUWASCO	Proponent cost
	Improved and reliable water supply for the residents of Maragua Sub – County.	- Positive impact, no mitigation measures. - Improve customer experience through better water supply services. - Reduction of water outages/ rationing. - Expansion of coverage area.	MUWASCO	-
	Increased reliability of water supply to the residents of Maragua Sub - County.	- Positive impact, no mitigation measures. - Reduction of water outages/ rationing.	MUWASCO	-
DECOMMISIONING PHASE				
Demolition of project structures and disposal of	Reduced availability of potable water to beneficiaries	- The proponent shall provide an alternative source of potable water to the beneficiaries of the project.	MUWASCO	-

construction materials	Loss of Flora and Fauna	- The proponent shall ensure minimal clearing of vegetation. - Transportation of decommissioning wastes to be done through the existing local roads. - Sensitization of decommissioning workforce on environmental conservation and ecological protection. - Re-vegetation of cleared areas with indigenous vegetation species.	MUWASCO Decommissioning Contractor	-
	Generation of solid wastes	- Provision of solid waste collection facilities (waste bins). - Contracting licensed solid waste handlers. - Sensitization of construction workers on proper disposal of solid wastes.	MUWASCO Decommissioning Contractor	-
	Water quality degradation	- The contractor will maintain all site vehicles and equipment is a serviceable state. - Oils and greases emanating from demolition activities will be collected in containers to avoid entry into local drainage channels. - Water from cleaning of equipment will be utilized within the project sites and will not be discharged into water courses.	MUWASCO Decommissioning Contractor	-
	Air quality degradation	- Restricting traffic speed of machines and vehicles as well as regular watering of dusty roads. - The contractor will ensure proper repair and maintenance of vehicles and equipment to minimize exhaust gases. - Demolition workers will be provided with dust masks to mitigate against occupational health risks of inhaling exhaust gases and dust.	MUWASCO Decommissioning Contractor	-
	Noise emissions by Demolition equipment and activities	- Use of noise abatement equipment for machinery; Limit construction activities to daytime only. - Switch off noisy equipment when not in use.	MUWASCO Decommissioning Contractor	-
	Increased Vehicular and Human Traffic	- Transportation of decommissioning wastes to specific sites will be done through the existing local roads.	MUWASCO Decommissioning Contractor	-

		- The contractor will rehabilitate the local roads that will be damaged during decommissioning activities. - Consultation with the local communities on planned road diversions. - The contractor will rehabilitate the local roads that will be damaged during decommissioning activities. - Restriction of Vehicular and Huma Traffic to the road reserve where possible. - Sensitization of drivers to comply with prescribed speed limits.		
	Health and Safety Hazards	- Continuous supervision of occupational, health and safety management to ensure compliance. - Occupational Safety and Health. - Training for contractor's staff. - Conduct orientation talks and visits. - Conduct toolbox talks.	MUWASCO Decommissioning Contractor	-
	Employment opportunities for local community	- Positive impact, no mitigation measures. - The contractor shall reserve opportunities for semi-skilled and casual work for interested members of the local communities.	MUWASCO Decommissioning Contractor	-

8 ENVIRONMENTAL AND SOCIAL MONITORING PLAN (ESMoP)

Monitoring and Evaluation (M&E) is a process that helps improve performance and achieve results. The overall purpose of M&E is the measurement and assessment of performance to manage the impacts of a project more effectively. The overall objective of environmental and social monitoring is to ensure that mitigation measures are effectively being implemented. Environmental and social monitoring will also enable response to new and developing issues of concern. The activities and indicators that have been recommended for monitoring are presented in the ESMP.

Internal Monitoring

The project proponent will take the responsibility of conducting regular internal monitoring of the project to verify the results of the Contractor and to audit direct implementation of environmental mitigation measures contained in the ESMP and construction contract clauses for the Project. The proponent will also initiate periodic environmental audits; the audit shall check that mechanisms are in-place to ensure that:

- The ESMMP being used is the up-to-date version.
- Variations to the ESMMP and non-compliance and corrective action are documented.
- Appropriate environmental training of personnel is undertaken.
- Emergency procedures are in place and effectively communicated to personnel.
- A register of major incidents (injuries, complaints) is in place and other documentation related to the ESMMP.
- Appropriate corrective and preventive action is taken by the Contractor once instructions have been issued.

The Construction consultant's and the Contractor' project teams will include environmental and social experts who will direct ESMP activities directly at the site. Monitoring will be a systematic assessment of the activities in relation to the specified criteria of the condition of approval. Internal monitoring will follow the following key criteria.

Air quality monitoring

The contractor shall monitor the site dust levels and emission levels from vehicles and construction equipment. In the cases where suspended dust levels are high, the contractor will take appropriate measures to mitigate the same. Results of regular monitoring of emission levels will inform the servicing of affected vehicles and equipment.

Soil erosion and siltation monitoring

The project E&S Expert will monitor the implementation of soil and siltation control measures. This will include sediment load and turbidity measurements on the nearby surface water resources.

Monitoring of vegetation clearing activities

On-site monitoring will be conducted to ensure that vegetation clearing activities are conducted within the extent of the pipeline trench. Monitoring will also help in the conservation of indigenous vegetation species within the project areas.

Monitoring of Health and Safety

The contractor's E&S officer will ensure that appropriate safety signage is prominently displayed at appropriate locations/positions to mitigate against accidents. Additionally, measures to create awareness regarding sexually transmitted diseases, primarily HIV/AIDS will be taken and the local community sensitized on the same. The contractor will also monitor the compliance to the site's occupational health

and safety policy; where occupational health and safety requirements are not being met; the concerned workers shall immediately be trained and instructed to implement these requirements.

Waste Management Monitoring

The contractor's environmentalist will monitor the management of wastes in the construction sites. This will ensure that all solid and organic wastes are dumped in designated waste receptors and taken to approved landfills; clean sanitary facilities such as mobile toilets are always available to construction staff.

