THE REPUBLIC OF KENYA

(Water Services Trust Fund (WSTF) in collaboration with the World Bank)

KENYA URBAN WATER AND SANITATION –OBA PROGRAM FOR LOW INCOME AREAS

MURANG'A SOUTH WATER AND SANITATION COMPANY (MUSWASCO)

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT PROJECT (ESIA) REPORT FOR PROPOSED

SABASABA URBAN WATER SUPPLY PROJECT

Report Prepared By

Losai Management Limited

Providing viable solutions

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KENYA URBAN WATER AND SANITATION –OBA PROGRAM FOR LOW INCOME AREAS

SABASABA URBAN WATER SUPPLY PROJECT

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LIST OF ABBREVIATIONS & ACRONYMS

BPT	Break Pressure Tanks
CSOs	Civil Society Organization
DCBL	Decibels
EHS	Environment Health and Safety
ESIA	Environmental and Social Impact Assessment
EMCA	Environmental Management & Coordination Act
GDP	Gross Domestic Product
ICDP	Integrated Development Plan
ILO	International Labour Organization
IFC	International Finance Agency
KeNHA	Kenya National Highways Authority
KURA	Kenya Urban Roads Authority
KeRRA	Kenya Rural Roads Authority
MUSWASCO	Murang'a South Water and Sanitation Project
MWI	Ministry of Water and Irrigation
NEMA	National Environment Management Authority
NEP	National Environment Policy
NGO	Non-Governmental Organization
OBA	Output Based Aid
OSHA	Occupational Health and Safety
OP	Operations Policy
PPEs	Personal Protective Equipment
RAP	Resettlement Action Plan
SDGs	Sustainable Development Goals
STD	Sexually Transmitted Diseases
SUP	Social Upgrading Project
TWSB	Tana Water Services Board
WB	World Bank
WIBA	Workplace Injuries and Benefits Act
WSTF	Water Services Trust Fund
WSP	Water Services Provider
WRUA	Water Resources Users Authority
WRMA	Water Resources Management Authority
VCT	Voluntary Counselling Centers

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EXECUTIVE SUMMARY

E. EXECUTIVE SUMMARY

E.1 Project Information

The Water Services Trust Fund (WSTF) has established an Output Based Aid (OBA) Fund Murang'a South Water and Sanitation Company (MUSWASCO) intend to implement Saba Saba Urban Water Supply Project. The Project will involves augmentation of existing Kinyona Water Treatment Plant through construction of new sedimentation basins and Rehabilitation of existing utility buildings, this will improve the water production capacity of the plant by an additional 4000m3/day. The works will also involve laying of 8 km transmission main to an existing 10km pipeline which is under implementation by MUSWASCO, this pipeline will transmit additional water to the existing Mariira tank.

The Project once complete will supply safe, reliable and adequate water to Sabasaba Town, Iganjo, Kaharati, Kamahuha, Githembe, Gakuya, Kahariro, Kandani and Mugumoini sub - locations. The number of new and dormant water households' connections that the project targets to connect are 2500 households' connections, this target will used by Water Services Trust Fund (WSTF) to compute eligible subsidy due MUSWASCO as provided for by OBA manual 2013.

This report therefore presents environment and social risks to human and natural environment of identified Project components, appropriate mitigation measures have also been recommended in chapter 7 and 8 of this assessment.

E.2 Policy, Legal and Administrative Framework

The ESIA study preparation was guided by both national and international legal and policy instruments aimed at ensuring compliance with Environmental and Social Safeguards of the World Bank. A summary of the instruments is presented box below;

National Policies and Laws

1. Kenyan Constitution 2010
2. Kenya Vision 2030
3. Sustainable Development Goals
4. Gender Policy 2011
5. HIV and AIDS policy 2009
6. Environmental Management and Coordination Act (EMCA),1999 amended 2015 and subsequent regulations
7. Water Act 2016 and subsequent regulations.
8. County Government Act no 17 of 2012
9. Physical Planning Act 1996 (286)
10. Occupational Health and Safety Act (OSHA 2007)
11. The Public Health Act (Cap.242)
12. Workplace Injuries and Benefits Act 2007

International Instruments

1. World Bank OP 4.01 on Environment Assessment
2. World Bank Group Environment Health and Safety Guidelines on Water and Sanitation
3. International Finance Cooperation (IFC) Performance Standard 2: Labour and Working Conditions
4. Guidelines on incorporating Human Rights Standards and Principles, including Gender, in Programme Proposals for Bilateral German Technical and Financial Cooperation

E.3 Highlights of Stakeholder Engagement

E.3.1 Stakeholder Engagement Findings

The assessment involved consultations with relevant stakeholders in target Project area. The aim of stakeholder consultations was to give a platform for information sharing and opinion gathering in relation to the proposed Project. Consultations were done in form of public meetings and key informant interviews. The issues were than analyzed and presented to design team for finalization of Project designs and planning on how best to implement the Project. The main meetings were held within the month of April 2017, attendance of the meetings was from diverse sectors of the society as summarized below

Table E-1: Schedule of Stakeholder Consultations

Date	Stakeholder Consulted
4th April 2017	Public Health officer Kigumo sub county
4th April 2017	District Social Development Officer Kigumo Sub county
4th April 2017	Deputy County Commissioner Kigumo
5th April 2017	Public Works Officer Kigumo Sub County
7th April 2017	Water Sub County Officer Kigumo
4th April 2017	Public Health Officer Maragua
5th April 2017	Water quality and pollution control officer. WRMA Murang'a
7th April 2017	Deputy county commissioner murang'a south.
5th April 2017	District Social Development Officer Murang'a south Sub county.
6th April 2017	Chairman WRUA upper Maragwa.

Table 2: Schedule of Public Consultation Meetings

Date		Stakeholder Consulted	Number of Meeting Attendance
6th April 2017	Kamahuha Shopping Centre	Local Administration and Public in Kamahuha Area	87
4th April 2017	Kinyona Shopping Centre	Local Administration and Public in Kamahuha Area	82

Summary of Issues from Public and Institutional Consultations is presented in table E-3 below

Table E-3: Summary of Stakeholder Consultation Issues

Date	Officer Consulted	Concerns raised
4th April 2017	Public Health officer Kigumo sub county	• Contractor should organize campsite to required standard in order to avoid environmental pollution. • MUSWASCO should treat water to required standards. • Public Health and Safety Requirement as per the Public Health Act Cap 242 and OSHA 2007 to be complied with.
4th April 2017	District Social Development Officer Kigumo	• Ensure casual jobs during project implementation are given to local youth. • Bulk water mains should be installed properly to

	Sub county	avoid bursts which locals believe can cause landslides, like the one that happened in Gakira in 2016.
4th April 2017	Deputy county commissioner Kigumo	• Chiefs and village elders to assist in identifying legible youth to be employed during project implementation. • Residents should be encouraged to form a committee that will help resolve any disputes that might arise. • All stakeholders should be careful not to incite residents considering that this is an election year
5th April 2017	Public Works Officer Kigumo sub county	• MUSWASCO should ensure that all stakeholders are consulted before project commences. • The company should ensure that no treated water is used for irrigation • The company should ensure timely repairs of burst pipes to reduce losses and water shortages to customers
7th April 2017	Water Sub County Officer Kigumo	• MUSWASCO should ensure all illegal connections are disconnected. • Disconnect all customers who use treated water to do irrigation. • Provide civic education for locals along the main line so that they can report any interference to the line in due time.
4th April 2017	Public Health Officer Maragua	• The company should improve waste water management by providing sewer systems • Contractor should avoid use of environmentally hazardous materials like asbestos. • Civic education should be conducted by the company as part of company's social responsibility to enable residents maintains high level of hygiene so as to avoid jigger infestation.
5th April 2017	Water quality and pollution control officer. WARMA Murang'a	• Water companies should consider alternative ways of getting water by constructing dams to collect rain runoff water that can later be used during dry seasons • MUSWASCO should declare the amount of water drawn from the river so that it can be charged at 50 cents per cubic metre. • A master meter should be installed after treatment plant to ensure all the water drawn is charged. • Water company should be involved in water catchment conservation by planting trees particularly bamboo which helps to clean water naturally.
7th April 2017	Deputy county commissioner Murang'a south.	• The company should expand water intake to ensure constant water supply to residents • Consult residents properly before project works commencement to avoid resistance at a later stage of implementation. • Contractor should offer employment to local people.

5th April 2017	District Social Development Officer Murang'a south Sub county.	• The company should offer employment to locals since it creates a sense of ownership even after project completion. • Local residents should be encouraged to form committees to monitor and report any bursts, leakages and illegal connections. • Offer sufficient civic education to local residents on the advantages of having piped water.
6th April 2017	Chairman WRUA upper Maragwa.	• The company should ensure that kinyona area are given sufficient water supply to avoid conflicts like the one witnessed in ichichi • The government together with Kenya forest service should stop deforestation at Katare forest immediately.

Details of stakeholder consultations are presented in Chapter 6 of this Report.

E.4 Potential Project Impacts

The Project impacts during the assessment were generated based on the analysis of the proposed project activities in relation to the Project area environment. The impacts arising during each of the phases of the proposed development namely; construction, operation and decommissioning, were categorized into:

- Impacts on Biophysical Environment
- Impacts related Social-Economic Setting
- Impacts related to Health and Safety

Section E.4.1 to E.4.4 below provides a summary of the Project impacts both positive and negative discussed in this Report.

E.4.1 Positive Impacts during Construction Stage

The Project is a Socially Uplifting Project (SUP) and it's envisaged to have more positive impacts after completion of the civil works and commissioning. The main anticipated positive impact during construction phase is Creation of Employment and Business Opportunities for the local communities in the Project Areas.

E.4.2 Positive Impacts during Operation Stage

The Project shall result in both direct and indirect benefits to the residents of Sabasaba as summarized below;

- Improved Accessibility to Clean and Reliable Water Supply
- Improved Hygiene and Sanitation in the Project Areas
- Reduced Cases of Water Related Diseases
- Reduced Water and Sanitation Burden to Women
- Increased Land Values in the Project Area

E.4.3 Negative Impacts and Mitigation Measures during Project Construction Period

The Project Construction Phase will involve the following activities; delivery of construction of pipes and associated fittings to the Project site, manual excavation of trenches, temporary stockpiling of soils, sub-soils and rock along the trenches, importing material for bedding of joints of the water lines (e.g. sand, cement, and concrete) and delivering pipelines and other materials to site.

The activities discussed above have the potential of triggering negative environment and social impacts during Project Construction Phase. The impacts are presented in three categories of environment namely: Biophysical, Socio Economic and Occupational Health and Safety setting.

E.4.4 Biophysical Environment Setting

The project impacts on Biophysical environment setting of the Project area identified during the assessment is presented in **Table E.3** below.

Table E.3: Negative Impacts on Biophysical Environment and Proposed Mitigation Measures During Construction

Impacts	Proposed Mitigation Measures
Destruction of Vegetation in the Project Areas	• Site Clearance and Construction activities will be limited to available reserves within which the pipelines are to be laid so as to minimize destruction to vegetation cover • Reinstatement of the project sites to their original state to be carried out once construction works are completed to allow growth of vegetation. • All hedges damaged during construction to be reinstated after completion of the Works
Contamination of Surface Water Sources by Effluents from Construction Plant and Equipment	• Ensure Construction Equipment is well maintained and serviced according to manufacturers' specifications to prevent oil leaks. • Cleaning / repair of Construction Plant and Equipment to be carried out at designated yards • Contractor to have designated storage areas for oils, fuels etc. that is protected from rain water and away from nearby surface water courses
Soil Erosion resulting to loss of top soil	• The risk of Soil Erosion is low as the design of the water pipelines has incorporated measures to minimize this risk through provision of Erosion prevention structures i.e. gabions in areas susceptible to Soil Erosion especially at the Banks of the rivers.
Solid Wastes Generation from Construction Activities	• Construction wastes (residual earth, debris and scrap materials) to be collected at designated points and Contractor to dispose to designated Solid Waste Dumping Sites approved by the Murang'a County Government • Contractor's Camps and Construction Sites to have designated waste collection points, • Environmental Management, Health and Safety Training Programmes to be conducted for Contractor's Staff to create awareness on proper solid wastes management

E.4.5 Social Environment Setting

The project impacts on Social environment setting of the Project area identified during the assessment is presented in T**able E.4** below.

Table E.4: Negative Impacts on Social Environment and proposed Mitigation measure during Construction

Impacts	Proposed Mitigation Measures
Loss of Temporal Assets and Sources of Livelihood	Not triggered due to the following • Kinyona Water Treatment Plant is an existing facility that has adequate land for expansion, the proposed expansion works will be done within the existing facility. • Proposed 8km clear water line from Kinyona to Kaharati will utilize existing road reserve that is free from encroachment
Disruption of Public Utilities	• Contractor to carry out piloting to locate services such as pipes and cables along the Pipeline Route before commencing excavation works. • The relevant Services Providers and Agencies to be notified prior to commencement of Works so that any relocation works can be carried out before the Pipeline Construction Works begin. • Length of excavation to be restricted to sections that can be reinstated within the shortest period possible to minimize time of disruption of services
Increased Transmission of HIV/AIDS	• HIV/AIDS Awareness Program to be instituted and implemented as part of the Contractor's Health and Safety Management Plan to be enforced by the Supervising. This will involve periodic HIV/AIDS Awareness Workshops for Contractor's Staff • Access to Contractor's Workforce Camps by outsiders to be controlled • Contractor to provide standard quality condoms to personnel on site
Labour Influx and sexual offences	• Effective community engagement and strong grievance mechanisms on matters related to labour. • Effective contractual obligations for the contractor to adhere to the mitigation of risks against labour influx • Proper records of labour force on site while avoiding child and forced labour • Fair treatment, non-discrimination, and equal opportunity of workers. • Comply to provisions of WIBA 2007 and IFC PS 2 on labour and Working Conditions, and ILO Conventions 87, 98, 29,105,138,182,100,111 • Develop and implement a children Protection Strategy
Human Rights and gender inclusivity	• Mainstream Gender Inclusivity in hiring of workers and entire Project Management as required by Gender Policy 2011 and 2/3 gender rule. • Comply to provisions of guidelines on incorporating Human Rights Standards and Principles, including Gender, in Programme Proposals for Bilateral German Technical and Financial Cooperation • Protecting Human Risk areas Associated with, Disadvantaged Groups, Interfering with Participation Rights, and interfering with Labour Rights
Increased Crime and Insecurity	• Contractor and Supervision Team to liaise regularly with the Local Administration and Police Service to address any security and crime arising during project implementation. • Contractor to provide 24 hours security to Workforce Camps, Yards, Stores and to the Supervising Team's Offices

E.4.6 Occupational Health and Safety Setting

The project impacts on Social Economic environment setting of the Project area identified during the assessment is presented in **Table E.5** below

Table E.5: Negative Impacts on Occupational Health and Safety Setting and Proposed Mitigation Measures During Construction

Impact	Proposed Mitigation Measures
Noise and Excessive Vibrations.	• Contractor will comply with provisions of EMCA 1999 and 2015 amendments (Noise and Excessive Vibrations Regulations of 2009) • The Contractor shall keep noise level within acceptable limits (60 Decibels during the day and 35 Decibels during the night) and construction activities shall, where possible, be confined to normal working hours in the residential areas • Hospitals and other noise sensitive areas such as schools shall be notified by the Contractor at least 5 days before construction is due to commence in their vicinity
Air Pollution and Dust Generation.	• The contractor shall comply to the provisions of EMCA 1999 and amendments 2016 (Air Quality Regulations 2014) • Workers shall be trained on management of air pollution from vehicles and machinery. All construction machinery shall be maintained and serviced in accordance with the contractor's specifications • Water sprays shall be used on all earthworks areas within 200 metres of human settlement especially during the dry season.
Risk of Accidents at Work Sites	• Contractor to provide a Healthy and Safety Plan prior to the commencement of works to be approved by the Supervising Engineer. • Provide Personal Protective Equipment including gloves, gum boots, overalls and helmets to workers, use of PPE to be enforced by the Supervising Engineer. • Fully stocked First Aid Kits to be provided within the Sites, Camps and in all Project Vehicles
Risk of Traffic Accidents along the Pipeline Route	• Strict use of warning signage and tapes where the trenches are open and at other active construction sites • Contractor to Employ and train Road Safety Marshalls who will be responsible for management of traffic on site • Contractor to provide a Traffic Management Plan during construction to be approved by the Supervising Engineer

E.4.7 Negative Impacts and Mitigation Measures During Project Operation Period

Table E.6 presents a summary of potential negative impacts likely to be experienced by the MUSWASCO during operation of the project.

Table E.6: Potential Negative Impacts and Proposed Mitigation Measures During Operation

Potential Impact	Proposed Mitigation Measures
Risk of Encroachment and Construction of Structures on the Pipeline Way Leave	• Arrest and prosecution of encroachers as required by Murang'a County By laws on Way Leaves and Road Reserves • MUSWASCO to undertake awareness campaigns aimed at preventing encroachment
Risk of Pipeline Bursts Leading to Water Loss (Non-Revenue Water)	• The risk of pipeline bursts is low as the pipeline design, including the selection of pipe material and pipe pressure classes, has been carried out so as to minimize this risk. • This risk will be further minimized through regular inspection, repair and maintenance of the pipeline by the Operator, MUSWASCO
Risk of Illegal Connections and Vandalism of the Pipeline	• Regular inspection by MUSWASCO of the pipeline corridor for illegal connections

Potential Impact	Proposed Mitigation Measures
	• Prosecution of encroachers as required by Murang'a County By laws on Way Leaves and Road Reserves • MUSWASCO will undertake awareness campaigns to prevent illegal connection to the water lines

E.5 Findings and Recommendation

E.5.1 Findings

The Main Findings from the assessment described in the Report are as follows:

1. The project design has ensured that the project is constructed with existing road reserves and no private land will be acquired, therefore OP 4.12 will not be triggered

2. The Environmental and Social Scoping undertaken for the project indicate that the investment will result in low impact on biological environment; however, the Project triggers World Bank Operation Policy (OP) 4.01 on Environmental Assessment.

3. Provisional Budget of Kenya Shillings 3.2 Million is required for implementation of mitigation measures of potential negative environmental impacts identified in the report.

4. The overall objective of project is to improve the living conditions of people of Sabasaba through provision of adequate reliable and safe water supply to approximately 2500 household connections.

MAIN REPORT

CHAPTER 1: BACKGROUND INFORMATION

1.1 Background Information

The Water Services Trust Fund (WSTF) has established an Output Based Aid (OBA) Fund (the OBA Fund) with the objective of facilitating access to water and sanitation services for the urban low income communities subsiding sub projects developed and implemented by Water Service Providers (WSPs) and financed through commercial lending loans. Through the OBA fund, administered by the Water Services Trust Fund (WSTF), the project will provide subsidies to subprojects financed by commercial lenders and implemented by WSPs to provide water and/or sanitation services in low-income areas identified in the Government's poor areas mapping database referred to as MajiData.

The OBA Fund has received initial funding through the Global Partnership on Output based Aid (GPOBA), a trust administered by the World Bank. It is expected that the programme will support WSPs to access US$ 16 million of the debt finance from market based lenders and provide water and sanitations services to 30,000 households or approximately 150,000 people. To do so GPOBA is contributing US$ 11.7 million to be used in the following components: The grant consists of USD 2.335 million for implementation support activities and USD 9.5 million for output-based aid (OBA) subsidies – total US$11.835 million. Participating WSPs will deliver results, which must be independently verified to access the OBA subsidy.

In December 2015, MUSWASCO under the Pro- Poor Social Connection and Service Coverage Expansion and Improvement Program commercially financed by Sidian Bank and Subsidized by OBA successfully extended water supply to Saba Saba, Kandara, Kabati and Kenol area where a total of 2310 households were connected to water supply.