TABLE 8-1: ENVIRONMENTAL AND SOCIAL MONITORING PLAN (ESMOP)

Activity	Location	Means of Monitoring	Frequency	Responsible Agency	
				Implemented by	**Supervised by**
Compensation for loss of livelihood due to business interruptions during pipelines installations.	Construction site	- All PAPs successfully compensated as recorded in the Compensation Entitlement Matrix. - Grievances resolved promptly (within the duration allowed in the Grievance Redress Mechanism.	Prior to commencement of construction activities at sites.	MUWASCO Contractor	E&S Expert Grievance Redress Committee
Restoration of affected assets during pipelines installations.	Construction site	- Visual inspections of restoration of affected assets to their original status. - Grievances resolved promptly (within the duration allowed in the Grievance Redress Mechanism	Prior to commencement of construction activities at sites.	MUWASCO	Project Supervising Engineer E&S Expert Grievance Redress Committee
Occupational Health and Safety	Construction site	- Visual inspection of first aid area, - Injury reporting mechanism, - WIBA insurance policy, - Appropriate use and wearing of PPE, - Training programs for workers, health and safety plan prepared for site, - Clean drinking watering points, - Safety training certificates, gloves, earplugs, safety boots, reflector jackets, drinking water, nose mask, helmet, overall, sanitation facilities.	Daily	Contractor	Project Supervising Engineer, E&S Expert
Public health	Areas surrounding the construction site.	- Visual inspection of site for; safety signs at strategic places, - Cordoned off working sites to protect the public or unauthorized persons, usage of signs and warnings on sites with high risks. - Low speeding of construction vehicle and consideration of wind action. - No. of reported injuries and accidents and No. of grievances reported.	Weekly	Contractor	Project Supervising Engineer, E&S Expert
Leakages and spills of	Contractor's yard and	- Visual inspection of hazardous waste leakage or spills to soils on site,	Weekly	Contractor	Project Supervising Engineer,

greases, oil or fuel	construct ion site	- records of cutting pits for disposed off contaminated soils, - Developed site-specific incident management or response plan.			E&S Expert
Noise and vibrations	Construction site	- Use equipment with low noise levels or fitted with mufflers. - Visual inspection of site for use of PPE, - Use of soundproof materials, - Notices to public on noisy construction activities, Restricting noisy activities daytime. - Regular measurement of noise levels through mobile phone gadgets.	Weekly	Contractor	Project Supervising Engineer, E&S Expert
Air quality	Construction site and along construct ion vehicle movement routes	- Physical inspection of vehicles records to ensure meets emission requirements, - Use of masks while working in dusty conditions, - Shielding wind impacts during construction, - Low speed of construction vehicle, catalytic devices on vehicle and suppress dust.	Daily	Contractor	Project Supervising Engineer, E&S Expert
Waste generation	Construction sites	- Visual inspection of sanitation facilities for human waste management. - Amount of waste correctly disposed, - Practicing of waste avoidance, reduction, reuse and recycle. - Documented approved waste dumping site. - Presence and compliance to implementations of site-specific waste management plan.	Monthly	Contractor	Project Supervising Engineer, E&S Expert
Flora and fauna	Construction sites	- Documentation of uprooted and cut down trees - Physical Inspection	Weekly	Contractor	Project Supervising Engineer, E&S Expert
Impacts on Soil	Construction sites	- Physical Inspection	Monthly	Contractor	Project Supervising Engineer, E&S Expert
Impacts on water sources	Water sources	- Physical inspection - Chemical inspections	Monthly	Contractor	Project Supervising Engineer, E&S Expert
Labour and employment related issues	Construction site and contractors' office	Physical counts and inspection of records on; - No. of locals employed on the project from the employment records. - No. of Grievance recorded from employees and how they were addressed resolved.	Weekly	Contractor	Project Supervising Engineer, E&S Expert

Immigration of workers	Construction site and office	- Review of records - Interviews with staff and local community	Monthly	Contractor	Project Supervising Engineer E&S Expert
Gender Equity and Sexual Harassment	Construction sites	- Number of female employees - Number of male and female toilets - Complaints from female employees	Weekly	Contractor	Project Supervising Engineer E&S Expert
Damage to private property	Project area	- Review of records - Interviews with staff and local community	Daily	Contractor	Project Supervising Engineer

9 PROJECT AFFECTED PERSONS

Project affected persons (PAPs) are individuals, communities, households, institutions, and businesses whose assets may be lost and/or affected, including and other assets, livelihoods, and/or access to natural and/or economic resources because of activities related to a given investment especially component.

9.1 PAPS ASSESSMENTS

Site assessments at the proposed Project sites were carried out between 3rd-5th December 2024 to establish the presence of any Project Affected Persons (PAPs). The assessments were undertaken jointly with the technical officers from MUWASCO, using the layout plan for the proposed pipelines (**Annex I**). This assessment established that the implementation of the proposed pipelines extensions and installation of water meters will not require any land to be acquired and therefore loss of land will not be triggered under this Project. The pipelines will be installed along public road reserves within the areas set aside by the road authorities (KURA, KERRA & County Roads for public utilities. The water meters will be installed within the available road reserves or inside the consumer plots in some cases for security purposes. However, the assessment identified 44 PAPs within the proposed pipelines installation alignment whose livelihood activities will temporarily be affected for a duration of 3 – 5 days during the implementation of the works. These PAPs include:

a) Temporary interruption of business activities within Maragua Town during the installation of several pipeline sections. Due to the limited available space within the Central Business District of Maragua Town, there will be need to break sections of walkway pavements thereby temporarily affecting access to some business premises.
b) Temporary removal of semi- permanent wooden structure that have been erected at the road reserves to facilitate the installation of pipelines. The structures will be re-constructed upon completion of the works within the same location on the road reserve.
c) Traders carrying out business activities within the proposed pipelines alignments at the road reserve but with no erected structures (merchandise placed on the ground).
d) Several farmers with animal feed napier grass and crop cultivations along the road reserves.

MUWASCO has aligned the proposed pipelines within the existing road reserves such that disruptions of businesses and livelihood incomes are minimized as much as is practical. This is through:

i. Taking advantage of the spacious areas within the existing road reserves to avoid disruption of business activities. Most of the pipelines will be installed outside the urban centres with only a few encumbrances along the available wayleaves.
ii. Use of HDPE relatively small diameter pipes (OD 32mm – OD 63mm) in 50 -100m long coils whose alignments can easily avoid obstructions. The trench excavation widths for pipelines installations will be minimal (150 -300mm) due to the small diameter pipes.
iii. Duration any disruption of business activities during the installation of pipelines on the existing wayleaves is limited to a maximum of 5 days after which the PAPs can continue with their normal activities. This will be achieved through a well-planned program of construction activities.

9.2 PAPS CATEGORIZATION

The total number of Project Affected Persons (PAPs) enumerated along the proposed water pipeline routes is 44 PAPs. This number includes 14 male PAPs of which 2 are vulnerable PAPs and 30 female PAPs of which 13 are vulnerable PAPs.

Vulnerable, or disadvantaged groups

Vulnerable groups include older persons, the sick; single mothers, children, PWDs, women; unemployed youth, and orphans; households headed by women that depend on sons, brothers, and others needing support and are especially vulnerable. The vulnerable groups are eligible for additional assistance.

The nature of vulnerability in the enumerated PAPs include:

- Women headed households (single mothers) among the female PAPs.
- Elderly PAPS (over the Age of 65 years).

Table 9.1: PAPs Categorization

PAPs	Male	Female
Total Enumerated PAPs by Gender	14	30
Vulnerable PAPs	2	13
PAPs whose business activities will be temporarily affected due to limitation of access to business premises	4	10
PAPs whose semi-permanent business structures will be demolished and temporarily relocated within the existing road reserve area.	0	9
PAPs operating in open areas (no erected structures) but will be affected	8	8
PAPs with cultivations within the road reserves earmarked for pipelines installations	2	3

9.3 ELIGIBILITY FOR COMPENSATION

The concept of eligibility is used with respect to the definition of PAPs and the criteria for determining their qualification for compensation. And any other resettlement assistance. The WSDP Resettlement Policy Framework (RPF) provides for, that if a Sub – project funded under WSDP causes loss of income or livelihood, regardless of whether the affected Project affected people are physically displaced, the project will meet the following requirements among others:

a) Promptly compensate economically displaced persons for loss of assets or access to assets at full replacement cost.

b) Compensate economically displaced persons who are without legally recognizable claim to land for lost assets including other improvements made to the land, other than land, at full replacement cost.

c) Provide transitional support to economically displaced persons, as necessary, based on a reasonable estimate of the time required to restore to restore their income earning capacity, production levels, and standards of living.

Eligibility Cut – Off Date

The entitlement cut-off date refers to the time when the assessment of persons and their property in the area is carried out for the preparation of investment specific RAPs during the census exercise. The affected persons are eligible for some form of assistance if they engaged in any livelihood activity at the affected sites before the entitlement cut-off date. The cut-off date was discussed and agreed upon during consultative meetings as the date of start of PAPs census activities – **3/12/2024 to** prevent opportunistic invasions.

9.4 ASSET VALUATION METHODS AND COMPENSATIONS

Valuation Methods for the Affected Assets and losses of income

Valuation is the process of determining the value of land, or an asset that PAPs possess or use.

A Replacement Cost Approach valuation method has been used where the costs of replacing assets are based on damages caused by project operations. The approach involves direct replacement of expropriated assets and covers an amount that is sufficient for asset replacement, moving expenses and other transaction costs. Replacement cost for properties affected by the proposed project has been based on the pre-project or pre-displacement market value of similar asset or structures, including preparation, registration, and transfer costs.

- For structures, it includes the cost of building materials, labor, contractors' fees, and transportation.
- Valuations for compensations on losses of income due to interruptions of business activities have been estimated from net daily profits of the businesses.
- For the affected crops and other cultivations, the prevailing market rate for mature crop/vegetation has been considered.

Table 9.2: Summary of the valuation methods used for the affected assets

Structures	• The prevailing market cost of the materials to build a replacement structure with an area and quality similar to or better than those of the affected structure, or • To repair a partially affected structure, plus the cost of transporting building materials to the construction site, plus the cost of any labour and contractors' fees, plus the cost of any registration and transfer taxes.
Loss of Income	• Losses of income for businesses have been estimated from net daily/monthly profit of the business verified by an assessment of visible stocks and activities. • In addition to the compensation, disturbance allowances of 15% of total compensation have been considered. • The estimation of supplementary assistance for affected commercial structures or business units has generally been based on the estimated income obtained from the use of the business/commercial unit and the estimated period of disruption of business activities.
Crops and cultivations	• The prevailing market rate incorporating the value of crops and labor invested in preparing new land. • That is, the average of last three years' market value for the mature and harvested crop and the average wage in the community for the same period for labour.

The valuation process of the Affected Assets included:

- Field preparation of asset inventory.
- Enumeration of each asset and recording in an inventory Asset Register.
- Valuation of the asset carried out using the approach described above and the values of each asset recorded in the Asset Register.

Compensation for the PAPs

- **Interruption due to lack of access to business premises**

PAPs losing business due to blockage of access during installation of pipes within Maragua Town CBD will be entitled to cash compensation equivalent to daily average income derived from the businesses they

operate. Restoration of access will be done by the works construction contractor upon installation of pipelines.

- **Temporary relocation of semi- permanent structures**

PAPs whose semi-permanent wooden structures will be temporarily affected will be entitled to full restoration of the structure at the same location after the installation of pipelines. This can either through cash compensation with the right to salvage materials without deduction from compensation and self-reconstruction or reconstruction carried out by the works implementation contractor on behalf of MUWASCO. The PAPs will be entitled to cash compensation equivalent to daily average income derived from the businesses they operate during this interruption.