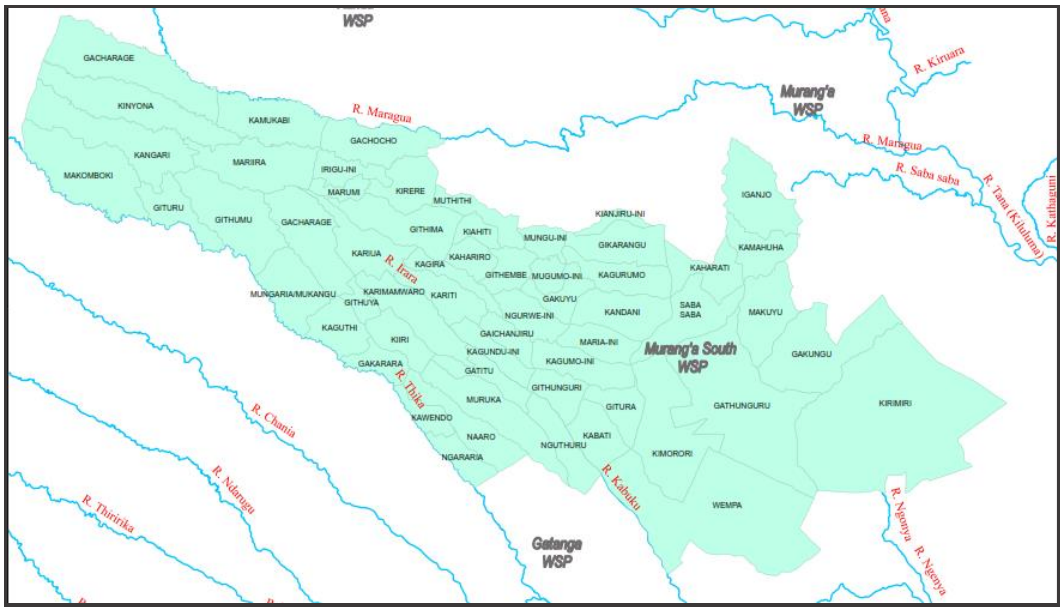
To increase water supply, MUSWASCO intends to implement Saba Saba Urban Water Supply Project which involves construction of sedimentation basins and Rehabilitation of existing utility buildings. The works also involve laying of 8 km transmission main 10km pipeline under construction to existing Mariira tank. The Project once complete will supply safe, reliable and adequate water to Sabasaba Town, Iganjo, Kaharati, Kamahuha, Githembe, Gakuya, Kahariro, Kandani and Mugumoini sub - locations. The supply area is approximately 81 km2 and has an estimated population of over 50,000.

1.2 Project Implementing Agency

Muranga South, Water and Sanitation Company (MUSWASCO) was incorporated in 2006. The MUSWASCO's service area is approximately 1000 km2 and has an estimated population of 456,269. The Water Services Provider (WSP) borders Gatanga Water and Sanitation Company (GAWASCO) to the south west, Thika Water and Sewage Company (THIWASCO) to the South, Yatta Water and Sanitation Company to the South East (YAWASCO), Muranga Water and Sanitation Company to the north East (MUWASCO) and finally Kahuti Water and Sanitation Company (KAWASCO) to the North West.

The main sources of water that supply MUSWACO are; Irate, Kiriciungu, Ngararia, Sabasaba and Maragua rivers Water Supply Systems. The main supply areas are 2 rural and 3 urban supply areas. These are; i) Kandara rural area, ii) Kigumo rural area, iii) Kigumo urban area which encompasses kigumo, Ikumbi, Kangari, Kirere, Makomboki, Mariira and Muthithi towns and their environs, iv) Maragua urban area and, v) Sabasaba urban area. Figure 1 below illustrates MUSWASCO area of operation.

Figure 3-1: MUSWASCO Area of Jurisdiction



1.3 Project Justification and Benefits

Sabasaba is a low income peri-urban settlement situated along the Kenol –Muranga road. The more urbanized parts of Saba Saba are settled by low income communities largely consisting of labourers and low income earners who depend on trade in the town and the adjacent towns. The outer parts of Saba Saba are mainly rural in nature settled by small scale agricultural farmers and agricultural workers. Sabasaba area is noted to be experiencing high rate of growth. The area is a low income and is in Majidata under the Company's area of Jurisdiction

Sabasaba region is currently not adequately supplied with water. MUSWASCO's water supply in this area is commonly on a rationed programme. The alternative water sources i.e. communal boreholes and water vendors have also not been reliable. The proposed project, Sabasaba water supply project, is therefore aimed at augmenting the water supply in the area.

The proposed intervention overall goal is to improve the health and access to water for the residents of Saba Saba and the environs. The proposed project will provide safe, clean, reliable water and improved home environmental sanitation for the residents. It is anticipated that more than 24,189 residents will benefit from this project.

The Project will directly contribute towards realization of MUSWASCO strategic objectives (years 2017 - 2021), Sustainable Development Goals, Kenyan's Vision 2030 on provision of water and Sanitation Services to population as described below

- To increase the proportion of the population accessing safe water from 46% to 70% in MUSWASC area by 2019 therefore improving the current Low access and coverage to safe water and sanitation services. The proposed construction of 500mm diameter mainline from Kinyona intake works and extending it to the new Mariira tank by 2021 and Expansion of Kinyona treatment works from 12000m3/day to 24000m3/day by 2019 are some of the activities indentified under this strategic objective.

- Sustainable Development Goal (6) which is the new 2030 agenda and expands Millennium Development Goal as guided by resolutions of Rio+20 conference. The goal focuses more on investment in adequate infrastructure in water sanitation, Hygiene, water quality, waste Water Management, water scarcity and use efficiency, integrated water resource management and protection of water related ecosystems

- The project is a Vision 2030 related project which endeavours to contribute to improved water supply to Kenyan citizens. Once commissioned, the project will contribute towards achieving the 10% economic growth of the republic of Kenya for the next 25 years.

1.4 Objectives of the EIA study

This ESIA assessment has been conducted in compliance with the Environmental Impact Assessment Regulation as outlined under the Gazette Notice No. 56 of 2003 reviewed in 2009 established under the Environmental Management and Coordination Act (EMCA), 1999 of Kenya. The Environmental & Social Impact Assessment (ESIA) is expected to achieve the following objectives:

Box 1-1: EIA Objectives

- To identify all potential significant environmental and social impacts of the proposed Project and recommend measures for mitigation.
- To assess and predict the potential impacts during site preparation, construction and operational phases of the Project.
- To verify compliance with environmental regulations.
- To generate baseline data for monitoring and evaluation of how well the mitigation measures will be implemented during the Project cycle.
- To allow for public participation.
- To give an Environmental and Social Management Plan to mitigate the identified impacts so as to ensure sustainability of the proposed Projects.
- To recommend cost effective measures to be implemented to mitigate against the expected impacts.

1.5 ESIA Assessment Methodology

The approach to this exercise was structured such as to cover the requirements under the EMCA, 2015, as well as the EIA regulations as stipulated under the Gazette Notice No. 56 of 13th June 2003 and World Bank Operational Safeguards Policies. The assessment involved an understanding of the Project background, the interim designs and the implementation plan as well as Project commissioning. In addition, the baseline information was obtained through physical investigation of the site and the surrounding areas, interviews with a sample of

surrounding community, Stakeholder benchmarking photography and most important discussions with the Client and the Design Team.

1.5.1 Environment and Social Scoping

Scoping process involved the identification of significant environmental and social issues associated with the proposed Works. Through reviews of the secondary Documents and available data supported with field evaluations, it was possible to estimate the current status of the water and sanitation infrastructure, implications of additional water into the system, the capacity and integrity of the distribution network and the consumers' locations. Interviews and discussions with stakeholders and Project beneficiaries were applied in determining the aspects such as adequacy of the supply, awareness ownership, willingness to pay for water and general opinions of the people. Significant issues identified through this process have been applied in drawing up the impacts as well as the management plan under this Report.

1.5.2 Desk Reviews

A desktop review was conducted prior to site visit. Documents reviewed are illustrated in Box 2-2 below

Box 2-2: Literature Review Documents

- Saba Saba Water Supply Preliminary Design Report 2017
- Maragua Water Supply Environment Impact Assessment Report Log Associates December 2016
- Environment Management and Coordination EMCA 1999 amended in 2015 and EIA/EA Regulations 2003)
- World Bank Operational Safeguards Policies on Environment and Social Risks
- Kenya Urban Water and Sanitation Output Based Aid Fund for Low Income Areas Operations Manual: Water Services Trust Fund (WSTF) 2014.

1.5.3 Field Assessment

The physical evaluation of the Project area was carried out with specific focus on the environmental and social issues. The environmental issues assessed include, water sources and water quality, drainage and hydrology, air quality, sanitation and hygiene, biodiversity and sources of environmental pollution. The social issues include; settlement patterns, socio economic activities, land use, presence of traditional/cultural sites in the area. On the social economic front, structured stakeholder consultation meeting were held in some specific areas in addition to rapid interactions with the stakeholders to capture the views of all the parties affected.

1.5.4 Stakeholder Consultations

The process involved identification of relevant stakeholders to be consulted during the assessment consultations were done with relevant stakeholders in Murang'a South, Kandara and Kigumo Sub Counties as illustrated below.

Table 1: Schedule of Stakeholder Consultations

Date	Stakeholder Consulted
4th April 2017	Public Health officer Kigumo sub county
4th April 2017	District Social Development Officer Kigumo Sub county
4th April 2017	Deputy County Commissioner Kigumo
5th April 2017	Public Works Officer Kigumo Sub County
7th April 2017	Water Sub County Officer Kigumo
4th April 2017	Public Health Officer Maragua
5th April 2017	Water quality and pollution control officer. WRMA Murang'a
7th April 2017	Deputy county commissioner murang'a south.
5th April 2017	District Social Development Officer Murang'a south Sub county.
6th April 2017	Chairman WRUA upper Maragwa.

Table 2: Schedule of Public Consultation Meetings

Date		Stakeholder Consulted	Number of Meeting Attendance
6th April 2017	Kamahuha Shopping Centre	Local Administration and Public in Kamahuha Area	87
4th April 2017	Kinyona Shopping Centre	Local Administration and Public in Kamahuha Area	82

1.5.5 Social Infrastructure Mapping

Social mapping was undertaken while doing the community survey using full participation from the local administration and community. The focus of the process was to help in the depiction of location boundaries, roads, drainage systems, schools, drinking water facilities, source of drinking water, community infrastructure, etc. It focused on the spatial dimension of the people's realities as expressed in their background information. This process done to help in charting the various aspects related to land use and command areas, water bodies, rivers, drainage and health

1.5.6 Secondary Socio Economic Data

This information was largely drawn from the Kenya National Bureau of Statistic, The Kenya Population and Housing Census VII on Population and Household Distribution by Socio Economic Characteristic, August 2010 and findings from household survey undertaken during Environmental and Social Impact Assessment (ESIA) process within the month of April 2016.

CHAPTER 2: PROJECT DESCRIPTION

2.1 Existing Water Supply System in the Project Area

The Project area is currently served by two water supply schemes namely **Kigumo water supply scheme** and **Sabasaba borehole (No. C2163)**. The other documented scheme form Sabasaba River has since ceased operations. This scheme was primarily a pumping system. Water from the treatment works located adjacent to Sabasaba River Bridge along Kenol – Murang'a road was being pumped to ground tanks in Sabasaba town from where it would be gravitated to consumers. The scheme has ceased operation due to high operational inefficiencies mainly accrued as a result of irregular power supply, poor water quality and high running costs of the pumping system.

2.1.1 Kigumo Water Supply Scheme

The scheme derives water from Irati River and is treated at Kinyona treatment works. Kigumo water scheme supplies water to Sabasaba through the Kaharati main (DN 200). The same water scheme has 2 other major offtakes at Mutunguru and Ichagaki. According to the WSP the current water demand on Kaharati main outstrips its supply capacity by a big margin and resultantly all the areas served by this line are constantly under a stringent rationing program. The system was developed in 1970's and have therefore outlived their design period and requires major improvements. Kigumo scheme has the following 3 major supply lines:

i. **Mutunguru Main** – 250 mm diameter uPVC main tapped at Kiriangoro that serves the consumer along the Mutunguru – Maragwa route.
ii. **Ichagaki Main** - 225 mm diameter uPVC pipeline tapped at Ngaburi shopping centre. The diameter reduces to 160 mm only 200m from the point of tapping, and then reverts back to 225 mm diameter after another 400 m length.
iii. Kaharati main - It is tapped at Kaharati where the Kigumo main branches into two; Kaharati main and Sabasaba main. The Sabasaba main is 160 mm diameter uPVC pipeline and runs for 4 Km to Sabasaba Town.

Kigumo water scheme supplies water to Sabasaba as it is barely able to serve all the enroute offtakes simultaneously. This scheme being the major source of water for Sabasaba Town confirms the seriousness of water shortage situation in Sabasaba town and environs.

2.1.2 Saba Saba Borehole

The existing Sabasaba borehole (No.C2163) located at the current Murang'a South District Water Offices at Sabasaba was developed in 1954 and was mainly intended to provide water to businessmen who resided in the town at that time. The borehole was sunk to a depth of 103m. Its GPS coordinates are 292694.21m E and 9902861.12m N.

The yield of the borehole was 8.2 m3/h at commissioning but this has reduced considerably. As noted from previous studies and further confirmed from the operator the borehole runs

dry after 1hr or so of pumping and longer recharge period has to be allowed. Water from the borehole is pumped to an overhead storage tank from where it is distributed by gravity.

Photo Plate 2-1: Saba Saba Borehole


2.1.3 Kinyona Water Treatment Plant

The existing Kinyona treatment works is located at the edge of Aberdare Forest adjacent to the Kinyona track that leads to Gatare Forest Station. This system was constructed in the 1970's with a design capacity of 15,300 m3/day and it is an entirely gravity served by an intake on Irati River. The treatment works consist of inlet works, 2 No. horizontal sedimentation tanks,an elevated chlorination room, 2 No. contact tanks, and utility buildings comprising of administration house also housing a laboratory and 2 blocks of staff houses.

Raw water is transmitted via 2No. 315 mm diameter uPVC pipelines, each 4.5 Km long, constructed under different projects. From the assessment of the constructed facility the T/works was designed to treat flow from one water main. Raw water in the second main is by- passed the sedimentation process and is fed directly into the 225 m3 contact tanks for distribution. Areas served from Kinyona system include; Nginda, Kigumo, Kamahuha, Kahumbu, Muthithi, Kinyona, Maragua and Sabasaba.

Photo Plate 2-2: Kinyona Water Treatment Plant


2.2 Proposed Water Supply Project

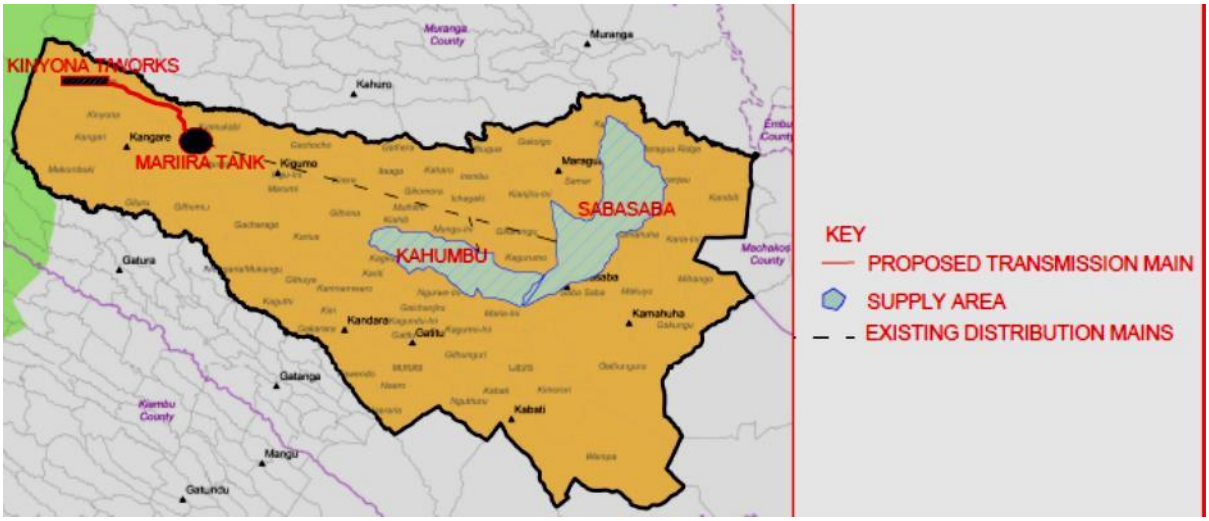
The proposed project will comprise of the following key components as indicated in Box 2-1 Below

Box 2-1: Proposed Project Scope

i. Upgrading of Kinyona treatment works to a treatment capacity of 20,740 m3/day i.e. double the existing capacity by adding two (2) sedimentation tanks.
ii. The 8 km transmission main traverses Kinyona and Kagundu area and shall be connected to the pipeline being implemented by MUSWASCO traversing Karinga – Ikumbi to Mariira tank.
iii. The pipeline will start from a new outlet at the old 225 m3 contact tank at Kinyona Treatment Works and will run along the road reserves. From the tank, water will flow along the existing mainline through Karinga-Ikumbi route to the Mareira tank where it will be connected to existing distribution network to serve Sabasaba, Kaharati, Iganjo and Kamahuarha sub-locations. 8 km long comprising of 3.7 km OD 315mm and 4.3 km OD 280 uPVC main pipeline.

The layout Map in **figure 2-1** below illustrates an general overview of the proposed Project supply area

Figure 2-1: Layout of Proposed Supply area



2.2.1 Improvement Works for Water Treatment Plant

The planned improvement shall comprise of construction of 2nr additional sedimentation basins, improvement of the chlorination room and general renovation of the utility buildings within the treatment works.

At the treatment works 2nr additional sedimentation tanks have been proposed. The proposed sedimentation tank details are presented in table 2-1 below.

Table 2-1: sedimentation tank details

Parameter	Details
No. of tanks	2
Type	Horizontal flow
Detention time	3.7 hours
Dimensions	Length=40 m, Width = 10 m, total depth = 3.8
Length breadth ratio	4
Surface Loading	1.0 m3/m2/hr
Velocity of flow	0.2 m/s
Inlet Top Water Level (TWL)	2367.52 masl
Collection trough TWL	2367.32 masl

The new tanks are sited adjacent and parallel to the existing sedimentation tanks. The system has been designed to handle the excess design raw water flow to the t/works (10,370 m3/day) which would have otherwise been by-passed the partial treatment process in accordance with Client's recommendations. The new tanks will fit well into the current t/works layout and integrated harmoniously to the existing interconnection system.

Further, renovation of some of the existing facility have been proposed to help in improving the overall performance of the system are presented in Box 2-3 below

Box 2-3: Proposed Renovation to Existing Facility

- Rehabilitation of chlorine dosing tanks and installation of 3 Nr. chlorine solution gravity dosers
- Construction of an alum dosing point and installation of 2 Nr. alum solution gravity dosers (during periods of high turbidity alum is dosed at the inlet to facilitate flocculation process)
- Rehabilitation of administration building including provision of basis laboratory equipment

2.2.2 Transmission Line

The pipeline will transmit treated water from the Kinyona Treatment Works to the existing storage tank at Mariira. The proposed line is 8,000 m long comprising of 3,700 m OD 315 mm and 4,300 m OD 280 of uPVC material of varying pressure ratings – PN 12.5 and PN 16.

Large orifice air valves (40 to 50 mm openings) are provided at all accentuate high points while 80 mm washouts are provided at all accentuate low points. Section or isolation valves have been provided at the inlet point and outlets of the BPTs to enable easy flow control during O&M activities

A DN 300mm bulk master meter has been proposed at the off-take point for monitoring of flows through to the new transmission system.

The existing tank at Mariira will be the end of the proposed transmission main. Three (3)

break pressure tanks have been provided to maintain the pressures in the pipeline within allowable limits of respective pipe classes. Where applicable the existing BPTs have been used e.g. for BPT 1. The tank adjacent to ACC&S church is strategic for use as BPT 3. However, there is need for detailed assessment on the soundness of the tank and the effect on existing system flows and pipe alignment.

Storage tanks are necessary in a distribution system especially in rural areas to cut down on the peak demands. The recommended minimum storage capacity by MWI Manual (2005) is 50m^3 of the daily water demand of a given supply area.