- **Business interruption in open areas with no erected structures**

PAPs operating businesses on open areas within the road reserves, and which will be affected during pipeline installation, will be entitled to cash compensation equivalent to daily average income derived from the businesses they operate for the affected days.

- **PAPs with cultivations long pipelines wayleaves**

PAPs who have cultivations on the existing road reserves where the proposed pipelines will be aligned will be entitled to full compensation of mature crop or vegetation. In addition, they will be entitled for compensation on seeds and labour costs for re-plantation after the installation of pipelines.

- **Disturbance Allowance**

In addition to the compensation valuation amounts an additional 15% disturbance allowance has been provided.

Provisions for Vulnerable PAPs

The below listed provisions are included for the vulnerable PAPs enumerated:

(i) Targeted and localized house-to-house sensitization for the vulnerable PAPs households during pre-payment consultations. This will be applicable during the PAPs compensation implementation to vulnerable PAPs (particularly the elderly) who are not able to attend PAPs sensitization forums. The PAPs Compensation implementation teams will visit such PAPs at their premise and further sensitize and enlighten them on the compensation implementation process.

(ii) Priority consideration in processing compensation payments and extra assistance to vulnerable PAPs in explaining and filling out compensation payment forms.

(iii) Additional 25% of the eligible compensation amount to the vulnerable persons.

9.5 INCOME RESTORATION MEASURES

The PAPs assessment has been carried out to enhance restoration of the PAPs' income streams to pre-impact status. Therefore, in addition to compensation for loss of income due to the temporary disruption of business activities during the installation of pipelines, the Proponent (MUWASCO) will:

- Program work scheduling such that pipelines installations at any section does not take more than 3 days (including testing) with another about 2 days provided for re-construction of the affected structure.
- Minimal excavation widths for the areas where access pavements for the business premises will be affected. The proposed pipe diameters within these sections are small (OD 32mm) and therefore the trench width of about 100 – 150mm will be sufficient and restoration can be achieved in a day.
- Re-construction of affected wooden semi-permanent business structures within the same locality on the road reserve immediately after the installation of pipeline section.

- Excavations, installations of pipelines, backfilling of trenches and levelling of target sections where businesses are conducted with no erected structures can be planned for just 1 day interruption and the traders can resume usual business thereafter.

9.6 AFFECTED ASSET VALUATION & PAPS COMPENSATION ENTITLEMENT MATRIX

The names and Telephone Contacts of the PAPs, details of affected assets & their valuations and compensation dues to the PAPs have been compiled and summarized in a PAPs and Assets Compensation and Entitlement Register. This Register is attached in the Report as **Annex V.**

9.7 PAPS COMPENSATIONS IMPLEMENTATION ARRANGEMENTS

9.7.1 Asset Restoration & PAPs Compensation Implementation Principles

The main objective of asset restorations and compensations are to ensure that the affected assets are restored to their original status and the PAPs get fair and prompt compensations. In this way it is expected that their income, production capacity and standard of living will be improved, or at least restored to their former levels. The guiding principles for the implementation of the PAPs compensations will be as follows:

(i) Disruptions of PAPs livelihoods has been minimized by taking into consideration all possible alternative measures including re-alignment of pipeline routes where possible.
(ii) Compensation will be paid before Project works commence in a specific Project area and in a manner that does not curtail the livelihoods of the PAPs in terms of access and utilization of such compensation.
(iii) The compensation values awarded will be fair enough to restore the livelihoods of PAPs.
(iv) All other activities related to the proposed compensations will be communicated in advance to the PAPs using the preferred channels of communication.
(v) Where grievances arise, the respective PAPs will be given an opportunity to be heard, fairly and promptly.
(vi) Measures will be taken to ensure that vulnerable groups get special assistance and support; and where spousal and children consent is needed, the provision will be enforced.
(vii) A statutory disturbance allowance of 15 percent of the compensation value will also be included.

9.7.2 Asset Restoration & PAPs Compensation Implementation

MUWASCO PAPs Compensation Implementation Committee

The MUWASCO PAPs committee will oversee the overall monitoring and evaluation of the affected assets restorations and PAPs compensation process. The committee will comprise of:

- Project Engineer,
- Environmental and Social Safeguards Specialist,
- Land Surveyor,
- Accountant,
- Monitoring/ Evaluation Expert.

MUWASCO will hire short term consultancy services for the Environmental and Social Safeguards Specialist and Monitoring/ Evaluation Expert specifically for the Project as the WSP does not have the experts within the existing staffing. The committee will work with representatives of relevant stakeholders including:

- Project Affected Persons (PAPs),
- Maragua Town Business Community,
- Informal traders within the Project areas,

- Area Chiefs and Assistant Chiefs in the Project areas (Maragua Ridge, Gakoigo, Kambiti & Igikiro).

The Committee's roles shall be:
(i) To verify the details in the PAPs' Register. The register shall have among other parameters the following data and information:

- The name of the person,
- Type of loss (structure / Livelihood)
- Identification number of the PAP,
- Compensation Amount
- Bank Details or Mpesa details of the PAP.

(ii) To verify the correctness of each PAP as stated in the register and ascertain that every identity card holder is correctly documented in the register.
(iii) To develop an appropriate framework for delivering the compensation payments to the PAPs in line with government financial management regulations and as much as possible keeping in mind that most PAPs have no bank accounts. In the event that an individual is absent during payment, the Compensation Committee will immediately communicate a new date of payment to such individual(s).
(iv) On completion of the PAP Audit list, payments will be made according to locations and adequate information will be made available to all affected persons prior to payment. Such information will include:

- Dates and locations where payment will be made,
- List of eligible people,
- amount to be made Mode of payment, etc.