Photo Plate 2-3: Existing Mariira Water Tank

2.2.3 Project Cost Estimates

The preliminary design estimates have been prepared based on the relative costs obtained from; recently completed designs or currently ongoing works of similar and related water supply projects. Table 2-2 below shows the overall cost estimates for the project

Table 2-2: Project Cost Estimates

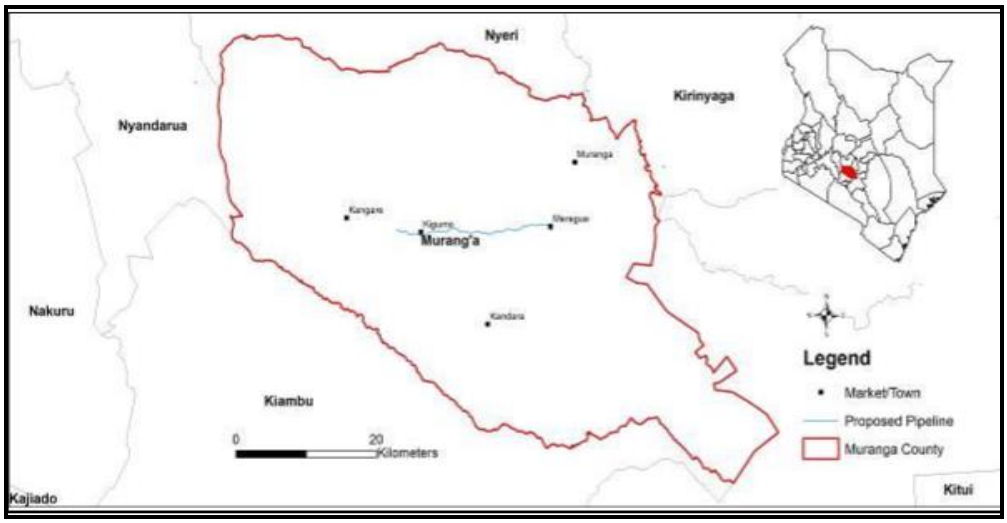
Item	Cost (Kshs)
Preliminary and General Items	1,180,000
Transmission main (8km)	35,431,748
Construction of 2no. sedimentation tanks	36,498,390
Sub Total	**73,110,138**
Add 10% Contingency	7,311,014
TOTAL	**80,421,152**

CHAPTER 3: ENVIRONMENT AND SOCIAL SETTING

3.1 Project Location

The Project is located in Murang'a County which has a total area of 2,558.8 Square kilometers and 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 00 34' South and 107' South and Longitudes 36o East and 37o 27' East. Figure 3-1 below illustrated the entire map of Murang'a County

Figure 3-1: Map of Murang'a County



Source: ICDP Murang'a County 2012

The proposed transmission main will transmit water from Kinyona treatment works located at the edge of Aberdares ranges at coordinates 255695 m Eastings and 9918003 Northings to Mariira tank near Gakira Town in Kigumo Sub-county. The water treated at Kinyona Treatment Works is diverted from Irati River via an intake constructed deep inside the Aberdares forest. From Mariira tank water will be transmitted to the supply area through existing distribution mains. Figure 3-2 below illustrates a map showing specific Project location

Figure 3-2: Specific Project Location

Source: Preliminary Design Report: Sabasaba Urban Water Supply Project: Losai Management Limited 2017

Sabasaba Water Supply Project is majorly intended to serve Sabasaba and its environs comprising Kaharati, Iganjo, Kamahuha, Githembe, Gakuyu, Kahariro, Kandani and Mugumoini sub-locations, the project area is approximately 81 Km2.

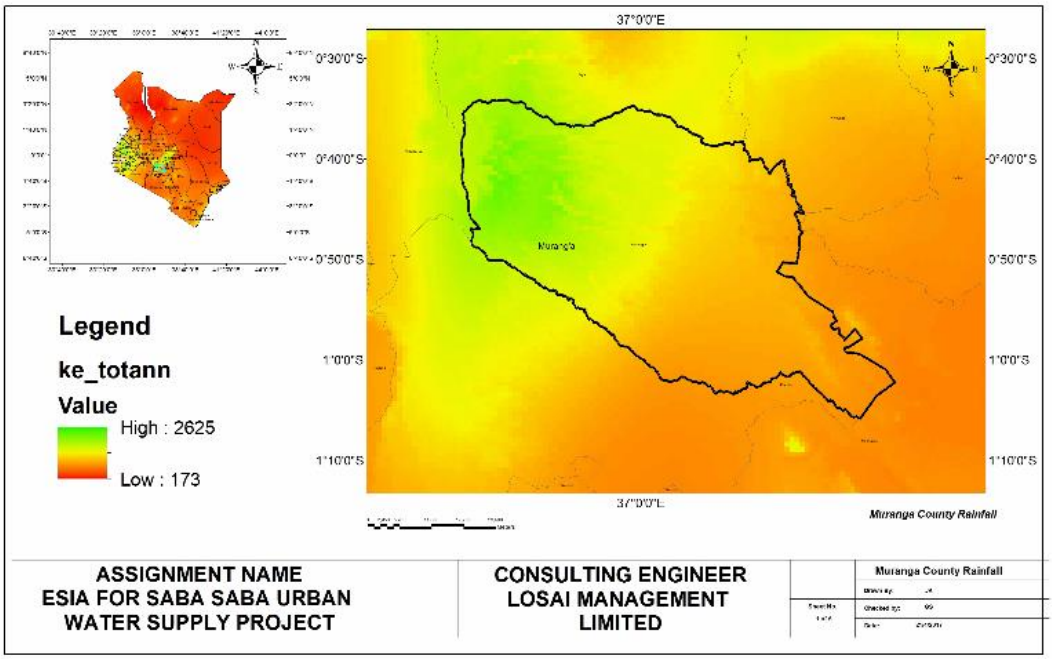
3.2 Physical Environment

3.2.1 Climate

Rainfall

The project area experiences two rainy seasons i.e. Long rains (March – May) and Short rains (October – November). The highest amount of rainfall is recorded in the month of April, and reliability of rainfall during this month is very high. 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. Figure 3-3 presents rainfall map of the Project area.

Figure 3-3: Rainfall Map of Project Area.



Temperature

Temperatures in the project area vary with altitude. In the Eastern lower areas, the maximum annual temperatures range between 26°C and 30°C while the minimum annual temperature range between 14°C and 18°C. In the western area, which is mostly high altitudes, the minimum temperatures can be as low as 6°C. Temperatures are moderate in the medium potential areas.

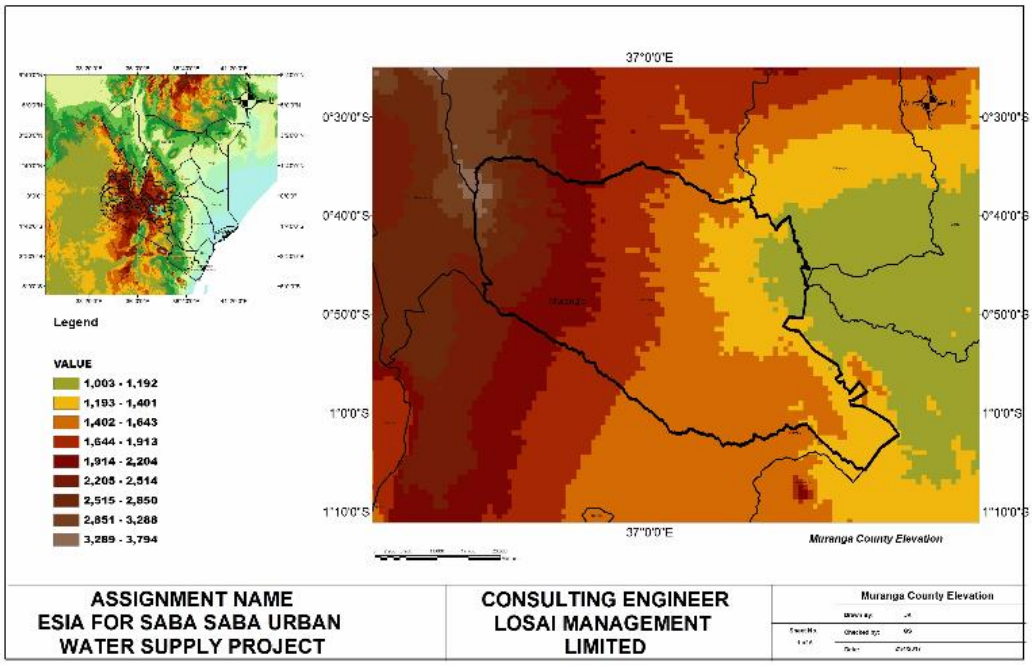
The project area has three climatic zones as follows: Equatorial covering the Western region; Sub-tropical type in the central region; and Semi-arid in the Eastern side. The western region,

Kangema, Gatanga, and higher parts of Kigumo and Kandara, is generally wet and humid due to the influence of the Aberdares and Mt. Kenya. The eastern region, lower parts of Kigumo, Kandara, Kiharu nd Maragwa Constituencies receive less rain and crop production requires irrigation.

3.2.2 Topography

The project area lies on the eastern, southern slopes of the Aberdares ranges. The land in Sabasaba generally rises from East to West and is well drained by several rivers the major ones being River Sabasaba, Kabuku, Makindi, Thugi, Thamuru and Thika. The project area's high altitude areas are at the foot of the Aberdare Ranges which starts at about 1800m asl and terminates at about 1350m asl, the land then slopes towards the east and is characterised by numerous hills and steep valleys. Streams and small rivers run through the valleys which even out at about 1500m asl. Figure 3-4 presents topography map of the Project area.

Figure 3-4 Topography map of the Project area



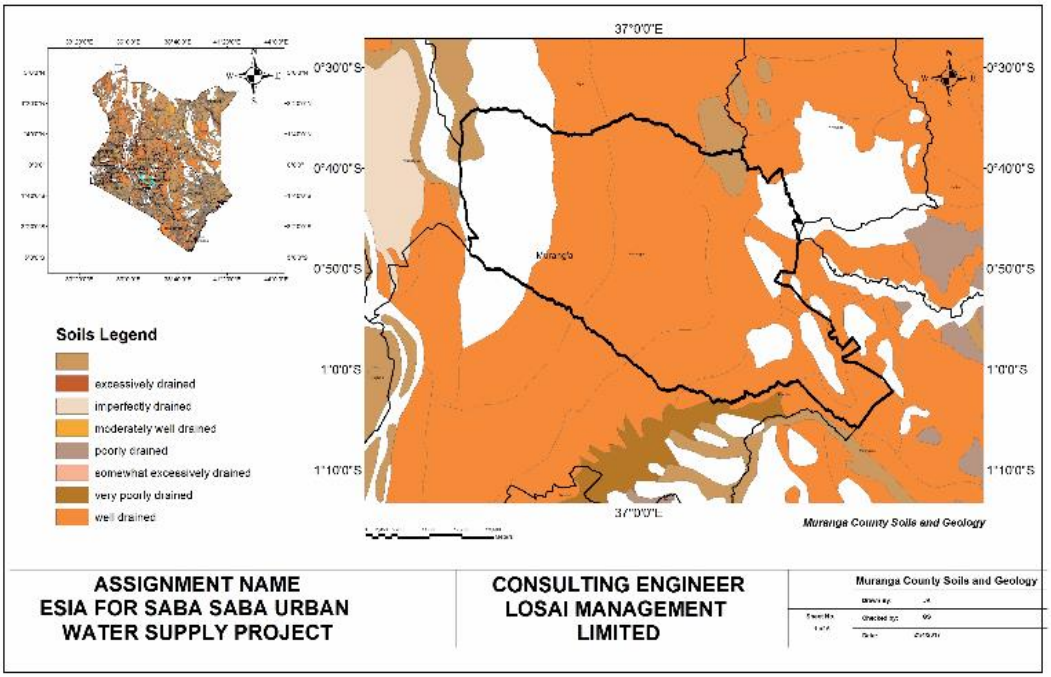
3.2.3 Geology

The geology of the project area 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 landslides during wet seasons due to high, mechanically unstable slopes of deeply weathered volcanic soil and a high sorption capacity of the surface soil layer.

3.2.4 Soils

The predominant soils in the project area are the deep and well-drained red/brown soils. These soils are loose and combined with the hilly terrain are easily eroded and sometimes are responsible for landslides which are common in the area. Sometimes pockets of black soils are found around wetlands but these are more common in the lowlands where cotton is grown. Figure 3-5 Geology and Soil Map of the Project Area.

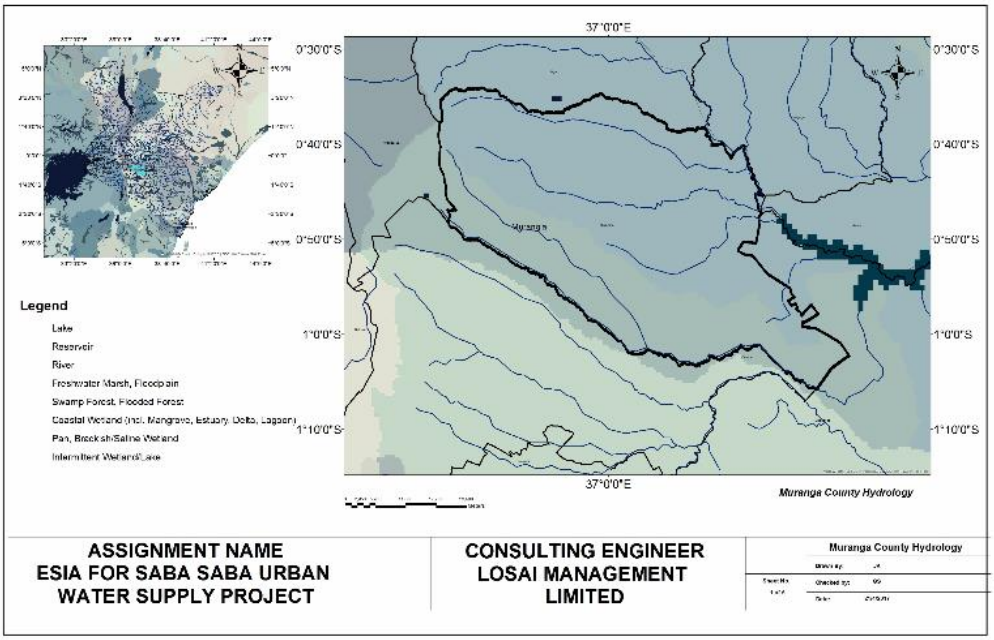
Figure 3-5 Geology and Soil Map of the Project Area



3.2.5 Hydrology

The study area is on the eastern slopes of Aberdare Ranges, the highest Ranges in Kenya and a major water tower to Murang'a, Nairobi, Nyeri and Kiambu Counties. Being on the wind ward side of the mountain, the area is traversed by numerous streams and springs that flow eastwards in the general direction of the slopes of Aberdare ranges. These streams and springs include Sabasaba, Kabuku, Makindi, Thugi, Thamuru and Thika in the Project area, others Rivers include Irati, Gigigie and Maragua Rivers. Figure 3-6 over leaf presents Hydrology of the Project Area.

Figure 3-6 Hydrology of the Project Area



3.3 Biological Environment

3.3.1 Vegetation and Flora

3.4 Social Economic Setting

Biodiversity of the Project location is highly influenced by the Aberdare Forest Ecosystem with respect to indigenous plant cover species. However, due to human activities, the indigenous plant species have been displaced by exotic species that have also acquired economic values among the communities. Such plant species include tea, coffee, Eucalyptus spp, Cypress ssp., Caussurina spp. and Graveria SSP and wattle trees species. Other plant features include grass species, ferns, nappier grass, avocado, banana, yams (mainly in the river flood plains), cassava, sugar cane, pineapple, arrowroots, and coffee). Table 3-1 presents the popular trees species in the area.

Table 3-1: Common Tree Species in the Project Area

Local name (Adopted Gikuyu language)	Scientific name	Status
Mutati	Polyscias kikuyensis	Dominant
Muiri	Prunus Africana	Dominant
Mugumo	Ficus sycomorus	Rare
Mukohokoho	Monimiaceace spp	Dominant
Mutundu	Croton macrostachyus	Dominant
Muirugi		Dominant
Mugaita	Rapanea rododendroides	Dominant
Mutheoera		Rare
Muagu	Rausonia lucida	Dominant
Muerere	Tabernaemontana stapfiana	Dominant

Local name (Adopted Gikuyu language)	Scientific name	Status
Githirathiru		Dominant
Munyawa	Fraxinus berlandrine	Dominant
Mukuhakuha	Macaranga kilimandscharica	Dominant
Mutuya	Myrianthus holstii	Dominant
Mukurue	Albizia gummiflora	Dominant
Mutati	Polyscias kikuyuensis	Dominant
Mukoe	Syzygium cordatum	Dominant
Muhehe	Pistacia aethiopica	Rare
Muna	Aningeria adolfifriendericci	Rare
Muthaduku	Acacia mearnsii	Rare
Muiruthi	Diospyros abyssinica	Dominant

Photo Plate 3-1: Vegetation of the Project Area.

3.4.1 Fauna

Human habitation and agricultural activities have also significantly interfered with both terrestrial and aquatic habitats in the Project areas. There is no terrestrial wildlife observed in the Project areas since most land is under agricultural use for many years pushing the animals into the Aberdare forest. However, limited rodents like squirrels, moles and different bird species among others are found in the area (specific habitats characteristics will be established during the detailed assessment. Among the aquatic species present include frogs, fresh water fishes are found naturally in the rivers. Livestock keeping is significant with dairy cows, sheep, goats, poultry and house pets (dogs and cats) may also constitute part of the wider biodiversity).

3.5 Social Setup

3.5.1 Population

According to 2009 population census report the population in the nine (9) sub-locations in Kamahuha and Kahumbu Ward was 43,775 distributed in the various Sub-Locations as shown in Table 2.2. The growth rates recorded in 1989, 1999 and 2009 censuses for Central Province were 3.0%, 1.8% and 1.7% resp. Due to anticipated growth in rural population as a result of devolution a more conservative growth rate of 2.0% has been adopted in population

projection for the design of this project.

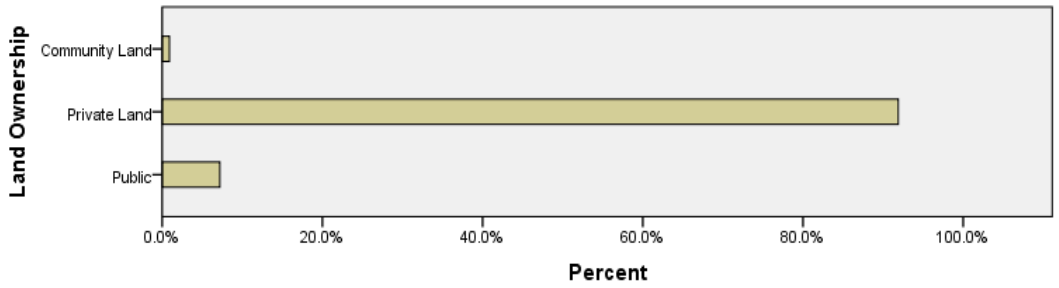
Table 3-2 Population Size of Target Area

Ward	Sub-location	Census 2009	Households Number
Kamahuha	Kamahuha	4528	1193
	Sabasaba	9938	2784
	Iganjo	4923	1232
	Kaharati	4800	6242
		24,189	**6,242**
Kahumbu	Githembe	4352	1198
	Gakuyu	4750	1257
	Kahariro	2700	738
	Kandani	5300	1385
	Mugumoini	2484	654
		19,586	**5,232**
	Grand Total	**43,775**	**11,685**

3.5.2 Land Ownership

Most of the land in the project area is privately owned. Figure 4.6 below shows that the main land tenure system in the project area is private holding at 92.3%, public land at 7.3% and 0.4% being community land as indicated in Figure

Figure 3-7 Land Ownership of the Project Area



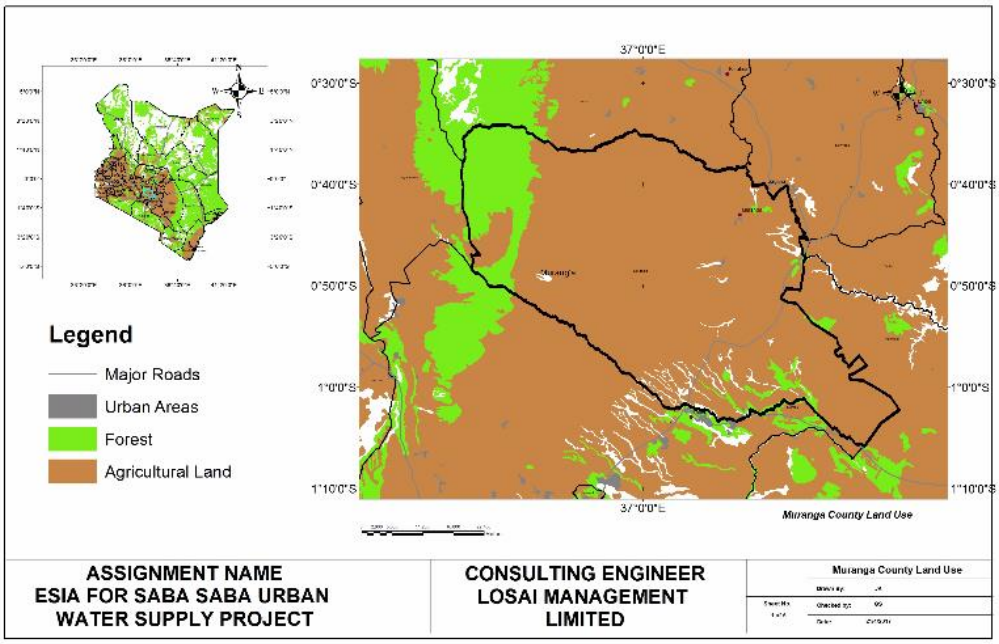
Source: ESIA Maragua Water Supply: Log Associates 2016

3.5.3 Land use

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 forests occupy the highest grounds while cash crops like tea and coffee zones in that order. Horticultural crops and subsistence crops like bananas, maize and beans are found in the mid and lower zones of the project study area.