9.8 PAPS COMPENSATIONS IMPLEMENTATION BUDGET

The estimated PAPs Compensations Implementation budget is **Ksh 610,455.** The budget includes for the restoration of the affected structures and livelihood losses compensations for 44 PAPs as summarized in the Table below:

Table 9.4 : PAPs Compensations Implementation Budget

	Description	**Amount (KES)**
1	Asset Loss	68,216
2	Livelihood Loss	542,237
Total		**610,453**

9.9 MONITORING AND PAPS COMPENSATIONS AUDIT

Monitoring and Evaluation (M&E) procedures establish the effectiveness of all the Project affected assets in addition to the measures designed to mitigate adverse social impacts for the PAPs. The procedures include internal track-keeping efforts as well as independent external monitoring. The purpose of compensation monitoring for the Project is to verify that:

(i) Actions and commitments described in the PAPs Compensation Report are implemented.
(ii) Eligible PAPs receive their full compensation prior to the commencement of the construction activities in the Project area.

(iii) Actions and compensation measures have helped the people who sought cash compensation in restoring their lost incomes and in sustaining/improving pre-project living standards.
(iv) Complaints and grievances lodged by PAPs are followed up and, where necessary, appropriate corrective actions taken.
(v) Changes in compensation procedures are made, if necessary, to improve delivery of entitlements to PAPs.

The primary responsibility for Monitoring and Evaluation of the PAPs compensation processes rests with proponent (MUWASCO). The **Table 9.5** below indicates Internal Monitoring Indicators that will be checked during Internal Performance Monitoring by MUWASCO.

Table 9.5: Internal Monitoring Indicators

Activity/Parameters	Indicators
Compensation Payments to PAPs	• PAPs successfully compensated. • PAPs promptly paid. • PAPs not paid promptly and reasons. • Money paid to PAPs.
Additional Assistance and Livelihood Restoration	• PAPs with restored assets. • PAPS with restored livelihood enterprises. • PAPs without restored assets. • PAPS without restored livelihood enterprises.
Community participation and public engagement	• Local consultative Meetings held. • PAP consultative Meetings held.
Grievance management	• Grievances received. • Grievances resolved promptly (within the duration allowed in the Grievance Redress Mechanism). • Grievances not resolved in time but completed. • Outstanding grievances not resolved.

9.10 CONCLUSION AND PROVISIONS ON PAPs ASSESSMENTS

Conclusion

The PAPs assessment has identified that implementation of the proposed Project has the potential of resulting to risks associated with destruction of structures used for business belonging to private individuals. However, loss of land will not be triggered under this Project. The proposed pipelines alignments lie within existing road reserves and wayleaves shared by local utilities owned by the relevant Road Authorities i.e. Kenya Urban Roads Authority (KURA), Kenya Rural Roads Authority (KeRRA), Kenya National Highways Authority (KENHA) and the Murang'a County Roads Department. Therefore, no land will be acquired since the PAPs are occupying the land informally. MUWASCO when implementing the water pipelines extension project shall seek for approvals from the relevant roads authority before laying the water pipes with the road reserves.

The total number of Project Affected Persons (PAPs) enumerated along the proposed water pipelines routes is 44 PAPs. This number includes 14 male PAPs of which 2 are vulnerable PAPs and 30 female PAPs of which 13 are vulnerable PAPs.

PAPs Compensations Provisions

In order to ensure smooth implementation of the Proposed Project, the below listed provisions will be undertaken by MUWASCO:

(i) MUWASCO will provide adequate notice to the PAPs for them to salvage and relocate their assets.

(ii) To minimize grievances, MUWASCO will not only follow the full replacement cost for compensation but hold comprehensive consultation and negotiations with the PAPs.

(iii) MUWASCO will ensure all the 44 PAPs are compensated prior to laying of the water pipelines.

(iv) The Affected Assets Restorations and PAPs Compensations schedule provides for phasing of compensation depending on the water pipelines that are ready for construction. This approach will eliminate the risk of PAPs re-encroaching on water lines after compensation.

10 GRIEVANCE REDRESS MECHANISM (GRM)

10.1 INTRODUCTION

A key principle of any development is to prevent or minimize grievances rather than going through a redress process. This can be achieved through commitment to full participation and consultation of the stakeholders and establishing extensive communication and coordination between the affected communities, and the envisioned development. However, this does not always preclude grievances from arising. This ESIA process provides opportunities for the likely to be affected parties to air and articulate their queries, concerns, issues, complaints, dissatisfaction or sense of injustice or unfairness, and seek to have these resolved amicably, and in the shortest time possible. Affected parties should be able to file a grievance for any disagreeable decision, practice or activity, arising from proposed development. Therefore, a Grievance Redress Mechanism (GRM) as a mechanism, or set of procedures and processes, or organizational systems and resources, has been established to be used as a means to hear, address and resolve issues and complaints related to the proposed project implementation. The stakeholder input handled through these systems and procedures may be called grievances, complaints, feedback, or any other functionally relevant terminology or concept.

10.2 POTENTIAL GRIEVANCES

In practice, some of the possible grievances that can be anticipated or are most likely to occur during implementation of the project may include:

- Disagreement over opportunities offered to the community, for instance on job opportunities, loss of livelihoods, loss/decrease of business or income etc.
- Interruption of public, community, social or other services and infrastructure e.g., water.
- Damage to un-expropriated public / community assets such as roads.
- Unfair compensation for affected assets and lose of livelihood during project implementation.