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. Figure 3-8 below presents the land use map of the Project area.

Figure 3-8 below presents the land use map of the Project area.



3.5.4 Settlement Patterns

The Project area which comprise Kigumo, Kandara and Murang'a South Sub Counties are densely populated with population distribution determined by infrastructure, food availability, and proximity to Urban centres among other factors. High population density is distributed around market centers. The settlement patterns within the Project area is characterized by myriad of high, medium and low income residents with the areas occupied by low and medium residents depicting high population densities. Population also varies from the towns and rural areas. In the rural areas population density is low compared to the urban centers. Urban settlement is mostly concentrated within 3km radius from the town's Central Business District. The main market centres in the Project area include Sabasaba, Kaharati, Iganjo, Kamahuha, Githembe, Gakuyu, Kahariro, Kandani and Mugumoini and Kinyona. Photo plate below presents images of Saba Saba market

Photo Plate 3-2: Sabasaba Market

3.5.5 Source of Energy

The availability of cheap and reliable energy ensures economic and social development and improved quality of life. Energy is needed for cooking, heating and lighting of households. Energy sources in the project area include biomass/ biogas, fossil fuels and electricity from the national grid. The choice of energy use depends on several factors including cost, income levels; the availability, and cultural preferences. Dry cells and vehicle batteries are also used at the household level as a source of energy, in flashlights, radios, television sets and clocks. As more households in the lower income bracket acquire electronic equipment, the use of car batteries to power them is growing.

3.5.6 General Infrastructure

About 40 per cent of the households live in stone/brick walled houses, 24.3 per cent in mud/wood walled houses while 2.19per cent live in grass straw/tin walled houses. Most housing units in the county are roofed with corrugated iron sheets (94.38 percent), while makuti and grass roof constitute 0.18per cent of the households. Most of these housing units have earth floor (60.04 per cent), followed by cement floor at 38.85per cent.

3.5.7 HIV and AIDs

HIV and AIDS is considered a threat to the development of Kenya. The prevalence rate stands at 3.7per cent. 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

CHAPTER 4: PROJECT ALTERNATIVES

4.1 Project Alternatives

This chapter describes and examines the various alternatives considered during the design of the Project. The consideration of alternatives is one of the proactive sides of environmental and social assessment required to enhance Project design. This is achieved through examining options instead of only focusing on the more defensive task of reducing adverse impacts of a single design option.

Analysis of Project Alternatives requires comparison of feasible alternatives for the proposed Project in terms of: Project site, Project technology, Potential Environmental and Social Impacts, capital and recurrent costs, suitability under local conditions, and acceptability by neighboring land users. The sub chapters below presents the considerations that were analyzed in determining feasible alternatives for the Project.

4.1.1 Improvement of collapsed Sabasaba Water Scheme.

Sabasaba Township was served by water from Sabasaba River, water from the treatment works located adjacent to Sabasaba River Bridge along Kenol – Murang'a road was being pumped to ground tanks in Sabasaba town from where it would be gravitated to consumers. The scheme has ceased operation due to high operational inefficiencies mainly accrued as a result of irregular power supply, poor water quality and high running costs of the pumping system.

Therefore, due to the inefficiencies associated with this option, the Project design team proposed upgrading of existing Kinyona Water Treatment system which would be able to supply Sabasasaba through gravity. The upgrading will improve the works treatment capacity to 20,740 m3/day i.e. double the existing capacity by adding two (2) sedimentation tanks and construction of 8km clear water line to the existing line that transmits water to existing Mariira Tank

4.1.2 Rehabilitation of Existing Sabasaba Borehole

The existing Sabasaba borehole (No.C2163) located at the current Murang'a South District Water Offices at Sabasaba was developed in 1954 and was mainly intended to provide water to businessmen who resided in the town at that time. The borehole was sunk to a depth of 103m. Its GPS coordinates are 292694.21m E and 9902861.12m N.

The yield of the borehole was 8.2 m3/h at commissioning but this has reduced considerably. As noted from previous studies and further confirmed from the operator the borehole runs dry after 1hr or so of pumping and longer recharge period has to be allowed. Water from the borehole is pumped to an overhead storage tank from where it is distributed by gravity. This situation renders the option of rehabilitating the borehole not feasible.

4.1.3 Proposed Improvement of Kinyona Water Treatment Facility

Improving the existing Water Supply at Kinyona was considered to the most feasible scenario because of the following reasons

i. **Gravity Flow Consideration**:The elevation of the treatment system is high (located at the edge of Aberdare forest) in Kinyona, this allows for water to flow by gravity to existing Mariira and Tanks. Therefore, proposed areas of supply namely; Sabasaba Kaharati, Iganjo, Kamahuha, Githembe, Gakuyu, Kahariro, Kandani and Mugumoini can receive water by gravity through an existing water supply network

ii. **Utilization of Existing Infrastructure:** Mariira Tank is strategically located, currently the tank hardly fills up with water due to unreliable water supply, also MUSWASCO under a separate Project is construction a 10km clear water line from Kaharati to Mariira, this project will benefit from the transmission system

iii. **Project Layout Route and Resettlement:** The Project route from Kinyona to Mariira is free from encroachment, therefore no resettlement impacts will be triggered by the proposed Project.

iv. **Land Acquisition and Resettlement**: Kinyona Water Treatment scheme is an already established system with MUSWASCO land, therefore the proposed Project will not require land acquisition

4.2 Project Alternative

The Project will directly contribute towards realization of MUSWASCO strategic objectives (years 2017 - 2021), Sustainable Development Goals, Kenyan's Vision 2030 on provision of water and Sanitation Services to population as described below

- To increase the proportion of the population accessing safe water from 46% to 70% in MUSWASC area by 2019 therefore improving the current Low access and coverage to safe water and sanitation services. The proposed construction of 500mm diameter mainline from Kinyona intake works and extending it to the new Mariira tank by 2021 and Expansion of Kinyona treatment works from 12000m3/day to 24000m3/day by 2019 are some of the activities indentified under this strategic objective.
- Sustainable Development Goal (6) which is the new 2030 agenda and expands Millennium Development Goal as guided by resolutions of Rio+20 conference. The goal focuses more on investment in adequate infrastructure in water sanitation, Hygiene, water quality, waste Water Management, water scarcity and use efficiency, integrated water resource management and protection of water related ecosystems
- The project is a Vision 2030 related project which endeavours to contribute to improved water supply to Kenyan citizens. Once commissioned, the project will contribute towards achieving the 10% economic growth of the republic of Kenya for the next 25 years.

4.3 The "No Action Alternative"

This alternative means that the project should not proceed. The No Project Alternative in respect to the subject project implies that the water deficient Sabasab town and its environs maintain a status quo.. However, if this option is taken, the community members living in Sabasaba town and its environs as well as those within the project area will continue to face the following challenges

CHAPTER 5: POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

5.1 Introduction

Development of infrastructure projects is dealt with under several Laws, By-laws, Regulations and Acts of Parliament, as well as Policy Documents and it is not possible to bring all those statutes under one heading. This section is therefore aimed at assessing the existing policies and legislative framework, economic tools and enforcement mechanisms for the management of infrastructure projects at different stages.

5.2 Policy Provision

5.2.1 Constitution of Kenya

Article 42 of Bill of Rights of the Kenyan Constitution provides that every Kenyan has a 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 legislation and other measures.

Part II of Chapter 5 of the Constitution (Environment and Natural Resources), (I) the State clearly undertakes to carry out the following:

- Ensure sustainable exploitation, utilization, management and conservation of the environment and natural resources, and ensure the equitable sharing of the accruing benefits;
- Work to achieve and maintain a tree cover of at least ten per cent of the land area of Kenya;
- Protect and enhance intellectual property in, and indigenous knowledge of, biodiversity and the genetic resources of the communities;
- Encourage public participation in the management, protection and conservation of the environment; Protect genetic resources and biological diversity;
- Establish systems of environmental impact assessment, environmental audit and monitoring of the environment;
- Eliminate processes and activities that are likely to endanger the environment; and

Part (II) “Every person has a duty to cooperate with State organs and other persons to protect and conserve the environment and ensure ecologically sustainable development and use of natural resources.

Chapter 5 on Land and Environment emphasizes on the following:

- Land use and management shall by law benefit local communities
- Community land is protected from encroachment by State.
- Law shall protect Rivers, forests and water bodies.
- Equitable access to land.

- All lawful land rights are secured; only someone who has stolen land needs to worry.
- County governments will manage land in trust of the people in accordance with the constitution.

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.

5.2.2 Kenya Vision 2030

Kenya Vision 2030 is the current national development blueprint for period 2008 to 2030 and was developed following on the successful implementation of the Economic Recovery Strategy of Wealth and Employment Creation which saw the country's economy back on the path to rapid growth since 2002. GDP growth rose from 0.6% to 7% in 2007, but dropped between 1.7% and 1.8% in 2008 and 2009 respectively.

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 this aims 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.

Kenya's transformation in to a middle income country will be achieved by bringing and improving basic infrastructure and services namely: roads, street lights, storm water drains, footpaths, and water and sanitation facilities among others. This Project aims at improving the Water supply in Sabasaba town through the construction of Sabasaba Urban Water Supply Project.

5.2.3 National Environment Policy (NEP)

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 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, promoting environmental management tools.

Relevance

The Project shall implement the Environmental and 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.

5.2.4 National Land Policy

Chapter 2 of the policy is linked to constitutional reforms; regulation of property rights is vested in the government by the Constitution with powers to regulate how private land is used in order to protect the public interest. The Government exercises these powers through compulsory acquisition and development control. Compulsory acquisition is the power of the State to take over land owned privately for a public purpose. However, the Government must make prompt payment of compensation.

Chapter 4 of the land policy under Environmental Management Principles, The policy provides actions for addressing the environmental problems such as the degradation of natural resources, soil erosion, and pollution.

For the management of the urban environment it provides guidelines to prohibit the discharge of untreated waste into water sources by industries and local authorities; it also recommends for appropriate waste management systems and procedures, including waste and waste water treatment, reuse and recycling. This Project aims at improving physical infrastructure within the Project area.

The policy goes further to advocate for environmental assessment and audit as a land management tool to ensure environmental impact assessments and audits are carried out on all land developments that may degrade the environment and take appropriate actions to correct the situation. Public participation has been indicated as key in the monitoring and protection of the environment.

Chapter 4 further advocates for the Implementation of the polluter pays principle which ensures that polluters meet the cost of cleaning up the pollution they cause, and encourage industries to use cleaner production technologies.

5.2.5 HIV and AIDS Policy 2009

The proposed project is to be implemented in the rural area, this areas have high freelance cases of HIV and Aids. This policy shall provide a framework to both the project proponent and contractor to address issues related to HIV and Aids. In Summary the policy provides a mechanism for:

- Setting Minimum Internal Requirements (MIR) for managing HIV and AIDS
- Establishing and promoting programmes to ensure non-discrimination and non-stigmatization of the infected;
- Contributing to national efforts to minimize the spread and mitigate against the impact of HIV and AIDS;
- Ensuring adequate allocation of resources to HIV and AIDS interventions;
- Guiding human resource managers and employees on their rights and obligations regarding HIV and AIDS.

Relevance

The Policy will be complied with during implementation of the Project, the Contract will in cooperate in tender document and implement HIV awareness initiatives during construction of the Project.

5.2.6 Gender Policy 2011

The overall goal of this Policy Framework is to mainstream gender concerns in the national development process in order to improve the social, legal/civic, economic and cultural conditions of women, men, girls and boys in Kenya

The policy provides direction for setting priorities. 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

5.2.7 The Sustainable Development Goals (SDGs)

The 2030 Agenda comprises 17 new Sustainable Development Goals (SDGs), or Global Goals, which will guide policy and funding for the next 15 years, beginning with a historic pledge to end poverty.

The concept of the SDGs was born at the United Nations Conference on Sustainable Development, Rio+20, in 2012. The objective was to produce a set of universally applicable goals that balances the three dimensions of sustainable development: environmental, social, and economic.

The Global Goals replace the Millennium Development Goals (MDGs), which in September 2000 assembled the world around a common 15-year agenda to tackle the indignity of poverty.

Sustainable Development Goal (6) which is the new 2030 agenda and expands Millennium Development Goal as guided by resolutions of Rio+20 conference. The goal focuses more on investment in adequate infrastructure in water sanitation, Hygiene, water quality, waste Water Management, water scarcity and use efficiency, integrated water resource management and protection of water related ecosystems. Sabasaba Urban Water Supply Project will directly contribute towards achieving this goal .

5.3 Kenyan Legislations

5.3.1 The Environmental Management and Coordination Act (EMCA), 1999 amended in 2015.

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:

- The Environmental (Impact Assessment and Audit) Regulations, 2009 Legal Notice No. 101;
- The Environmental Management and Coordination (Waste Management) Regulations, 2006 Legal Notice No. 121;
- The Environmental Management and Coordination (Water Quality) Regulations, 2006 Legal Notice No. 120;
- The Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009 Legal Notice No. 61;
- The Environmental Management and Coordination (Air Quality Regulations 2014)
- The Environmental Management and Coordination (Conservation of Biological Diversity and Resources, Access to Genetic Resources and Benefit Sharing) Regulations, 2006 Legal Notice No. 160;
- Environmental Management and Coordination (Wetlands, River Banks, Lake Shores and Sea Shore Management) Regulation, 2009.
- The Environmental Management and Coordination (Controlled Substances) Regulations, 2007 Legal Notice No. 73.

Relevance to the Project

EMCA 1999 with 2015 amendments and 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.

5.3.2 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 Tana Water Services Board (TWSB) while the ownership of the assets is the responsibility of County Murang,a.

The County Government Act of 2012 allows the Water Services Providers to Source for own funds to develop infrastructure, in this case MUSWSCO has approached a commercial Bank with the intention of implementing the Sabasaba Water Supply Project Through the OBA subsidy Program of WSTF.

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 Management Authority (WRMA) on case by case basis when required.

5.3.3 County Government Act No. 17 of 2012

Part II of the Act empowers the county government to be in charge of 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 national government, this arrangement has been adopted for interventions in order not to conflict with provisions of the Kenyan Constitution.

Relevance to the Project

The project once commissioned will be handed over to MUSWASCO which is a water utility, wholly owned by Murang'a County Government for operation and maintenance.

5.3.4 Physical Planning Act 1996 (286)

Section 29 of the said Act empowers the local Authorities (now 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 same section allows for prohibition or control of the use and development of an area.

Section 30 states that any person who carries out development without development permission will be required to restore the land to its original condition. It also states that no other licensing authority shall grant license for commercial or industrial use or occupation of any building without a development permission granted by the respective local Authority.

Relevance to the Project

Thus the Act directs, regulates and harmonizes development and use of land over the Country, the entire Project has been designed within the reserve land stipulated as road reserve land under this Act, this was in an effort to avoid cases of acquisition of private property and resettlement complications.

5.3.5 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 EMP 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 in order to avoid injuries and even loss of life to workers and neighbouring community.

5.3.6 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 1999 for utmost compliance.

5.3.7 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.

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

5.4 Institutional Structure of the Water Sector

The Water Act 2002 has repealed and replaced by Water Act 2016, this Act now aligns Water Services Management to the Kenyan Constitution 2010.

The Ministry of Environment, Water and Natural Resources 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:

5.4.1 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 (WSREB) 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:

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

5.4.2 Water Resources Management Authority (WRMA)

Section 11 of the Water Act 2016 provides for establishment of Water Resources Management Authority, this assessment assumes that the current Water Resources Management Authority (WRMA) will assume the roles proposed in the Water Act 2016.

The authority is responsible for sustainable management of the Nations Water Resources:

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

5.4.3 Water Services Trust Fund (WSTF)

Section 113 of the Water Act 2016 provides for establishment of Water Sector Trust Fund, this assessment assumes that the current Water Services Trust Fund (WSTF) will assume the roles proposed in the Water Act 2016.

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

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

5.4.4 Water Services Boards (WSBs)

Section 65 of the Water Act 2016 provides for establishment of Water Works Development Agencies, this assessment assumes that the current Water Services Boards (WSB) will assume the roles proposed in the Water Act 2016.

The WSBs are responsible planning and development of water and sewerage services infrastructure in their areas of jurisdiction. In Murang'a, the relevant Water Services Board is the Tana Water Services Board, this Board is mandated to

- Develop the facilities, prepare business plans and performance targets
- Planning for efficient and economical provision of Water and sewerage services within their areas of jurisdiction;

5.4.5 Water Services Providers

The Kenyan Constitution Article 186 and 187 and corresponding further schedule item 11(b) mandates the county government to be in charge of Water and Sanitation in their respective counties. The County Government Act of 2012 part II provides more elaborate interpretation of the function.

The 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 Murang'a South, MUSWASCO is mandated to provide water and sewerage services to Kigumo, Kandara and Murang'a.

5.5 NEMA Compliance

The government established the National Environmental Management Authority (NEMA) as the supreme regulatory and advisory bodies on environmental management in Kenya under EMCA 1999 and amendments 2015. 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, programmes, plans and projects.

5.6 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 programmes and performing such other functions as contained in the act.

5.7 Project Implementation Institutional Structure

MUSWASCO has an established implementation system that has clear provisions for environmental and social integration through the Environmental Division. An ideal project management structure proposed for the organization in this project has the following components:

5.7.1 The Contractor

The contractor will be required to establish an environmental office to continuously advise on environmental components of the project implementation. Elements in the environmental and social management plan are expected to be integrated in the project with appropriate consultations with MUSWASCO through the supervising environmental expert. The environmental officer of the contractor is also expected to fully understand the

engineering and management aspects of the project for effective coordination of relevant issues.

5.7.2 The Supervisor

The supervisor will be engaged by MUSWASCO (as the project proponent) to ensure effective implementation of the environmental management plan. It is expected that supervisor engages the services of an environmental expert who should in return understand the details of the recommendations on environment management and especially the proposed action plans, timeframes and expected targets of the management plan. The environmental supervisor expert should also be the liaison person between the contractor and MUSWASCO on the implementation of environmental concerns as well as issues of social nature associated with the Project.

5.8 World Bank Policies

The Project will only trigger Environmental Assessment OP 4.01 as discussed below. Other Operational Safeguard Policies of the World Bank as illustrated by table 5-1 below are not triggered.

Table 5-1: Analysis of potential triggers to World Bank Safeguards Policies

World Bank Operation Policy	Applicability to the Project
Environmental Assessment OP 4.01	Applicable. As a result of environmental and social screening, the project was identified as a Category B
Natural Habitats OP 4.04	Not applicable - there no natural habitats at the project site
Pest Management OP 4.09	Not applicable- the project will not involve any pest management
Indigenous Peoples OP 4.10	Not applicable- there are no indigenous people at the site or project area
Physical Cultural Resources OP 4.11	Not applicable. Site inspections and literature searches have not indicated the presence of any cultural (historical, archaeological) sites in the construction area. However, to manage “chance finds” an appropriate procedure is included in this EIA. Such procedure to be followed by contractors during the construction phase.
Involuntary Resettlement OP 4.12	Not Applicable., -Kinyona Water Treatment Plant is an existing facility that has adequate land for expansion, -Proposed 8km clear water line from Kinyona to Kaharati will utilize existing road reserve that is free from encroachment
Forests OP 4.36	Not applicable
Safety of Dams OP 4.37	Not applicable because the project will not involve construction of dams.
Projects on International Waters (OP 7.50)	Not applicable- the site does not sit on international waters

Projects in Disputed Areas (7.60)	The site is not classified as disputed in the project area.