10.3 OBJECTIVE OF A GRIEVANCES REDRESS MECHANISM

Essentially, GRMs are designed as a conduit for soliciting inquiries, inviting suggestions, and increasing participation in developments. The proposed GRM has been established to:

- Generate public and stakeholder awareness about the proposed project and its objectives.
- Increase stakeholder involvement in the Project implementation.
- Improve proposed project outcomes through timely resolution of issues and problems. (The GRM will contribute to timely achievement of the project's objectives).
- Provide feedback to different levels of the project performance i.e., providing management with practical suggestions/feedback.
- Act as an early warning mechanism / effective risk management tool to identify and resolve implementation problems in a timely and cost-effective manner.
- Build community relations / legitimacy among stakeholders; through creating and maintaining trust with affected persons and the stakeholders.
- Allow the development management team to be more accountable, transparent and responsive to stakeholders.
- Deter or curb fraud and corruption.
- Assess the effectiveness of the proponent's processes but also improve the operational processes and performance

10.4 GUIDING PRINCIPLES FOR AN EFFECTIVE GRIEVANCE REDRESS MECHANISM

There are several guiding principles that drive the design of an effective GRM. GRMs that involve these principles are more likely to provide effective resolution of grievances. Some of the key GRM principles are as follows: -.

- Start early in the project cycle: GRM (or at least the lowest Level institution at PAP level should be put in place as early as possible, and later modified as need arises.
- Simple and Accessible: Should be known to the intended users and accessible to diverse members of the community, with multiple points of entry and access.
- Legitimate: Enabling trust from the stakeholders intended to use it.
- Participatory and Inclusive: Should be developed in a participatory manner and include representatives from the main actors/categories relevant to the area.
- Contextualization and appropriateness (e.g., Cultural and Context Sensitive): Should be localized to ensure it's appropriate to the local context, keeping in line with local cultural or traditional structures for raising and resolving issues.
- Responsive, Timely, and Efficient: Should be responsive to the needs of all complainants, and resolutions should be reached in the soonest time possible to discourage lengthy suits that are time wasting.
- Transparency / fairness / impartiality: Users must be clearly informed on how they can access the mechanism and be given fair and impartial resolutions without fear of reprimand.
- Formalized: The mechanism needs to be formally established, predictable and well known, and not ad hoc. It needs rules for addressing grievances, holds regular meetings/deliberations on specific and well-known days to discuss the issues. Clearly laid out and expected timetable for key process milestones is essential.
- Appropriate Protection: The mechanism should prevent retribution and should not impede access to other remedies such as legal reprieve.

10.5 THE PROPOSED GRIEVANCE STRUCTURE

This ESIA proposes a four (4) - tier grievance redress mechanism:

- Community / Stakeholders Level
- Management Level – project Implementation Team
- Water Sector Trust Fund
- World Bank

Table 10.1: Grievance redress mechanism summary

	Institution	Membership	Functions
1	Grievance Redress Committee/ Community Stakeholders Level (community Liaison Officer - – LO).	• Established at the community / Stakeholders' level with membership from the project area. • Consists of a 7 -11member committee (exclusive of ex official members). • Membership should be drawn from a variety of factors including affected persons (all gender,	• Assist community / stakeholders to file a complaint. • To address affected persons grievances as 1st point of contact, within 15 days.

		elders' representatives, and youth in cognizance of local dynamics). • A representation of the local government administration i.e., chief and assistant chief as Ex official default members with no voting rights.	
If no amicable solution or settlement is reached, the aggrieved person is not satisfied or does not hear from the GRC through CLO within the required time limits (15 days), they can escalate the grievance to the next level.			
2	Management Level – The project Implementation Team	• The proponent will consider grievance reports forwarded to it and make a determination. • Membership consists of the management team. • The CLO may be invited to the meeting to give a highlight and account of grievances.	• Escalation Mechanism to determine grievances unresolved by GRC within 15 days. • Responsible for monitoring the complaints. • Providing inputs into the monitoring and evaluation process i.e., quarterly reports on grievances handled.
3	Water Sector Trust Fund	Through the proponent, the grievances not concluded at the management level can be forwarded to WSTF for further review.	Resolves matters forwarded from the implementation team. Should WSTF be unable to resolve, it will be escalated to World Bank
4	World Bank	Grievances not resolved at WSTF level will be escalated to World Bank	Review and attend to matters received from WSTF.

The aggrieved person can go Court as a last resort. Given the above mechanism it is not foreseen that many disputes will end up in court.

Court of Law

- The aggrieved party may seek legal deals specifically with land and redress and at their own cost.
- The legal option will act as a last resort and will be sort after all other redress medium have been exhausted unsuccessfully.

11 CHANCE FIND PROCEDURES

11.1 PURPOSE OF THE CHANCE FINDS PROCEDURE

The chance find procedure is a project-specific procedure that outlines actions required if previously unknown heritage resources, particularly archaeological resources, are encountered during project design, construction or operation. It is a process that prevents chance finds from being disturbed until an assessment by a competent specialist is made and actions consistent with the requirements are implemented.

11.2 RESPONSIBILITY

Murang'a Water & Sanitation Company (MUWASCO) as the implementation institution is responsible for siting and designing the project to avoid significant damage to cultural heritage. When the proposed location of a project is in areas where cultural heritage is expected to be found, either during construction or operations, the client will implement chance find procedures established through the Social and Environmental Assessment. The client will not disturb any chance finds further until an Assessment by a competent specialist is made and actions consistent with the requirements of this Performance Standard are identified.

11.3. SCOPE OF THE CHANCE FINDS PROCEDURE

This procedure will be applicable to all activities conducted by the personnel, including contractors for the project that have the potential to uncover a heritage item/site. The procedure details the actions to be taken when a previously unidentified and potential heritage item/site is found during construction activities. Procedure outlines the roles and responsibilities and the response times required from both project staff, and any relevant heritage authority.

11.4. INDUCTION/TRAINING

All personnel, especially those working on earth movements and excavations, are to be inducted on the identification of potential heritage items/sites and the relevant actions for them with regards to this procedure during the Project induction and regular toolbox talks.