5.8.1 Environmental Assessment OP 4.01

The Project will involve improvement of existing Kinyona Water Treatment Plant to a production capacity of 20,000m^3/day and proposed 8km clear water line from Kinyona to Kaharati and eventually into existing Miriiti Tank.

The area overtime, anthropogenic activities have exerted pressure on both natural and social environment which has eventually converted the area into a human settlement area. Therefore, the Project will have less significant impact on both physical, biological and social setting within the immediate surroundings. However OP 4.01 will be triggered.

This policy requires Environmental Assessment (EA) of Projects proposed for Bank financing to help ensure that they are environmentally sound and sustainable, and thus to improve decision making. The EA is a process whose breadth, depth, and type of analysis depend on the nature, scale, and potential environmental impact of the proposed investment. The EA process takes into account the natural environment (air, water, and land); human health and safety; social aspects (involuntary resettlement, indigenous peoples, and cultural property) and Trans-boundary and global environmental aspects.

Operational Policy 4.01 further requires that the EA report must be disclosed as a separate and stand-alone document by the Government of Kenya and the World Bank. The disclosure should be both in Kenya where it can be accessed by the general public and local communities and at the Info-Shop of the World Bank and the date for disclosure must precede the date for appraisal of the Project.

The proposed improvement of the proposed project has been classified as environmental category B and hence requirement for this Project Report.

5.8.2 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 2015 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.
- Both require public disclosure of Project Report and stakeholder consultation during preparation,
- 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 1999 and amendments 2015 is adequate to address all World Bank requirements for environmental and social assessment. 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 info shop, as well as copy of the report available at the project site.

5.9 World Bank Group Environmental Health and Safety Guidelines on Water and Sanitation

The Environmental, Health, and Safety (EHS) Guidelines are technical reference documents with general and industry- specific examples of Good International Industry Practice. When one or more members of the World Bank Group are involved in a project, these EHS Guidelines are applied as required by their respective policies and standards. These industry sector EHS guidelines are designed to be used together with the General EHS Guidelines document discussed in 5.9 (above), which provides guidance to users on common EHS issues potentially applicable to all industry sectors

The EHS Guidelines contain the performance levels and measures that are generally considered to be achievable in new facilities by existing technology at reasonable costs. Application of the EHS Guidelines to existing facilities may involve the establishment of site - specific targets, with an appropriate timetable for achieving them.

Relevance to the Project

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

The Guidelines present Environmental Health issues on water distribution and the maintenance of adequate pressure to protect water quality in the system as well as sizing and adequate maintenance to assure reliable delivery of water of suitable quality. The most significant environmental issues associated with operation of water distribution systems include: **Water system leaks**, **loss of pressure and Water discharges.** The design for the project has ensured these environment risks are mitigated

CHAPTER 6: STAKEHOLDER ENGAGEMENT

6.1 Legal and Policy Provisions for Stakeholder Consultations

6.1.1 EMCA 1999 amended in (2015) through the Legal Notice No. 101: the Environmental (Impact, Audit and Strategic Assessment) Regulations, 2003

The principle Act of Parliament is the Environmental Management and Coordination Act (EMCA) 1999 amended in 2015 and the subsequent Regulation, the Environmental Impact Assessment and Audit Regulations 2003

The regulation requires that during the process of conducting Scoping, Environmental Impact Assessment the Proponent shall in consultation with the Authority here in referred to National Environment Management Authority (NEMA); seek the views of persons who may be affected by the Project. In seeking the views of the public, after the approval of the scoping report, of the proposed project by the Authority, the proponent shall publicize the project and its anticipated effects and benefits by;

- Posting posters in strategic public places in the vicinity of the site of the proposed project informing the affected parties and communities of the proposed project;
- Publishing a notice on the proposed project for two successive weeks in a newspaper that has a nation-wide circulation;
- Making an announcement of the notice in both official and local languages in a radio with a nation-wide coverage for at least once a week for two consecutive weeks.
- Hold at least three public meetings with the affected parties and communities to explain the project and its effects, and to receive their oral or written comments; ensure that appropriate notices are sent out at least one week prior to the meetings and that the venue and times of the meetings are convenient for the affected communities and the other concerned parties; and
- Ensure, in consultation with the Authority that a suitably qualified co-coordinator is appointed to receive and record both oral and written comments and any translations thereof received during all public meetings for onward transmission to the Authority.

6.1.2 World Bank Group (WBG) Environmental Assessment Policy (OP 4.01)

The **World Bank Group's Environmental Assessment Policy(OP 4.01, January 1999)** requires that project-affected groups and local non-governmental organizations (NGOs) be consulted during the impact assessments process about the project's potential environmental and social impacts.

The purpose of this consultation is to take local views into account in designing the environmental and social management plans as well as in project design. For complex projects where the environmental impacts and risks are high, the policy requires public consultation at least twice: first, shortly after Environmental Screening and before the terms of reference for the EIA are finalized and secondly, once a draft EIA Report is prepared.

Consultation during project execution is also required. Section 5 summarizes the consultation programme for the EIAs, and confirms that the project meets and indeed exceeds these requirements.

6.2 Stakeholder Consultation Approach

6.2.1 Stakeholder Mapping

The main key informants targeted in the consultations were both Government and private Institutions operating within the Project area as well as general residents residing within the project area. **Table 6-1** below presents specific stakeholders consulted during the assessment.

Table 6-1: Stakeholder Consultation Details

Name	Category
Murang'a South Water and Sanitation Company (MUSWASCO)	Project Proponent
Sub County Administrator -Kigumo and Murang'a South	County Government
• Members of County Assembly • Kamahuha • Kinyona- Chief	
Deputy County Commissioners -Kigumo and Murang'a South	National Government Administration
Water Resources Management Authority -Murang'a	Water Regulatory Body
Water Users Association(Maragua/Sabasaba)	Water Users (Irati River)
Sub-County Water Officer - Kigumo and Murang'a South	National Government Agencies and Ministries
Physical Planning Office -Kigumo and Murang'a South	
Public Health Officers -Kigumo and Murang'a South	
Department of gender and social development - Kigumo and Murang'a South	

6.2.2 Schedule of Stakeholder Consultations

The process involved identification of relevant stakeholders to be consulted during the assessment consultations were done with relevant stakeholders in Murang'a South, Kandara and Kigumo Sub Counties as illustrated below in table 6-2 and 6-3.

Table 6-2: Schedule of Stakeholder Consultations

Date	Stakeholder Consulted
4th April 2017	Public Health officer Kigumo sub county
4th April 2017	District Social Development Officer Kigumo Sub county
4th April 2017	Deputy County Commissioner Kigumo
5th April 2017	Public Works Officer Kigumo Sub County
7th April 2017	Water Sub County Officer Kigumo
4th April 2017	Public Health Officer Maragua
5th April 2017	Water quality and pollution control officer. WRMA Murang'a
7th April 2017	Deputy county commissioner murang'a south.
5th April 2017	District Social Development Officer Murang'a south Sub county.
6th April 2017	Chairman WRUA upper Maragwa.

Table 6-3: Schedule of Public Consultation Meetings

Date		Stakeholder Consulted	Number of Meeting Attendance
6th April 2017	Kamahuha Shopping Centre	Local Administration and Public in Kamahuha Area	87
4th April 2017	Kinyona Shopping Centre	Local Administration and Public in Kinyona Area	82

6.2.3 Summary of issues raised in consultations during the assessment

Institutional Consultations

The key findings during public consultations and key informant interview forums during the EIA process are during are presented in table 6-4 below.

Table 6-4: Outcomes of Stakeholder Consultations – Institutions

Date	Officer Consulted	Concerns raised
4th April 2017	Public Health officer Kigumo sub county	• Contractor should organize campsite to required standard in order to avoid environmental pollution. • MUSWASCO should treat water to required standards. • Public Health and Safety Requirement as per the Public Health Act Cap 242 and OSHA 2007 to be complied with.
4th April 2017	District Social Development Officer Kigumo Sub county	• Ensure casual jobs during project implementation are given to local youth. • Bulk water mains should be installed properly to avoid bursts which locals believe can cause landslides, like the one that happened in Gakira in 2016.
4th April 2017	Deputy county commissioner Kigumo	• Chiefs and village elders to assist in identifying legible youth to be employed during project implementation. • Residents should be encouraged to form a committee that will help resolve any disputes that might arise. • All stakeholders should be careful not to incite residents considering that this is an election year
5th April 2017	Public Works Officer Kigumo sub county	• MUSWASCO should ensure that all stakeholders are consulted before project commences. • The company should ensure that no treated water is used for irrigation • The company should ensure timely repairs of burst pipes to reduce losses and water shortages to customers
7th April 2017	Water Sub County Officer Kigumo	• MUSWASCO should ensure all illegal connections are disconnected. • Disconnect all customers who use treated water to

		do irrigation. • Provide civic education for locals along the main line so that they can report any interference to the line in due time.
4th April 2017	Public Health Officer Maragua	• The company should improve waste water management by providing sewer systems • Contractor should avoid use of environmentally hazardous materials like asbestos. • Civic education should be conducted by the company as part of company's social responsibility to enable residents maintains high level of hygiene so as to avoid jigger infestation.
5th April 2017	Water quality and pollution control officer. WARMA Murang'a	• Water companies should consider alternative ways of getting water by constructing dams to collect rain runoff water that can later be used during dry seasons • MUSWASCO should declare the amount of water drawn from the river so that it can be charged at 50 cents per cubic metre. • A master meter should be installed after treatment plant to ensure all the water drawn is charged. • Water company should be involved in water catchment conservation by planting trees particularly bamboo which helps to clean water naturally.
7th April 2017	Deputy county commissioner Murang'a south.	• The company should expand water intake to ensure constant water supply to residents • Consult residents properly before project works commencement to avoid resistance at a later stage of implementation. • Contractor should offer employment to local people.
5th April 2017	District Social Development Officer Murang'a south Sub county.	• The company should offer employment to locals since it creates a sense of ownership even after project completion. • Local residents should be encouraged to form committees to monitor and report any bursts, leakages and illegal connections. • Offer sufficient civic education to local residents on the advantages of having piped water.
6th April 2017	Chairman WRUA upper Maragwa.	• The company should ensure that kinyona area are given sufficient water supply to avoid conflicts like the one witnessed in ichichi • The government together with Kenya forest service should stop deforestation at Katare forest immediately.

Public Consultations

The assessment also organized two public forums in Kinyona on 6th April 2016 and Kamahuha, this forums were organized in order to provide a platform to the local communities in the Project area to express their view and opinion with regards to the Proposed Project. The outcome and suggestions from these consultations were used to finalize the Project

preparation and design. Summary of public meeting consultations is presented in table 6-5 and 6-6 below

Table 6-5: Kamahula Location – Public Consultations

Dates of Meeting	**Participants**	**Participants**
6th April 2017	Chief Kamahuha location, Assistant chief kamahuha sub location, MUSWASCO public relations officer, Kamahuha water scheme liaison person and EIA expert.	>87 persons
Issues	**Response and Discussions**	
Residents wanted a clarification on why customers in urban centers like sabasaba and kenol were being charged using a lower tariff.	The public relations officer informed residents that those allegations are baseless and false since all customers are charged using the same tariff despite their location. He also informed them that WASREB is the body mandated to set tariffs and it gives a uniform rate for equality purposes.	
Residents wanted to know if they will get any employment opportunities during project implementation	EIA team informed residents that during construction phase, the contactor will source some skilled and semi skilled labour from the community to supplement his staff when such opportunities are available. Residents were further advised to be responsible when working on the project to avoid termination of their jobs pre maturely.	
Resident wanted to know the expected commencement date of the project.	Resident residents were informed that the project will commence immediately after all the necessary designs have been done and required licenses issued including the NEMA license. They were further informed that the project was urgent and should start by mid this year (2017)	
Compensation for affected assets like crops and tress	The EIA team informed those in attendance that the project is low risk since it only involves de silting of the existing water intake which is in the forest area so now private land and trees will be affected. Incase tress are cut down it will be upon MUSWASCO community social responsibility to replant. A pipeline will be laid parallel to the existing pipeline way leave hence no private land will be acquired. However, if any crop is affected during the construction the farmer will given a just compensation.	

Photo Plate 5-1: Kamahuha Public Consultations

Table 6-6: Kinyona Location – Public Consultations

Dates of Meeting	**Participants**	**Participants**
7th April 2017	Chief Kinyona location, Assistant chief kinyona sub location, MUSWASCO public relations officer, Kinyona water scheme liaison person and EIA expert.	>84 persons
Issues	**Response and Discussions**	
The community suggested that since water intake is in their area they should be given water free or at a cheaper tariff.	The public relations officer informed residents that it was not economically viable for the company to supply water free to the area since they incur a huge treatment costs. He also informed them that WASREB is the body mandated to set tariffs and it gives a uniform rate for equality purposes.	
Residents suggested that since they have sufficient domestic water supply, the company the company should now provide them with irrigation water.	The EIA team informed residents that water companies only deal with domestic water supply. The water they supply is treated hence it will be expensive and uneconomical to use it for irrigation. They were further informed that National irrigations board was the body responsible for irrigation water supply.	
Residents wanted to know if they will get any employment opportunities during project implementation	EIA team informed residents that during construction phase, the contactor will source some skilled and semi skilled labour from the community to supplement his staff when such opportunities are available. Residents were further advised to be responsible when working on the project to avoid termination of their jobs pre maturely.	
Resident wanted to know the expected commencement date of the project.	Resident residents were informed that the project will commence immediately after all the necessary designs have been done and required licenses issued including the NEMA license. They were further informed that the project was urgent and should start by mid this year (2017)	
Compensation for affected assets like crops and tress	The EIA team informed those in attendance that the project is low risk since it only involves de silting of the existing water intake which is in the forest area so now	

	private land and trees will be affected. Incase tress are cut down it will be upon MUSWASCO community social responsibility to replant. A pipeline will be laid parallel to the existing pipeline way leave hence no private land will be acquired. However, if any crop is affected during the construction the farmer will given a just compensation.
Residents requested for a fire hydrant to be provided within Kinyona.	EIA team informed residents that they will notify the design engineers about the issue to be included in the final design if possible.

Photo Plate 5-2: Photos of Kinyona Public Consultations

6.3

6.4 Inclusion of Outcomes of Stakeholder Engagement in the Final Design of the Project

6.4.1 Employment Opportunities for the Public

The Stakeholder Engagement identified the need to provide employment opportunities to the local community members during project implementation period as the main concern from the community.

The project will provide employment opportunities for the estimated number of people as illustrated in **Table 6.7**below.

Table 6.7: Employment Opportunities to be provided by the Project

Description	No.
Casual Labourers	100
Skilled Staff	30
Plant Operators / Drivers	20
Managerial Staff	10

The opportunities will be shared equally throughout the Project Areas and as provide by Gender Policy 2011 discussed in chapter 4.

6.4.2 Improved Water Supply

The Stakeholder Engagement identified the need for improved water supply as a major community concern in the target Project area. The project will result in improved water and sanitation services to residents of the target areas.

Improved water supply and sanitation services will also benefit schools, health centers, chief's camps and police posts within the Project area.

6.4.3 Public Health and Safety

The public were concerned about health and safety risks that are likely to be triggered by the project. Specific risks were traffic risks of workers and community members during road crossings, occupational health and safety issues related to dust, noise and excessive vibrations and general health and hygiene.

The Contract Specifications (Clause 141 and 142 of the Specifications) have included a chapter on Contractor's compliance with Environment Health and Safety as outlined in the ESMMP prepared for the project. An item has been included in the Preliminaries and General Items Bill of Quantities for the Contractor to price for all costs for compliance with the specified requirements on environment health and safety.

6.5 Public Disclosure of ESIA, RAP, SEP and Annual Monitoring Reports

In accordance with EMCA 1999 and amendment 2015 and World Bank OP 4.01, the Project Proponent in this case MUSWASCO will ensure that the Results of Public Consultations including ESIA area disclosed on WSP website.

The Reports will also be made available at Chiefs' Offices in the affected Locations for ease of access by the project interested parties at location level and Project site office, the local chiefs offices include Sabasaba, Kaharati, Iganjo, Kamahuha, Githembe, Gakuyu, Kahariro, Kandani and Mugumoini.

This disclosure will be done early before commencement of Project Works, 60 days before Contractor's mobilization on site. In addition, MUSWASCO will ensure that the ESIA Reports are available throughout the project area. During the disclosure period, interested and affected parties will submit their final comments and concerns about the Reports.

The Reports and information will also be disclosed at the ESIA Stage by NEMA and during Project Implementation Stage by MUSWASCO. NEMA will require MUSWASCO to undertake a closeout audit after completion of the project and also undertake and initial Environment Audit (EA) immediately after commissioning of the project in the 1st year, these audits are essential in determining the performance of the project in addressing issues related to environment and social safeguards, gaps identified are corrected through implementation of recommendation of the Environment and Social Audit Action Plan (ESAAP).

6.6 Construction, Operation and Decommissioning Phase Consultations

Stakeholder groups that may be affected by and/or interested in the implementation of the Project, as well as proposed communication methods and media for each group, have been identified and are presented in **Table 6.8** below.

Table 6.8: Stakeholder Consultations during Project Construction and Operation Phase

Stakeholder/s	Type of communication	Responsibility	Timing
External Stakeholders			
Project Affected Persons	Public meetings and monthly project progress updates	Contractor / MUSWASCO	Throughout project implementation phase
Local administration representatives Chiefs and Ward Representatives	Public meetings and monthly project progress updates	Contractor / MUSWASCO	Throughout project implementation phase
Interested NGOs and other civil societies	Local media (newspapers) ESIA, published on MUSWASCO website.	Contractor / MUSWASCO	Throughout the implementation of the Project
Relevant National Government and County Government Authorities for example: KURA, Kenya Power	Official correspondence and meetings, progress reports Permitting procedures	Contractor / MUSWASCO	During project design, construction and implementation
Kenya National Museums due to chance find clause of OP 4.11 on physical cultural resources	Official correspondence and meetings Permitting procedures	Contractor / MUSWASCO	During project Construction phase
Internal Stakeholders			
Employees (Contractor, MUSWASCO)	Notice boards, email, Grievance Redress Mechanism, meetings	Contractor / MUSWASCO	Throughout project implementation phase
Casual workers and temporary staff	Notice boards, email, Grievance Redress Mechanism,	Contractor	Throughout project implementation phase

6.6.1 Community Relations in Construction Phase

This section set outs the proposed objectives, mechanisms and responsibilities for liaison with Project beneficiaries during the construction phase. It identifies the approach to, and frequency of, consultation with Project beneficiaries.

The primary responsibility for liaison will be borne by the construction contractor, MUSWASCO will therefore require the contractor to develop its own plan and more detailed proposals for community liaison. This will build on the approach outlined in this section. All potential contractors will be required to draw up this plan as part of the tender process.

The objectives of the Community Relations Programme will be to:

- Provide local residents with regular information on the progress of work.
- Inform the project/contractor of any community related issues that may impact construction.
- Monitor implementation of mitigation measures and the impact of construction via direct monitoring and feedback from Project area.
- Identify any significant new issues that may arise during the construction period; and

- Manage any complaints against the project/contractors and local residents (i.e., provide a grievance mechanism).

6.6.2 Construction Contractor's Role in Community Liaison

The Construction Contractor will be required to adhere to the requirements of the Environmental and Social Management and Monitoring Plan (ESMMP) that sets out how the contractor will meet and monitor the mitigation measures recommended by the Plan. The role and responsibilities of the Contractor include:

- Provide primary interface between project and affected or interested persons;
- Coordinate and implement required pre-construction activities, namely;
  - produce management plans for community relations, construction camps and transport; train staff with community relations responsibilities; and
  - implement induction training workshops for all construction staff;
- Assist in local recruitment process; and
- Ensure on-going communication with project and affected or interested persons

6.6.3 Community Relations in Operational Phase

The objective of the Community Relations Programme in this Phase will be to:

- maintain constructive relationships between local residents and the water operators, to assist in the operation of the facilities;
- maintain awareness of safety issues among local residents in the project areas;
- ensure compliance with land use constraints among land owners in the project areas;
- monitor community attitudes to the water infrastructure and to the operator, MUSWASCO

6.6.4 Decommissioning

In the event of decommissioning of the Project, liaison will continue to take place between MUSWASCO and with Project Affected or Interested Persons prior to de-commissioning. This role will complement work carried out by the operating company and social investment team to reduce the negative impact of the project decommissioning.

CHAPTER 7: ENVIRONMENTAL AND SOCIAL IMPACTS ASSESSMENT AND MITIGATION MEASURES

7.1 Introduction

This Chapter presents the assessment of the issues likely to arise as a result of implementation of the proposed Project. For each issue, the analysis is based on its nature, the predicted impact, extent, duration, intensity and probability, and the stakeholders and/or values affected. In accordance with best practice, the analysis includes issues relating to the Project's environmental and social sustainability. Appropriate Impact Rating has been presented for the situation without mitigation.

The project is a socially Uplifting Project and its envisaged to have more positive impacts after completion and commissioning of the Works.

Environmental and social risk assessment was based on key environmental and social issues identified at Environmental and Social Screening phase of the Project as illustrated below.

7.2 Definition and Classification of Environmental Impact

An environmental or social impact is any change to the existing condition of the environment caused by human activity or an external influence. Impacts may be:

- Positive (beneficial) or negative (adverse);
- Direct or indirect, long-term or short-term in duration, and wide-spread or local in the extent of their effect.

Impacts are termed cumulative when they add incrementally to existing impacts. In the case of the Project, potential environmental impacts would arise during the construction and operation phases of the Project and at both stages positive and negative impacts would occur.

7.3 Impact Scoring and Rating Criteria

The potential impacts associated with the proposed development have been assessed as presented in the matrix below. Precautionary principle was used to establish the significance of impacts and their management and mitigation i.e. where there is uncertainty or insufficient information, the Environmentalist opted to err on the side of caution.

Table 7.1 below summarizes the Impact Rating Criteria adopted in the Study.

Table 7.1: Environment Impact Scoring and Rating Criteria

Severity of Impact	**Rating**	**Scoring**
Insignificant / non harmful/less beneficial	-1/+1	Very Low
Small/ Potentially harmful / Potentially beneficial	-2/+2	Low
Significant / slightly harmful / significantly beneficial	-3/+3	Medium
Great/ harmful / beneficial	-4/+4	High
Disastrous/ extremely harmful / extremely beneficial	-5/+5	Very high
Spatial Scope of the Impact	**Rating**	**Scoring**
Activity specific	-1/+1	Very Low
Right of way specific	-2/+2	Low
Within Project area 5km radius	-3/+3	Medium
Regional / County	-4/+4	High
National	-5/+5	Very high
Duration of Impact	**Rating**	**Scoring**
one day to one month	-1/+1	Very Low
one month to one years	-2/+2	Low
Within Project construction period	-3/+3	Medium
within the Project life	-4/+4	High
at decommissioning	-5/+5	Very high

Example of Cumulative Impact Scoring

1. +3,+2,+5,+4, +4,+1=+4 (the weight that occurs more becomes the overall rating)
2. +2,+2,+5,+4, +4,+1=+3 (if two scores or more tie, then an average of the scores shall be adopted)

7.4 Positive Impacts during the Construction Phase

7.4.1 Creation of Employment and Business Opportunities

During the construction period, new employment opportunities will be created in the form of skilled and unskilled labour. The majority of unskilled labour will be sourced from the project areas. Business and Employment Opportunities will also be created for Suppliers, Sub-Contractors and other small businesses such as food kiosks that may be set-up near the contractor's camps and along the pipeline route.

Based on the Scope of Works, it is estimated that the following employment opportunities will be created during the Construction Phase:

Table 7.2: Jobs to be Created by the Project

Description	No.
Casual Labourers	100
Skilled Staff	30
Plant Operators / Drivers	20
Managerial Staff	10

In the Operation Phase of the project more job opportunities will arise in various sectors such as the transport industry, commerce and trade. Taken together, job creation will help to reduce the problem of unemployment with attendant improvement in income for the

workers' household and revenue.

The Impact Rating for Creation of Employment and Business is given in **Table 7.3** below.

Table 7.3: Impact Rating for Creation of Employment

Severity of Impact	+4
Spatial Scope of the Impact	+3
Duration of Impact	+3
Overall score	**+3**
Impact Rating	**Medium - Beneficial**

7.5 Positive Impacts during Operation Phase

7.5.1 Improved Accessibility to Clean and Reliable Water Supply

The project once commissioned will have a direct benefit the residents of Sabasaba areas where water supply networks are to be extended. These areas are currently experiencing acute water shortages. Residents currently rely on, amongst other sources, boreholes drilled by various development agencies. Water quality and supply reliability is not guaranteed, also water has to be transported by water vendors to households therefore compromising on its quality and price. The Impact Rating for Improved Accessibility to clean and Reliable Water Supply is as shown in **Table 7.4** below.

Table 7.4: Impact Rating for Improved Access to Clean and Reliable Water Supply

Severity of Impact	+5
Spatial Scope of the Impact	+4
Duration of Impact	+4
Overall score	**+4**
Impact Rating	**High - Beneficial**

7.5.2 Improved Hygiene and Sanitation in the Project Areas

Good Hygiene and Sanitation Standards are directly linked to provision of reliable and adequate water supply as well as provision of adequate sanitation facilities. The Project target areas will directly benefit from improved hygiene and sanitation as a result of improved water supply networks including consumer connections.

The Impact Rating for Improved Hygiene and Sanitation in the Project Areas is as shown in **Table 7.5** below.

Table 7.5: Impact Rating for Improved Hygiene and Sanitation

Severity of Impact	+4
Spatial Scope of the Impact	+3
Duration of Impact	+4
Overall score	**+4**
Impact Rating	**High - Beneficial**

7.5.3 Reduced Cases of Water Related Diseases

Cases of water borne disease in the Project area areas are likely to reduce with improved accessibility of potable water. This will effectively reduce related medical expenses among

the poor people in the project area with extended long term increased social productivity.

The Impact Rating for Reduced Water Borne Related Diseases in the Project areas is as shown in **Table 7.6** below.

Table 7.6: Impact Rating for Reduced Water Related Diseases

Severity of Impact	+4
Spatial Scope of the Impact	+3
Duration of Impact	+4
Overall score	**+4**
Impact Rating	**High - Beneficial**

7.5.4 Reduced Water and Sanitation Burden to Women

The burden of collecting water to the households is in many occasions presumed to the responsibility of women, also the burden of caring for the sick who suffer for instance from water related illness is also in many occasions left to women. Women constitutes a significant ratio of the total population of the project areas are largely affected by poor sanitation and hygiene as they are left to care for the home cleanliness, take care of children's health as well as spend hours looking for clean water.

Improved water supply will lessen this burden and also ensure enhanced family health. The Impact Rating for Reduced Burden to Women is as shown in **Table 7.7** below.

Table 7.7: Impact Rating for Reduced Burden to Women

Severity of Impact	+3
Spatial Scope of the Impact	+3
Duration of Impact	+4
Overall score	**+3**
Impact Rating	**Medium - Beneficial**

7.5.5 Increased Land Values in the Project Area

Provision of any infrastructure is an additional value for properties in target areas of Sabasaba and its environs comprising Kaharati, Iganjo, Kamahuha, Githembe, Gakuyu, Kahariro, Kandani and Mugumoini. It is expected that property and land will appreciate because of improved access to potable water and sanitation facilities.

The Impact Rating for increase land values in the Project Area is as shown in **Table 7.8** below.

Table 7.8 Impact Rating for Increased Land Values

Severity of Impact	+3
Spatial Scope of the Impact	+3
Duration of Impact	+4
Overall score	**+3**
Impact Rating	**Medium - Beneficial**

7.6 Potential Negative Impacts and Mitigation Measures at Construction Phase

7.6.1 Negative Impacts to the Biophysical Environment and Mitigation Measures

7.6.1.1 Impacts on Vegetation Cover

Human settlement and anthropogenic activities have resulted to the areas being cleared of natural vegetation, clearance is done in order to provide land for development of houses and land for cultivation. However less significant impact to vegetation is expected in terms of

i. Loss of vegetation cover along pipeline route and reservoir tanks
ii. Economic loss tree to destruction of trees
iii. Less significant terrestrial habitat disruption

The Impact Rating for Destruction of Vegetation Cover is as shown in **Table 7.9** below.

Table 7.9: Impact Scoring for Destruction of Vegetation Cover

Severity of Impact	-2
Spatial Scope of the Impact	-2
Duration of Impact	-3
Overall score	**-2**
Impact Rating	**Low Negative**

The risk of destruction of vegetation in the project areas is low and will be further minimized by limiting Site Clearance and Construction activities to the pipeline routes within the Project area.

Loss of vegetation cover Mitigation

i. Reinstatement of the project sites to their original after completion of civil works
ii. All hedges damaged during construction to be reinstated after completion of the Works
ii. The contractor to adhere to the delineated construction work area.
v. Planting of grass along the way leave and Pipeline friendly tree to be grown after construction.

7.6.1.2 Impacts on Soils

The Project activities are likely to have minor impacts on soils, this impacts include:

i. Soil Erosion
ii. Soil Compaction
iii. Soil pollution.

The impact if not mitigated could result to:

i. Sediment transfer.
ii. increased sediment in rivers
iii. Reduced rainfall infiltration
iv. River bank damage
v. Alteration of the biophysical and chemical component of the soil reducing soil

productivity.

The Impact Rating for soil destruction is as shown in **Table 7.10** below.

Table 7.10: Impact Scoring for Soil Destruction

Severity of Impact	-2
Spatial Scope of the Impact	-2
Duration of Impact	-3
Overall score	**-2**
Impact Rating	**Low Negative**

This impact will be mitigated as follows

Soil Erosion Mitigation

i. The contractor to adhere to the proposed Soil conservation practices.
ii. Proper and compacted back filling.
ii. The contractor to stick to clear delineation of the construction to avoid vegetation loss.
v. Planting of vegetation cover along the pipeline wayleave.
v. Adhere to WRMA regulations & Water Act guidelines for River crossing. River diverted to its normal flow after river crossing, planting of vegetation in the riparian zone once

Soil Compaction Mitigation

i. Split compacted area to reduce runoff & revegetate where necessary
ii. Vehicles to be kept in designated access roads.
ii. Minimize compaction during stockpiling by working the soil in dry state.

Soil Pollution Mitigation

i. Any polluted soil should be handled with care for proper disposal.
ii. Concrete mixing shall be done on concrete slabs or a large metal sheet or mortar boards.
ii. Maintenance of vehicles to be done strictly at a designated place/Drip trays to be used to avoid oil spills.
v. Excavation materials to be stock piled at the demarcated location.
v. Rehabilitation of the site after construction.

7.6.1.3 Project Impact on Water.

The project is likely to have less significant impacts to water in terms of:

i. Water pollution from excavated soil, Sediments and effluents from construction machine during river crossing
ii. Increased Water demand
iii. Management of Waste water

This impact if not mitigated could result to

i. Reduced water quality

ii. Siltation
iii. Obstruction of water flow
iv. Increased water demand
v. Increased toxic levels in soil and water

The Impact Rating for project impact on water is presented in **Table 7.11** below.

Table 7.11: Impact Rating for Solid Waste Generation

Severity of Impact	-3
Spatial Scope of the Impact	-2
Duration of Impact	-3
Overall score	**-3**
Impact Rating	**Medium - Negative**

Project Impacts on Water Resources can be mitigated as follows

Reduced Water Quality Mitigation

i. Obtain permits from WRMA for under river crossing (Kabuku, Makindi, Thugi and Thamuru)
Checking on Equipment condition and Re-fuelling at safe locations, Use of spill kits and applications of emergency spill procedures
ii. Use of silt barriers and settling ponds
ii. Storing of fuels, oils and chemicals beneath impermeable away from surface drains
v. Deep soak pits for septic tanks with all water from ablution and toilets directed into the septic tank.
v. The machines to be properly serviced offsite and maintained to avoid spillage of effluents into the river.

Siltation, Obstruction and Water Demand Mitigation Measures

i. Use of soil erosion control measures eg Gabions.
ii. The river to be diverted to its normal flow after river crossing and notice given to the affected communities indicating the date of works.
ii. The constructor should obtain a permit from WRMA for abstraction and sustainable use of river water for construction purposes.

Waste Water Management

i. Grey water to be contained and properly chanelled.
ii. On site treatment of Grey water by the facility approved resident engineer.
ii. Water containing pollutants should be kept in a conservancy tank for removal to prevent pollution of the surface water and surface water bodies.
v. Prompt action to be taken by the contractor in case of any pollution incident.

7.6.1.4 Contamination of Surface Water Sources by Effluents from Construction Plant and Equipment

The assessment identified four main rivers which traverse through the Project area this rivers include; (Kabuku, Makindi, Thugi and Thamuru)

Effluents from Construction Plant and Equipment (oils, grease, hydro-carbonates) are potential point pollutants. This can occur during cleaning, repair of the equipment as well as

through leakages during normal operation of the equipment. These effluents can further contaminate the surface water channels within the project areas and eventually pollute adjacent water resources.

The Impact Rating is as shown in **Table 7.12** below.

Table 7.12: Impact Rating for Surface Water Pollution

Severity of Impact	-2
Spatial Scope of the Impact	-1
Duration of Impact	-3
Overall score	**-2**
Impact Rating	**Low - Negative**

The risk of surface water pollution by discharges from Construction Equipment is low and will be further minimized by

Water and Soil pollution from Plant and Equipment

i. Ensuring Construction Equipment is well maintained and serviced according to manufacturers' specifications to prevent oil leaks,
ii. Cleaning / repair of Construction Plant and Equipment to be carried out at designated yards
iii. Concrete paving of workshops and repair areas to prevent effluents contaminated by oil and diesel from infiltrating into the soil
iv. Construction of effluent holding chamber and solid Waste collection and sorting Chamber
v. Contractor to have designated storage areas for oils, fuels etc. that is protected from rain water and away from nearby surface water courses

7.6.1.5 Solid Wastes Generation from Construction Activities

Construction activities at the work sites and Contractor's Camps will generate some Spoil material, solid wastes such as plastic containers, used tyres, metal parts, plastics and cables. Such material if not mitigated could be washed away to drainage channels and rivers eventually clogging the drainage channels and increasing river sedimentation.

The Impact Rating for Pollution by Solid Wastes is as shown in **Table 7.13** below.

Table 7.13: Impact Rating for Solid Waste Generation

Severity of Impact	-3
Spatial Scope of the Impact	-2
Duration of Impact	-3
Overall score	**-3**
Impact Rating	**Medium - Negative**

Solid Waste Mitigation Measures

i. Maximum reuse of excavated material.
ii. Implementation of Soil erosion management in the spoil locations
ii. Construction wastes (residual earth, debris and scrap materials) to be collected at designated points and Contractor to dispose to appropriately
v. Contractor's Camps and Construction Sites to have designated waste collection points,
v. Environmental Management, Health and Safety Training Programmes to be conducted for Contractor's Staff to create awareness on proper solid wastes management

7.6.1.6 Accidental Oil and fuel Spills and Leaks

The Project will involve use of plant and equipment which include, excavators, dozers, tippers and wheel loaders, all these equipment use diesel oils. Fuel storage tanks will also be installed at contractor's yards.

In the event that these oils accidentally leak into the environ, they could result to significant contamination of soil, surface and underground water resources

The impact rating for accidental oil spills is presented below

Table 7.14: Impact Rating for Accidental Oil Spills

Severity of Impact	-4
Spatial Scope of the Impact	-4
Duration of Impact	-4
Overall score	**-4**
Impact Rating	**Highly - Negative**

Oils Spills can be mitigated as follows

i. Checking and regular servicing of Equipment.
ii. Re-fuelling at safe locations,
iii. Use of spill kits and applications of emergency spill procedures.
iv. Provision of a 20cm layer of sand and ballast at the machinery storage area and diesel tank section, this layer act as sink to potential oil spills and will be replaced when saturated**.**
v. Vehicle maintenance to be done in impervious concrete platforms and grease and oil traps to be used.

7.6.2 Negative Impacts to the Social Environment and Mitigation Measures

7.6.2.1 Loss of Temporal Assets and Sources of Livelihood

No Impact is anticipated to people assets and sources of livelihood due to the following reasons

OP 4.12 Not Triggered

i. Kinyona Water Treatment Plant is an existing facility that has adequate land for expansion, the proposed expansion works will be done within the existing facility.
ii. Proposed 8km clear water line from Kinyona to Kaharati will utilize existing road reserve that is free from encroachment

Photo Plate 7-1: Clear Road Reserve and Adequate Land at Kinyona Water Facility


7.6.2.2 Disruption of Public Utilities

The proposed Project will affect other public utility infrastructure which include, existing data cables, plot access culvers, existing water infrastructure, internal roads within the project areas and storm water drainage channels.

The Impact Rating for Disruption of Public utilities is as shown in **Table 7.15** below.

Table 7.15: Impact Rating for Disruption to Public Utilities

Severity of Impact	-3
Spatial Scope of the Impact	-2
Duration of Impact	-3
Overall score	**-3**
Impact Rating	**Medium - Negative**

Disruption of Public Utilities Mitigation Measures

- Contractor to carry out piloting to locate services such as pipes and cables along the Pipeline Route before commencing excavation works.
- The relevant Services Providers and Agencies (KeNHA, KURA, KeRRA, MUSWASCO, Kenya Power, etc.) to be notified prior to commencement of Works so that any relocation works can be carried out before the Pipeline Construction Works begin.
- Road Crossings of all major paved roads to be done through Trenchless Methods (Tunneling under the road surface) to avoid disruption to traffic flow.
- Length of excavation to be restricted to sections that can be reinstated within the shortest period possible to minimize time of disruption of services

7.6.2.3 Labour influx and Sexual Offences to Minors

The project at construction phase has the potential of attracting workers from various regions to Kinyona, also if the construction tender is awarded to international contractor chances of foreign workers influx to Kinyona is high. Labour influx has potential of triggering the following impacts.

i. Increased HIV
ii. Early Child pregnancies
iii. School dropout

iv. Sexual offences
v. Gender violence

The impact rating of labour influx and sexual offences is presented in table 7-16 below

Table 7.16: Impact Rating for Labour Influx and Sexual Offences

Severity of Impact	-4
Spatial Scope of the Impact	-3
Duration of Impact	-3
Overall score	**-3**
Impact Rating	**Medium - Negative**

Labour Influx Mitigation

i. Effective community engagement and strong grievance mechanisms on matters related to labour.
ii. Effective contractual obligations for the contractor to adhere to the mitigation of risks against labour influx
iii. Proper records of labour force on site while avoiding child and forced labour
iv. Fair treatment, non-discrimination, and equal opportunity of workers.
v. Comply to provisions of WIBA 2007 and IFC PS 2 on labour and Working Conditions, and ILO Conventions 87, 98, 29,105,138,182,100,111
vi. Develop and implement a children Protection Strategy

7.6.2.4 Human Rights Principles and Gender Inclusivity

The possibility of the works contractor not adhering to requirements of Human Rights Principles and Gender Inclusivity could trigger resistance from Civil Society Organization (CSO) through demonstrations. This could lead to delay substantial delay in Project implementation

The Impact rating for Human rights principles and gender inclusivity is presented in table 7-17 below

Table 7.17: Impact Rating for Human Rights Principle and Gender Inclusivity

Severity of Impact	-4
Spatial Scope of the Impact	-3
Duration of Impact	-3
Overall score	**-3**
Impact Rating	**Medium - Negative**

Mitigation measures to non-adherence to Human Rights Principles and Gender inclusivity

i. Mainstream Gender Inclusivity in hiring of workers and entire Project Management as required by Gender Policy 2011 and 2/3 gender rule.
ii. Comply to provisions of guidelines on incorporating Human Rights Standards and Principles, including Gender, in Programme Proposals for Bilateral German Technical and Financial Cooperation
ii. Protecting Human Risk areas Associated with, Disadvantaged Groups, Interfering with Participation Rights, and interfering with Labour Rights

7.6.2.5 Increased Transmission of HIV/AIDS

The Project will attract new people to the Project area seeking employment during the construction period and this can lead to increased transmission of HIV/AIDS and other sexually transmitted diseases (STDs).

The Impact Rating for Increased Transmission of HIV/AIDS is as shown in **Table 7.18** below.