11.5. DETAILS ON CHANCE FIND PROCEDURES

If any person/worker under the project discovers a physical cultural resource, such as (but not limited to) archaeological sites, historical sites, remains and objects, or a cemetery and/or individual graves during excavation or construction, the following steps shall be taken:

- Stop all works in the vicinity of the find, until a solution is found for the preservation of these artifacts, or advice from the relevant authorities is obtained from the National Museums of Kenya (NMK).
- Immediately notify the foreman. The foreman will then notify the Site engineer and the Environment Officer of the contractor.
- Record details in Incident Report and take photos of the find.
- Delineate the discovered site or area; secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a night guard shall be arranged until the responsible local authorities take over.
- Preliminary evaluation of the findings by archaeologists. The archaeologist must make a rapid assessment of the site or find to determine its importance. Based on this assessment the appropriate strategy can be implemented. The significance and importance of the findings should be assessed

according to the various criteria relevant to cultural heritage such as aesthetic, historic, scientific or research, social and economic values of the find.

- Sites of minor significance (such as isolated or unclear features, and isolated finds) should be recorded immediately by the archaeologist, thus causing a minimum disruption to the work schedule of the Contractor. The results of all archaeological work must be reported to the NMK, once completed.
- In case of significant find the NMK, will be informed immediately and in writing within 7 days from the find.
- The onsite archaeologist provides NMK with photos, other information as relevant for identification and assessment of the significance of heritage items.
- The NMK will investigate the fact and provide response in writing.
- Decisions on how to handle the finding shall be taken by the responsible authorities which is NMK. This could include changes in the layout (such as when finding an irremovable remain of cultural or archaeological importance) conservation, preservation, restoration and salvage.
- Construction works could resume only after permission is granted from the responsible authorities.
- In case no response received, this will be considered as authorization to proceed with suspended construction works.

One of the main requirements of the procedure is record keeping. All finds must be registered. Photocopy of communication with decision making authorities, conclusions and recommendations/guidance, implementation reports are kept.

Ma**nagement options for archaeological site**:

- **Site avoidance:** If the boundaries of the site have been delineated attempt must be made to redesign the proposed development to avoid the site. (The fastest and most cost-effective management option);
- **Mitigation:** If it is not feasible to avoid the site through redesign, it will be necessary to sample it using data collection program prior to its loss. This could include surface collection and/or excavation. (The most expensive and time-consuming management option.);
- **Site Protection:** It may be possible to protect the site through the installation of barriers during the time of the development and/or possibly for a longer term. This could include the erection of high visibility fencing around the site or covering the site area with a geotextile and then capping it with fill. The exact prescription would be site- specific.

12 CONCLUSION AND RECOMMENDATIONS

12.1 CONCLUSION

The assessment and evaluation of the environmental and social impacts of the proposed Maragua Water Supply project by MUWASCO has revealed that the project will bring a net environmental, social, health and economic benefits to all living within the Project area and its environs. Additionally, the project has also been found to have adverse impacts that need to be mitigated to make the project environmentally, socially, and economically viable throughout its lifespan. There are number of Project Affected Persons (PAPs) whose livelihood will be affected during the implementation of the Project. There is need to provide compensation to the PAPs for loss of income arising from disruption their activities and also ensure restoration of any affected structures to their original status. Based on the assessment of impacts, the following conclusions can be made.

- The proposed project is long overdue considering the increasing population and rising demand for water within the project areas.
- The County Government of Murang'a and the communities living within the project areas have fully embraced the project.

12.2 RECOMMENDATIONS

From the synthesis of the findings of the study, the following recommendations have been made:

i. While the quality and reliability of water supply to Maragua Ridge, Kambiti and Igikiro areas will improve with the project, the project proponent needs to plan for a sewerage system for the town Improved water supply will increase the generation of wastewater; without a functioning sewerage system, this will present a public health challenge to authorities and residents.

ii. With low or no connectivity for the communities living to the pipeline, the communities will not have a sense of ownership of the project. Such a scenario will promote illegal connection to the new pipeline. The proponent should ensure good coverage.

iii. To enhance social integration, the local communities and all the stakeholders involved will be sensitized on the benefits and risks of the project. The proponent will continuously conduct public participation and stakeholder consultation to better handle issues that emerge during the life of the project.

iv. There is need to undertake capacity building for the local communities to enable them to competitively exploit opportunities that arise from construction of the project (employment, supplies, etc.) as well as utilization of their resources. Public sensitization on matters of environmental conservation, public health and economic activities will also help improve the living standards of the communities.

v. The proponent, construction consultant and the contractor should work together to ensure full implementation of the ESMP for proper enhancement and mitigation of impacts emanating from the project.

vi. A budget for the implementation of the Environmental and Social Management Plan and Compensations for the Projects Affected Persons needs to be provided in the proposed Project development costs.

REFERENCES

- Environment Management and Coordination EMCA Cap 387 and EIA/EA Regulations 2003)
- Kenya gazette supplement number 56. Environment 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 gazette supplement number 68. Environmental Management and Coordination (water quality) Regulations 2006. Government Printer.
- Kenya gazette supplement Acts 2000, Environmental Management and Coordination Act Number 8 of 1999.Government Printers, Nairobi.
- Kenya gazette supplement Acts Public Health Act (Cap. 242). vii. World Bank Operational Safeguards Policies on Environment and Social Risks.
- Murang'a County Integrated Development Plan (2023 – 2027)
- The WSDP Environmental and Social Management Framework (ESMF)
- The WSDP Resettlement Policy Framework (RPF)

ANNEXES

ANNEX I: Proposed MUWASCO Water Distribution Pipelines Layout in Maragua Sub County