Table 7.18: Impact Rating for Increased Transmission of HIV/AIDS

Severity of Impact	-2
Spatial Scope of the Impact	-3
Duration of Impact	-3
Overall score	**-3**
Impact Rating	**Medium - Negative**

Mitigation Measures for Increased HIV transmission

i. Offer HIV/AIDS sensitization to workers in collaboration with the local health facilities.
ii. Offer VCT services to the communities with the help of the local Health facilities.
iii. Contractor to provide standard quality condoms to personnel on site

7.6.2.6 Increased Crime and Insecurity

Influx of persons to the project area may lead to increased insecurity and incidences of crime. This impact applies to all the project areas under this assessment

The Impact Rating for Increased Insecurity is as shown in **Table 7.19** below.

Table 7.19: Impact Scoring for Insecurity

Severity of Impact	-2
Spatial Scope of the Impact	-2
Duration of Impact	-3
Overall score	**-2**
Impact Rating	**Medium - Negative**

Mitigation Measures for increased Crime and Insecurity

i. Contractor and Supervision Team to liaise regularly with the Local Administration and Police Service to address any security and crime arising during project implementation.
ii. Contractor to provide 24 hours security to Workforce Camps, Yards, Stores and to the Supervising Team's Offices

7.6.3 Negative Impacts on Occupational Health and Safety and Mitigation Measures

7.6.3.1 Air Pollution and Dust Generation.

Air Pollution can be caused by emissions from Construction Plant and Equipment and Vehicles. Dust can be generated by vehicles travelling on unpaved roads and tracks, and dust from exposed, non-vegetated surfaces. Some dust will also be generated during excavation works, by blowing from dump truck loads, and possibly from project borrow pits and quarries.

The Impact Rating for Air Pollution and Dust Generation is as shown in **Table 7.20** below.

Table 7.20: Impact Rating for Air Pollution and Dust Generation

Severity of Impact	-3
Spatial Scope of the Impact	-2
Duration of Impact	-3
Overall score	**-3**
Impact Rating	**Medium - Negative**

Air pollution Mitigation Measures

i. The contractor to comply to the provisions of EMCA 1999 and amendments 2015 (Air Quality Regulations 2014), to be enforced by the Supervising Engineer.
ii. Workers shall be trained on management of air pollution from vehicles and machinery.
iii. All construction machinery shall be maintained and serviced in accordance with the contractor's specifications
iv. The removal of vegetation shall be avoided until such time as clearance is required and exposed surfaces shall be re-vegetated or stabilized as soon as practically possible
v. The contractor shall not carry out dust generating activities (excavation, handling and transport of soils) during times of strong winds
vi. Vehicles delivering construction materials and vehicles hauling excavated materials shall be covered to reduce spills and windblown dust
vii. Water sprays shall be used on all earthworks areas within 200 metres of human settlement especially during the dry season.

7.6.3.2 Noise and Excessive Vibrations.

Noise and Excessive Vibrations are caused by operation of construction plant and equipment and activities such as excavation and rock breaking. This impact poses a health and safety risk to both the communities living in the project area and construction workers.

The Impact Rating for Noise and Excessive Vibrations is as shown in **Table 7.21** below.

Table 7.21: Impact Rating for Noise and Excessive Vibrations

Severity of Impact	-3
Spatial Scope of the Impact	-1
Duration of Impact	-3
Overall score	**-3**
Impact Rating	**Medium - Negative**

Mitigation Measures for exposure to Noise and Excessive Vibrations

i. Contractor will comply with provisions of EMCA 1999 and amendments 2015 (Noise and Excessive Vibrations Regulations of 2009)
ii. The Contractor shall keep noise level within acceptable limits (55 Decibels during the day and 35 Decibels during the night) and construction activities shall, where possible, be confined to normal working hours in the residential areas
iii. Hospitals and other noise sensitive areas such as schools shall be notified by the Contractor at least 5 days before construction is due to commence in their vicinity

iv. Undertake Noise and Excessive Vibration Assessments
v. Effective use of appropriate PPE by exposed workers and Proper maintenance of machines.
vi. Any complaints received by the Contractor regarding noise will be recorded and communicated to the Supervising Engineer for appropriate action

7.6.3.3 Risk of Accidents at Work Sites

Accidents during construction activities may occur due to failure to use Personal Protective Equipment (PPE) by workers on site and members of the public illegally accessing the work sites. Accidents may result in injuries or even death of workers or members of the public.

The Impact Rating for Risk of Accidents at Work Sites is as shown in **Table 7.22** below.

Table 7.22: Impact Rating for Risk of Accidents at Work Sites

Severity of Impact	-4
Spatial Scope of the Impact	-3
Duration of Impact	-3
Overall score	**-3**
Impact Rating	**Medium - Negative**

Mitigation Measures for Accidents at Work sites

i. Construction Workers and the Supervising Team to be provided with Personal Protective Equipment including gloves, gum boots, overalls and helmets. Use of PPE to be enforced by the Supervising Engineer.
ii. Fully stocked First Aid Kits to be provided within the Sites, Camps and in all Project Vehicles
iii. Isolate the site for access by the local communities during the construction for their safety and health
iv. Camps and Work Sites to be fenced off and Security Guards provided to restrict access to members of the public.
v. Strict use of warning signage and tapes where the trenches are open and at other active construction sites
vi. Contractor to Employ and train Road Safety Marshalls who will be responsible for management of traffic on site
vii. Contractor to provide a Traffic Management Plan during construction to be approved by the Supervising Engineer
iii. Contractor to provide a Healthy and Safety Plan prior to the commencement of works to be approved by the Supervising Engineer.

7.7 Potential Negative Impacts and Mitigation Measures during the Operation Phase

7.7.1.1 Risk of Encroachment and Construction of Structures on the Pipelines

Encroachment and construction of structures on water pipelines is common in many areas across the county, however, this impact is less significant due to the fact that the project area is within rural context where community member do not encroach on way leaves and road reserves.

The Impact Rating is as shown in **Table 7.23** below**.**

Table 7.23: Impact Rating for Risk of Encroachment on Wayleave

Severity of Impact	-2
Spatial Scope of the Impact	-2
Duration of Impact	-4
Overall score	**-2**
Impact Rating	**low- Negative**

Mitigation Measures due to Encroachment of Wayleaves

i. Regular inspections to be carried out by MUSWASCO along the pipeline corridors for encroachment.
ii. Prosecution of encroachers as required by Murang'a County By laws on Way Leaves and Road Reserves
ii. MUSWASCO will undertake awareness campaigns to prevent re-encroachment. Forced evictions of encroachments shall not be carried out.

7.7.1.2 Risk of Burst of Water Pipelines Leading to Water Loss (Non-Revenue Water)

Pipeline bursts may occur as a result of interference with the pipelines during future construction activities e.g. road construction works in the project areas or due to lack of maintenance of the pipelines. Loss of water through such bursts will to revenue loss for MUSWASCO. Burst pipelines may also cause damage to roads, properties, etc.

The Impact Rating is as shown in **Table 7.24.**

Table 7.24: Impact Scoring for Risk of Pipeline Bursts

Severity of Impact	-2
Spatial Scope of the Impact	-2
Duration of Impact	-1
Overall score	**-2**
Impact Rating	**–Low - Negative**

Mitigation of Pipe burst leading to NRW

i. The risk of pipeline bursts is low as the pipeline design, including the selection of pipe material with appropriate pressure rating
ii. This risk will be further minimized through regular inspection, repair and maintenance of the pipeline by the Operator, MUSWASCO

7.7.1.3 Risk of Illegal Connections and Vandalism of Water Pipelines

Illegal connections and vandalism of Water Pipelines is a common practice, this ultimately results in loss of revenue to MUSWASCO. The Impact Rating is as shown in **Table 7.25** below**.**

Table 7.25: Impact Scoring for Risk of Illegal Connections and Vandalism

Severity of Impact	-2
Spatial Scope of the Impact	-2
Duration of Impact	-4
Overall score	**-2**
Impact Rating	**Low - Negative**

Mitigation Measures to Vandalism of Pipeline Infrastructure

i. Regular inspection to be carried out MUSWASCOin the project areas to identify and remove illegal connections to water pipelines
ii. Prosecution of offenders as required by Murang'a City County By laws
iii. MUWASC will undertake regular awareness campaigns in partnership with suitable Community Based Organizations and the Local Administration to educate the public against illegal connections and vandalism of pipelines

CHAPTER 8: ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN

8.1 Management Plan Principles

This project is geared towards enhancing social and economic benefits to the people living in the Project area however; the project should also observe environmental protection requirements in accordance to the established laws and regulations to ensure sustainability. To realize this goal, acceptability by a majority of the beneficiaries and minimal effects to the physical environment will require to be integrated in the project through constant consultations, evaluations and review of the design aspects throughout the project coverage. Among the factors that need to be considered in this particular project implementation will include:

i. The contractor shall hire qualified community liaison officers who will be act as an inter-phase between the contractor and community. The community liaison person will be responsible for implementing components of the Stakeholder engagement requirements which require continuous engagement of the community.
ii. Enhance integration of environmental, social and economic functions in the project implementation.
iii. Consider preventive measures towards possible social and economic disruptions that may arise from the project implementation in accordance with the laid down guidelines.
iv. The contractors and other players in the project activities be prevailed upon to implement the EMP through a sustained supervision and continuous consultations.

8.2 Specific Management Issues

8.2.1 Management Responsibilities

In order to implement the management plan, it is recommended that a supervisor is identified to oversee environment and management aspects during construction of the project. The supervisor would also be expected to co-ordinate and monitor environmental management during construction and provide monitoring schedules during operations.

The contractor shall be required to submit, under due consideration of the ESMMP as part of the ESIA the below listed management plans.

- Occupational health and safety plan
- Traffic management plan
- Public health and safety management plan
- The provisions for the workers grievance mechanism
- Environmental and social monitoring plan (with further detail to the outline of monitoring indicators as presented in the ESMMP) below.

8.2.2 Environmental Management Guidelines

Upon completion and commissioning the priority projects, it will be necessary to establish appropriate operational guidelines on environmental conservation and social linkages to

enable the operations' management identify critical environmental and social issues and institute appropriate actions towards minimizing associated conflicts.

Basically, the guidelines should cover among other areas environmental management progammes, standard operation procedures, compliance monitoring schedule and environmental audit schedules as required by law. Social harmony of the facilities and associated component will be achieved through collaborations with the stakeholders at the project level.

8.2.3 Environmental Education and Awareness Rising

The county government field staff and the other beneficiaries will need to understand the basic environmental principles associated with the projects. In this regard, therefore, the following steps will need to be considered:

- Creation of liaisons on all matters related to environment management of the facilities once commissioned
- Encourage contribution of improvement ideas from the beneficiaries on specific issues related to the management of the facilities
- Establish initiatives that would instil a sense of ownership of the facilities and related components to all beneficiaries,

8.2.4 Decommissioning Process

Due to the long-term life of the intervention facilities and related components, a decommissioning audit will be undertaken at least 1 year before the process for any of the components commences, following a notice to decommission. The decommissioning process will be guided by a comprehensive decommissioning plan developed through the decommissioning audit process. However, the following features will need to be decommissioned upon completion of the works:

- Contractor's camp and installations that will need to be removed without compromising on the safety and general welfare of the immediate residents. Special care to be given to associated wastes and dust emitted in the process,
- Materials stores that will comprise fresh materials and used items. Each category will be moved safely out of site ensuring minimal or no impacts to the related environment and social setting,
- Wastes and debris holding sites will be cleared with maximum re-use of the debris either on surfacing the passageways or other grounds such as schools and church compounds.

Table 8.1: Pre Construction Phase: Environmental and Social Management and Monitoring Plan

Activity	Associated Impacts	Impact Levels	Management Actions	Target Areas & Responsibilities	Monitoring Indicator	Budget
Seeking approvals from NEMA for ESIA and Approval of plans from County and National Government	Delay in implementation of the project due to objections and stop orders	Low	▪ The Contractor shall ensure that all pertinent permits, certificates and licences have been obtained prior to any activities commencing on site and are strictly enforced/ adhered to; ▪ The Contractor shall maintain a database of all pertinent permits and licences required for the contract as a whole and for pertinent activities for the duration of the contract	All Project Components Responsibility MUSWASCO	• Degree of completion of set of required approvals / permits issued (%tage), Number and type of findings during any audits based on conditions of approvals	~KShs0.2M
construction campsites	Environmental degradation risks	Low	▪ Undertake ESIA studies for the target camp sites and obtain approval from the relevant authorities (including NEMA) ▪ Isolate through fencing the camp sites from access by the public for their safety ▪ Preferably to be located on land already cleared land wherever possible ▪ The Contractor's Camp layout shall take into account availability of access for deliveries and services and any future works	Campsites Responsibility Contractor(s)	• Environment licence • Number of public outcry due to accidents	~Kshs. 0.5M
Access to campsites and construction sites	Environmental degradation risks	Low	▪ Utilize to the extent possible the existing public roads to avoid social and economic disruption ▪ Ensure road safety measures for the construction vehicles to the extent possible by observing all traffic regulations	Access Roads Responsibility Contractor(s)	• Cases of private land required • Accidents occurrence incidences	(integrated in the works costs
Environmental Training and	Risks of Environmental	High	▪ The Contractor and sub-contractors shall be aware of the environmental	All Workers	• Number of Trainings Held	KShs 0.1M

Activity	Associated Impacts	Impact Levels	Management Actions	Target Areas & Responsibilities	Monitoring Indicator	Budget
Awareness	degradation risks and occupational health and safety related accidents		requirements and constraints on construction activities contained in the provisions of the EMP ▪ The Contractor will be required to provide for the appropriate Environmental Training and Awareness as described in this EMP in his costs and programming ▪ An initial environmental awareness training session shall be held prior to any work commencing on site, with the target audience being all project	Responsibility Contractor(s)	• Availability of Training reports • Attendance list of participants during the training sessions	
HIV/AIDS awareness and prevention campaign	Risks of Increased HIV and Aids transmission in the area		▪ The Contractor shall institute HIV/AIDS awareness and prevention campaign amongst his workers for the duration of the contract, contracting an implementing organisation, with preference for an organisation already working on this issue in the project area; ▪ The campaign shall include the raining of facilitators within the workers, information posters in more frequented areas in the campsite and public areas, availability of promotional material (T-shirts and caps), availability of condoms (free), and theatre groups	All Workers and selected workshops targeting communities Responsibility Contractor(s)	• Number of Trainings Held • Availability of Training reports • Attendance list of participants during the training sessions	KShs. 0.1M
Local Labour / Employment	Delay in project implementation due to opposition from aggrieved community members	High	▪ Wherever possible, the Contractor shall use local labour, and women must be encouraged to be involved in construction work ▪ The contractor shall ensure compliance to the gender balance as required by the 2/3 gender rule ▪ Comply with IFC PS 2 on labour and	All the Project components Responsibility Contractor	• Number of workforce employed from the local community • Number of females employed	No direct costs associated

Activity	Associated Impacts	Impact Levels	Management Actions	Target Areas & Responsibilities	Monitoring Indicator	Budget
			Working Conditions including ILO conventions on Labour and Working Condition described in section 7 of the Report.		• Complaints from disgruntled work force	
ESMP management records	Risks of associated with non-tracking of environment and social risks management initiatives.	Medium	▪ The updated version of the EMP should be kept on site ▪ Copies of all necessary permits and licences should be kept on site ▪ All site specific plans prepared as part of the updated EMP ▪ All related environmental, social, health and safety management registers and correspondence, including any complaints ▪ A register of audit non-conformance reports and corrective actions	All the Project Components <u>Responsibility</u> Contractor	• Number of available permits on site • Environment and Safety audit • Number of corrective measure adopted	No direct associated costs
Stakeholder Engagement	Risk of delays in Project Implementation due to disputes / grievances from Stakeholders	High	▪ Contractor to hire community liaison officers who will act as a link between the community and contractor ▪ Identification and Engagement of all Stakeholders to be undertaken ▪ A working Grievance Redress Mechanism to be established before commencement of Works. ▪ This is as guided by World Bank Environment and Social Standard 10 (Draft)	All work areas <u>Responsibility</u> MUSWASCO	• No. of Complaints recorded in the Grievances Book • Number of community liaison officers employed by the contractor	Costs for implementation of any mitigation measures resulting from resolution of grievances. Allowed in the bid documents
					Sub Total 1	**0.9M**

Table 8.2: Construction Phase: Environmental and Social Management and Monitoring Plan

Activity	Associated Impacts	Impact Levels	Management Actions	Target Areas & Responsibilities	Monitoring Indicator	Budget
Earth moving and excavations (channeling and site preparations)	▪ Safety risks ▪ Air pollution ▪ Social nuisance	Medium	▪ Provide notices, signage and information to the public for their safety at all locations ▪ Install barriers along walkways, crossings and public places affected by the works for public safety ▪ Where there are potential for nuisance from dust generation, ensure earth moving is under dump conditions (consider watering where necessary) ▪ Inform immediate communities or stakeholders of the activities	All work areas Responsibility Contractor(s)	• Accidents occurrence incidences • Cases of respiratory complication at nearby health centre	~KShs. 0.2M
	▪ Vegetation Cover destruction	Low	▪ Construction activities will be limited to project sites / routes which already exist therefore limited destruction to vegetation cover ▪ Re-vegetate the project route after completion of civil works	All work areas Responsibility Contractor(s)	• Soil erosion extend and intensity on site	Contractor to include these costs in his rates
	▪ loss of top soil	Low	▪ Stock piling of top soil, construction material and wastes should be done only at designated sites approved by the supervising engineer, erosion prevention through berming of loose soil sites should be done in all areas susceptible to agents of erosion.	All work areas Responsibility Contractor(s)	• Soil erosion extend and intensity on site	
	▪ Public safety risks ▪ Worker Occupational safety risks	Medium	▪ Notify public the intent to cut sections of the road for safety precautions ▪ Provide signage and safety information in all work areas. ▪ Ensure compliance by workers with safety safeguards including the OHS, provision of safety gear and enforcement of application	civil works areas Responsibility Contractor(s) Supervision	• Accidents occurrence incidences	0.2M

Activity	Associated Impacts	Impact Levels	Management Actions	Target Areas & Responsibilities	Monitoring Indicator	Budget
	Disruption of amenities (access roads, services lines and driveways) causing inconveniences to the community	Medium	▪ Notify other services providers and ▪ Open small sections that can be reinstated within the shortest period to avoid public disruption ▪ Mark the lines to avoid conflicts with other activities ▪ Use of trenchless technologies to cut roads	civil works areas <u>Responsibility</u> Contractor(s) Supervision	• Number of complaints from community due to lack of certain services	Costs included in contractors rates
Materials sourcing, from burrow pits and quarries delivery and storage	Environmental and Safety risks associated with burrowing and opening up of new quarry sites	High	▪ The Contractor will be responsible for ensuring that appropriate authorisation to use the proposed borrows pits and quarries has been obtained before commencing activities ▪ Topsoil shall be stripped prior to removal of borrow and stock piled onsite. This soil shall be replaced on the disturbed areas once the operation of the borrow site or quarry is complete ▪ Construction material sources should be environmentally sustainable (approved accordingly) ▪ Delivery routes and modes of transport should be approved Material storage on site not to be internal or external nuisance ▪ Delivery trucks to be well covered to avoid dust blown pollution	Burrow Pits and Quarry Site <u>Responsibility</u> Contractor(s) Supervision	• Environmental Status of reinstated burrow pits • Complains from the community on burrow pits and material transportation	KShs. 0.5M
Concrete / cement batching plant	Risks associated with water resource pollution and air pollution from dust this could lead to		▪ Where required, a Concrete batching plant shall be located more than 20m from the nearest stream/river channel; ▪ Top soil shall be removed from the batching plant site and stockpiled ▪ Contaminated storm water and	Concrete / cement batching plant <u>Responsibility</u> Contractor(s) Supervision	• Number of incidence of Environment pollution around the plant	KShs. 0.5M

Activity	Associated Impacts	Impact Levels	Management Actions	Target Areas & Responsibilities	Monitoring Indicator	Budget
	respiratory problems		wastewater runoff from the batching area and aggregate stock piles shall not be permitted to enter streams but shall be led to a pit where the water can soak away ▪ Suitable screening and containment shall be in place to prevent windblown contamination associated with any bulk cement silos, loading and batching ▪ Cleaning of equipment and flushing of mixers shall not result in pollution of the surroundingenvironment			
Wastes removals and disposal	Risks of contamina ting surface and undergrou nd water resources	High	▪ Construction wastes (residual earth, debris and scrap materials) to be removed for safe disposal ▪ Encourage recycling where possible (concrete debris for access road surfacing), ▪ Contaminated organic matter in the work areas to be isolated for safe disposal ▪ Material residuals to be disposed off in accordance with established regulations	Construction areas <u>Responsibility</u> Contractor(s) Supervision	• Number of complaints from community not happy with waste management of the contractor	KShs. 0.2M
Spoil Storage site	Risks of solid waste mismanagement leading to pollution	Medium	▪ Preferably to be located on land already cleared wherever possible. Communities shall be involved in the site location to avoid conflict ▪ The need to be more than 20 meters from water courses and in apposition that will facilitate the prevention of storm-water runoff from the site from entering the watercourse ▪ Contouring of spoil site to approximate natural topography and	Construction areas <u>Responsibility</u> Contractor(s) Supervision	• Number of complaints from community not happy with waste management of spoil material	Contractor best management practice