MUWASCO ESIA
Maragua CLS PIPELIN

ANNEX II: Cost estimates for the proposed Project



MUWASCO CLSG II
PROJECT COST ESTIV

ANNEX III: Sample ESIA Questionnaire Responses



MUWASCO
QUESTIONNAIRE 1.pc



MUWASCO
QUESTIONNAIRE 2.pc

ANNEX IV: Minutes of Consultations Meetings and Attendance Lists



MINUTES OF
MEETING - IGIKIRO - I



MINUTES OF
MEETING - SAMAR - I



LIST OF
ATTENDANCE -IGIKIR



LIST OF
ATTENDANCE -SAMA

ANNEX V: Road Authorities Wayleaves Application Forms & Guidelines

KENHA ROAD RESERVE WORKS -Ap

KENHA

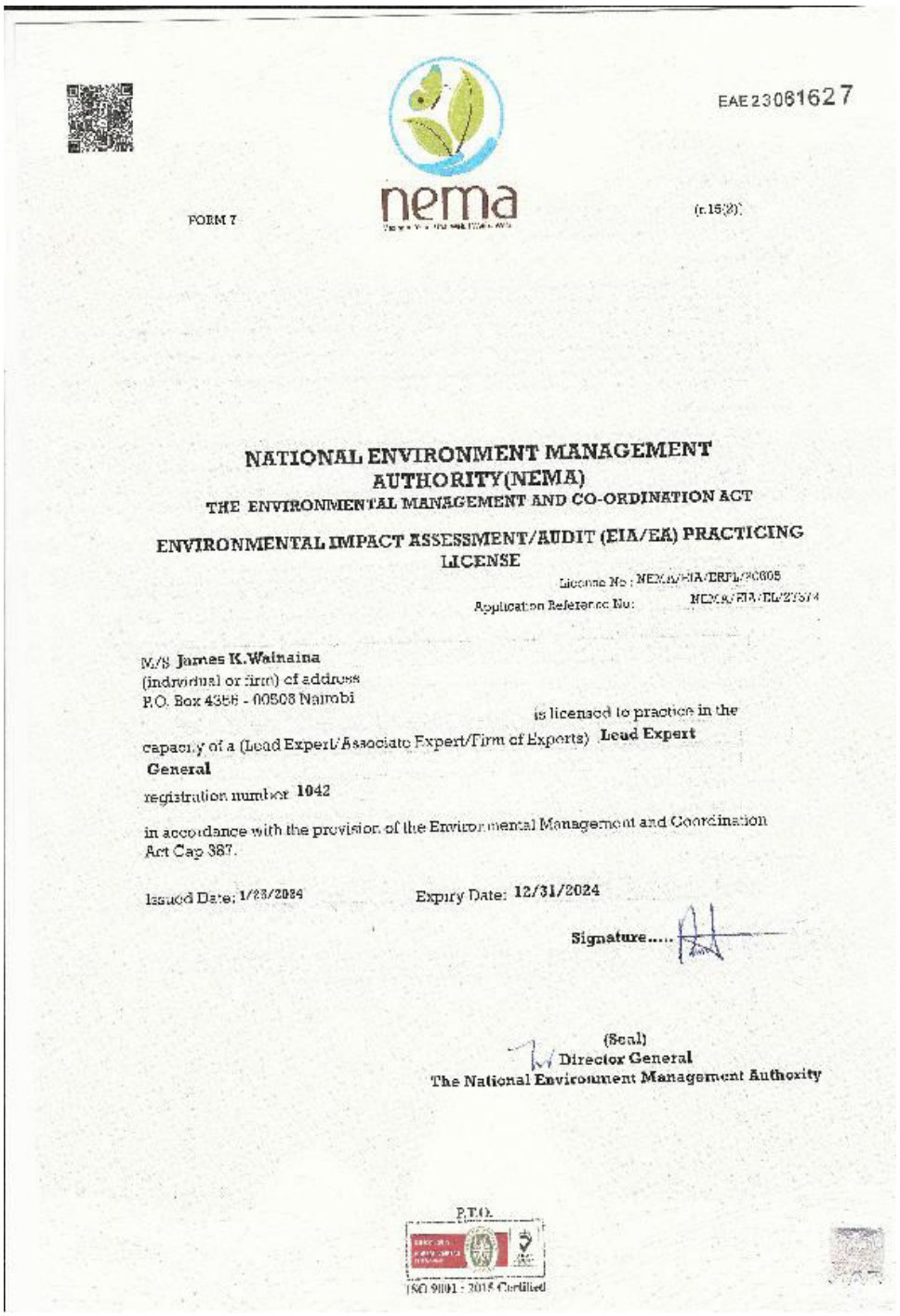
KURA ROADSIDE DEVELOPMENT APPLI

KURA

KERRA RoadsideDevtApplicat

KERRA

ANNEX VI: ESIA Study Team Leader's NEMA License - 2024



EAE 23081627

FORM 7 (r.15(2))

nema

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY(NEMA)

THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT

ENVIRONMENTAL IMPACT ASSESSMENT/AUDIT (EIA/EA) PRACTICING LICENSE

License No : NEMA/EIA/ERPL/9605

Application Reference No: NEMA/EIA/EL/27574

M/S **James K.Wainaina**
(individual or firm) of address
P.O. Box 4356 - 00506 Nairobi

is licensed to practice in the capacity of a (Lead Expert/Associate Expert/Firm of Experts) **Lead Expert**
General
registration number **1042**

in accordance with the provision of the Environmental Management and Coordination Act Cap 387.

Issued Date: 1/23/2024 Expiry Date: **12/31/2024**

Signature.....

(Seal)
Director General
The National Environment Management Authority

P.T.O.

ISO 9001 : 2015 Certified

ANNEX VII: Selected Photographs of Affected Structures



Concrete pavement on the road reserves in Maragua Town where a section of pipeline will be installed.



A narrow wayleave within Maragua Town CBD where a section of pipeline will be installed.





Street traders operating on the road reserves where sections of proposed pipelines will be installed within the outskirts of Maragua Town.



Napier grass on road reserve to be affected during installation of pipelines in Igikiro



Potatoes sellers operating on the road reserve at Gakoigo where a section of pipeline will pass.



Traders operating on at Kambiti Trading Centre where a section of the proposed pipelines will be installed.





Vegetable & Fruits business located on road reserves at Igikiro Trading Centre that will be temporarily affected during the installation of pipelines.