Activity	Associated Impacts	Impact Levels	Management Actions	Target Areas & Responsibilities	Monitoring Indicator	Budget
			drainage and/or reduce erosion impacts on the site ▪ The Contractor shall ensure that the placement of spoil is done in such a manner to minimise the spread of materials and the impact on surrounding vegetation and that no materials' creep' into' no-go' areas			
Occupational Health and Safety	Risks of Accidents, Injuries or death of workers or community member	High	▪ Provide construction workers with personal protective gear (gloves, gum boots, overalls and helmets), ▪ Provide temporary toilets and bathrooms for the construction workers at the work sites ▪ Provide onsite first aid kit accessible by the workers on need, ▪ Isolate the site for access by the local communities during the construction for their safety and health ▪ Contractor to provide a Healthy and Safety Plan prior to the commencement of works to be approved by the resident engineer. ▪ Contractor to follow provisions of Kenya Occupational Health and Safety Act 2007 ▪ Contractor to follow provisions of The World Bank Group Environment Health and Safety General Guidelines and specific Guidelines on Water and Sanitation and the World Bank Environmental and Social Standard No. 4 on Community Health and Safety (Draft)	All work areas <u>Responsibility</u> Contractor(s) Supervision	Accidents occurrence incidences recorded in the Incidence Book	KShs. 0.4M
Storage of fuel oils, lubricants,	Hazards of fire outbreak, oil and	High	▪ Follow specifications of the Occupational Health and Safety Act,	All work areas	Incidence of reported cases of	(integrated in the works costs)

Activity	Associated Impacts	Impact Levels	Management Actions	Target Areas & Responsibilities	Monitoring Indicator	Budget
chemicals and flammable materials	chemical spills.		EMCA 1999 and others in the development and operation of stores. ▪ Provide a 20cm sand or ballast medium at plant and equipment storage area and fuel tanks area, the sand and ballast will trap any oil / fuel leaks, this medium should be replaced when saturated and disposed off appropriately	Responsibility Contractor(s) Supervision	fuel leaks and fire incidences	
Sanitation issues resulting from both solid and liquid wastes on site.	Risks associated with water born diseases exposed to community and workforce	Medium	▪ The Contractor shall comply with all laws and any by-laws relating to public health and sanitation and provisions of Public Health Act Cap 242 ▪ All temporary/ portable toilets or pit latrines shall be secured to the ground to the satisfaction of the RE to prevent them from toppling over ▪ A wash basin with adequate clean water and soap shall be provided alongside each toilet .Staff shall be encouraged to wash their hands after use of the toilet, in order to minimise the spread of possible disease	All work areas Responsibility Contractor(s) Supervision	Incidence of reported cases of water related diseases among the workforce and neighbor community	(integrated in the works costs)
Noise and Vibration control from plant and equipment	Risk to health and safety of community and workers	Medium	▪ The Contractor shall keep noise level within acceptable limits 60dB (A) at day time and 35dB(A) at night and construction activities shall, where possible, be confined to normal working hours in the residential areas ▪ Hospitals and other noise sensitive areas shall be notified by the Contractor at least 5days before construction is due to commence in their vicinity ▪ Undertake Noise and Excessive	.civil works areas and access roads Responsibility Contractor(s) Supervision engineer	Reported complaints from neighbor community and institutions	(integrated in the works costs

Activity	Associated Impacts	Impact Levels	Management Actions	Target Areas & Responsibilities	Monitoring Indicator	Budget
			vibrations assessments ▪ Any complaints received by the Contractor regarding noise will be recorded and communicated to the RE			
Traffic management on site	Risks of Accidents, Injuries or death of workers or community member	high	▪ Strict use of warning signage and tapes where the trenches are open and active sites ▪ Employ and train road safety Marshalls who will be responsible for management of traffic on site ▪ Contractor to provide a traffic management plan during construction to be approved by the resident engineer	.civil works areas and access roads <u>Responsibility</u> Contractor(s) Supervision engineer	Accidents occurrence incidences	KShs. 0.2M
Air Quality Control	Air pollution causing respiratory disorders to human	High	▪ Workers shall be trained on management of air pollution from vehicles and machinery. All construction machinery shall be maintained and serviced in accordance with the contractor's specifications ▪ The removal of vegetation shall be avoided until such time as clearance is required and exposed surfaces shall be re-vegetated or stabilised as soon as practically possible ▪ The contractor shall not carry out dust generating activities (excavation, handling and transport of soils) during times of strong winds ▪ Vehicles delivering soil materials shall be covered to reduce spills and windblown dust ▪ Water sprays shall be used on all earthworks areas within 200 metres	All work areas <u>Responsibility</u> Contractor(s) Supervision	Cases of respiratory complication at nearby health centre	(integrated in the works costs

Activity	Associated Impacts	Impact Levels	Management Actions	Target Areas & Responsibilities	Monitoring Indicator	Budget
			of human settlement. ▪ Conduct air quality monitoring assessments			
Contractor de-mobilization and site reinstatement	Associated risks of environmental degradation	High	▪ The site is to be cleared of all construction materials, including litter prior to hand over ▪ Fences, barriers and demarcations associated with the construction phase must be removed from the site ▪ Fences, barriers and demarcations associated with the construction phase must be removed from the site ▪ Rehabilitation Activities of Environmental Cases identified must continue throughout the defect liability period	All work areas <u>Responsibility</u> Contractor(s) Supervision	Closeout audit report findings	(integrated in the works costs
				Subtotal 2		**Kshs. 2.2 Million**
				Total Estimated Cost for EMP		**Kshs. 3.1 Million**

Table 8.3: Operational Phase: Environmental and Social Management and Monitoring Plan

No.	Issue	Action required	Responsibility	Monitoring Indicator	Provisional Budget
1	Risk of encroachment and construction of structures on the water lines	• Mapping and installation of beacons to which illustrate the width of the pipeline reserve • Regular inspection of the pipeline corridor for encroachment. • Prosecution of encroachers as required by Murang'a County By laws on way leaves and road reserves maintenance. • Conduct public sensitization programs on importance not interfering with way leaves and public reserve land	MUSWASCO Murang'a County Government	Number of encroachment cases reported	To be established at operation phase and included in the operation of the projects
2	Risk of water pipeline bursts leading water wastages (Non-Revenue Water percentages increase)	• Regular check, repair and maintenance of the pipeline • Activate a community watch group for information sharing on the status of the pipeline	MUSWASCO	Number of reported cases water bursts	To be established at operation phase and included in the operation of the projects
3	Risk of vandalism and illegal connection to the water line pipeline	• This will require constant inspection by MUSWASCO officials and installation of leak and burst detectors at designated areas along the pipeline. • Conduct public sensitization programs on importance not interfering with the water pipeline and the need to seek official water connection from MUSWASCO	MUSWASCO	Number of illegal connection cases reported	To be established at operation phase and included in the operation of the projects

8.3 Decommissioning Flow Chart

The project has been designed to operate effectively for over 20years. In the event that the infrastructure will be required to be overhauled, then the following steps should be considered in order to undertake the procedure in a structured manner with minimum impact to both human and natural environment.

Table 8.2: Decommissioning Flow Chart

	Action	Actor
Step 1	**Initiation** Development of an Objective Worksheet and checklist incorporating references, legal, stakeholder engagement and policies Undertake decommissioning audit	**Proponent**
Step 2	**Prepare Road Map for Decommissioning Design** Conduct design review to validate elements of the design and ensure design features are incorporated in the decommissioning design. Public consultations	**Proponent**
Step 3	**Prepare and Award Contract** Prepare a contract that incorporates validated project information and award to a contractor as per the Procurement rules.	**Proponent**
Step 4	**Execute Decommission Works** Implement design elements and criteria on the Project in accordance with specifications and drawings. Inspect during decommissioning and at Project completion to ensure that all design elements are implemented according to design specifications.	**Contractor**
Step 5	**Non-Conformance, Corrective/Preventive Action** Determine root cause Propose corrective measures Propose future preventive measures	**Proponent**

CHAPTER 9: CONCLUSION AND RECOMMENDATION

9.1 Conclusion

Through the assessment and evaluation of all potential environmental and social impacts of the proposed Sabasaba Urban Water Supply, it is concluded that the Project will have net ecological, economic, social and health benefits to residents of the target Project areas in Sabasaba and its environs comprising Kaharati, Iganjo, Kamahuha, Githembe, Gakuyu, Kahariro, Kandani and Mugumoini.

The Project is expected to provide adequate realibale water approximated to be 4000m3/day in addition to the current 15,000m3/day that is currently being supplied by the existing Kinyona Water Treatment Plant. This water will ultimately benefit 2500 household connections

Project activities that are envisaged to have potential negative impacts at different phases of the project have been assessed in detail in this Report and appropriate Mitigation Measures proposed.

In order to mitigate the potential negative impacts and to make the Project environmentally and socially sounder, an Environmental and Social Management and Monitoring Plan (ESMMP) has been prepared. It includes the Mitigation Plan, the Monitoring and Enforcement Requirements; and the Responsible Persons/Organizations. All the recommendations/ mitigations mentioned in the assessment will be financed, and incorporated in the construction and supervision contracts.

The Main Findings from the assessment described in the Report are as follows:

5. The project design has ensured that the project is constructed with existing road reserves and no private land will be acquired, therefore OP 4.12 will not be triggered
6. The Environmental and Social Scoping undertaken for the project indicate that the investment will result in low impact on biological environment; however, the Project triggers World Bank Operation Policy (OP) 4.01 on Environmental Assessment.
7. Provisional Budget of Kenya Shillings 3.2 Million is required for implementation of mitigation measures of potential negative environmental impacts identified in the report.
8. The overall objective of project is to improve the living conditions of people of Sabasaba through provision of adequate reliable and safe water supply to approximately 2500 household connections.

9.2 Recommendation

The project is recommended for implementation provided the mitigation measures identified in the study for the potential negative impacts are implemented.

ANNEXES

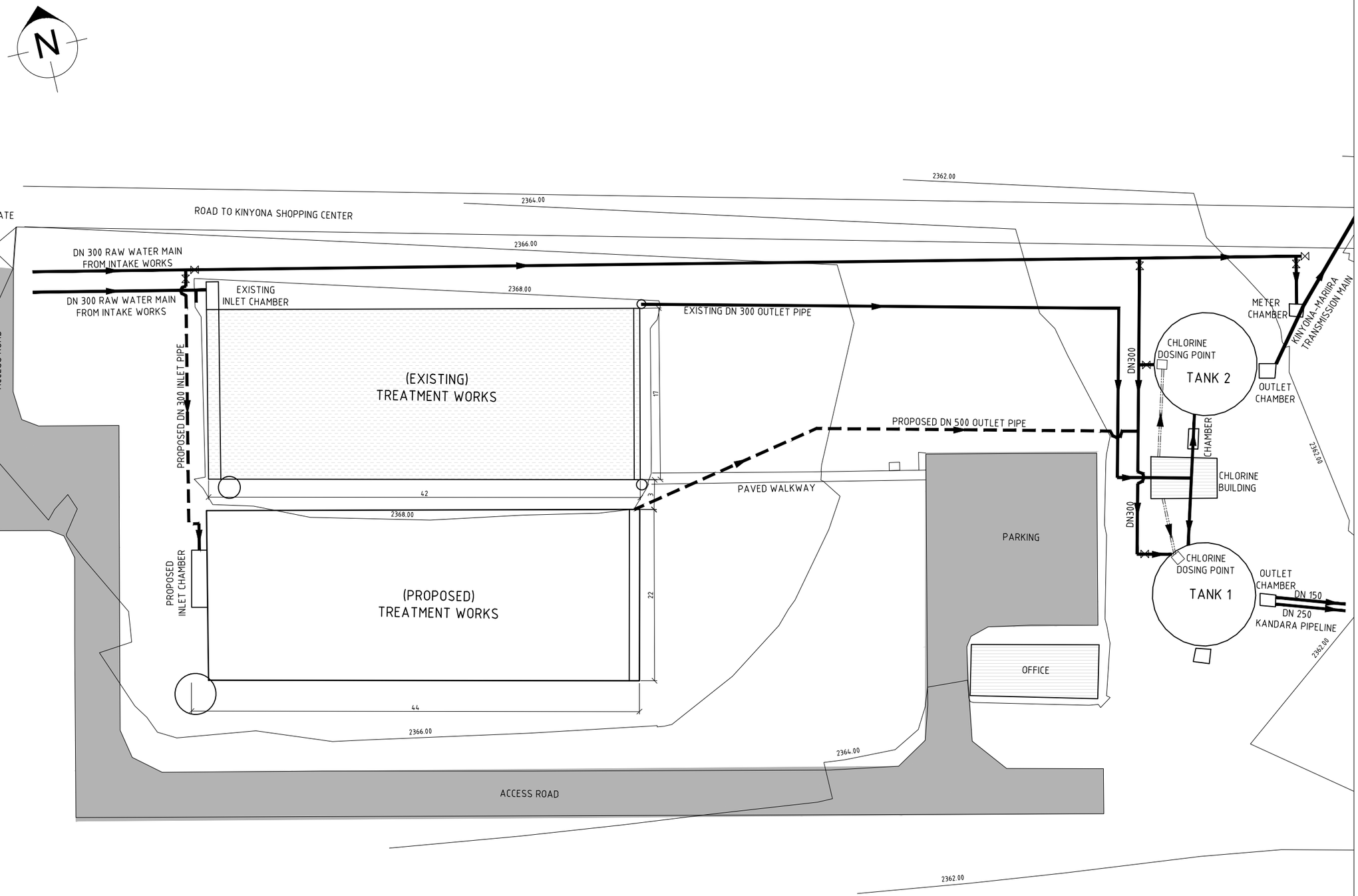
Annex 1 Layout Plans of the Project Areas showing the Proposed Works

Annex 2 Public Participation Minutes and List of Participants

Annex 1

Layout Plans of the Project Areas showing the Proposed Works


Kinyona T/Works
BPT 1
ACC&S Church
Mareira Tank
Muthithi Tank
Existing Pipeline
Proposed Pipeline
Thika-Gatura Rd
C72
KIHARU
MBIRI
MUGOIRI
NGINDA
SAMAR
IGANJO
MARAGUA RIDGE
KIGUMO
KAHARIRO
MUGUMOINI
GITHEMBE
KAHARATI
KAMAHUHA
GAKUYU
KANDANI
SABA SABA
MAKUYU
GAICHANJIRU
KANDARA
C71
A2



NOTE:

1. All dimensions in m unless otherwise specified

LEGEND

- EXISTING PIPELINE
- PROPOSED PIPELINE
- GATE VALVE
- DOSING PIPES
- 2364.00 CONTOUR

REVISION

Rev No.	Date	Description

CLIENT/EMPLOYER:

MURANG'A SOUTH WATER AND SEWERAGE COMPANY LTD
P.O. BOX 87-01034
KANDARA, KENYA.

PROJECT TITLE:

SABASABA WATER SUPPLY

DRAWING TITLE:

KINYONA
EXISTING AND PROPOSED
WATER TREATMENT WORKS
LAYOUT PLAN

DESIGN CONSULTANT

Losai Management Ltd
P.O Box 30337-00100
Nairobi, Kenya

DESIGNED BY:	DRAWN BY:	CHECKED BY:	APPROVED BY:
INT	JGG	PNK	JMM

DRAWING No.
SWSP/D/LYT/01

DATE: APRIL 2017 | SCALE: 1:200 (AT A1) | SHEET: 1/1

Annex 2

Public Participation Minutes and List of Participants

STAKEHOLDER CONSULTATIONS FOR SABASABA URBAN WATER IMPROVEMENT PROJECT.

DATE	OFFICE CONSULTED	CONCERNS RAISED
4th April 2017	Public Health officer Kigumo sub county	• Contractor should organize campsite to required standard in order to avoid environmental pollution. • MUSWASCO should treat water to required standards.
4th April 2017	District Social Development Officer Kigumo Sub county	• Ensure casual jobs during project implementation are given to local youth. • Bulk water mains should be installed properly to avoid bursts which locals believe can cause landslides, like the one that happened in Gakira in 2016.
4th April 2017	Deputy county commissioner Kigumo	• Chiefs and village elders to assist in identifying legible youth to be employed during project implementation. • Residents should be encouraged to form a committee t hat will help resolve any disputes that might arise. • All stakeholders should be careful not to incite residents considering that this is an election year
5th April 2017	Public Works Officer Kigumo sub county	• MUSWASCO should ensure that all stakeholders are consulted before project commences. • The company should ensure that no treated water is used for irrigation • The company should ensure timely repairs of burst pipes to reduce losses and water shortages to customers
7th April 2017	Water Sub County Officer Kigumo	• MUSWASCO should ensure all illegal connections are disconnected. • Disconnect all customers who use treated water to do irrigation. • Provide civic education for locals along the main line so that they can report any interference to the line in due time.
4th April 2017	Public Health Officer Maragua	• The company should improve waste water management by providing sewer systems • Contractor should avoid use of environmentally hazardous materials like asbestos. • Civic education should be conducted by the company as part of company's social responsibility to enable residents maintains high level of hygiene so as to avoid jigger infestation.

5th April 2017	Water quality and pollution control officer. WARMA Murang'a	• Water companies should consider alternative ways of getting water by constructing dams to collect rain runoff water that can later be used during dry seasons • MUSWASCO should declare the amount of water drawn from the river so that it can be charged at 50 cents per cubic metre. • A master meter should be installed after treatment plant to ensure all the water drawn is charged. • Water company should be involved in water catchment conservation by planting trees particularly bamboo which helps to clean water naturally.
7th April 2017	Deputy county commissioner Murang'a south.	• The company should expand water intake to ensure constant water supply to residents • Consult residents properly before project works commencement to avoid resistance at a later stage of implementation. • Contractor should offer employment to local people.
5th April 2017	District Social Development Officer Murang'a south Sub county.	• The company should offer employment to locals since it creates a sense of ownership even after project completion. • Local residents should be encouraged to form committees to monitor and report any bursts, leakages and illegal connections. • Offer sufficient civic education to local residents on the advantages of having piped water.
6th April 2017	Chairman WRUA upper Maragwa.	• The company should ensure that kinyona area are given sufficient water supply to avoid conflicts like the one witnessed in ichichi • The government together with Kenya forest service should stop deforestation at Katare forest immediately.

MINUTES

PUBLIC CONSULTATIVE MEETING HELD AT KAMAHUHA SHOPPING CENTRE FOR SABASABA URBAN WATER SUPPLY PROJECT ESIA.

Meeting Session	Dates of Meeting	Participants	Number of Participants
Consultative meeting with resident s of Kinyona.	6th April 2017	Chief Kamahuha location, Assistant chief kamahuha sub location, MUWASCO public relations officer, Kamahuha water scheme liaison person and EIA expert.	>87 persons

SUMMARY OF ISSUES DISCUSSED

No	Issues	Response and Discussions
1	Residents wanted a clarification on why customers in urban centers like sabasaba and kenol were being charged using a lower tariff.	The public relations officer informed residents that those allegations are baseless and false since all customers are charged using the same tariff despite their location. He also informed them that WASREB is the body mandated to set tariffs and it gives a uniform rate for equality purposes.
2	Residents suggested that since they have sufficient domestic water supply, the company the company should now provide them with irrigation water.	The EIA team informed residents that water companies only deal with domestic water supply. The water they supply is treated hence it will be expensive and uneconomical to use it for irrigation. They were further informed that National irrigations board was the body responsible for irrigation water supply.
3	Residents wanted to know if they will get any employment opportunities during project implementation	EIA team informed residents that during construction phase, the contactor will source some skilled and semi skilled labour from the community to supplement his staff when such opportunities are available. Residents were further advised to be responsible when working on the project to avoid termination of their jobs pre maturely.
4	Resident wanted to know the expected commencement date of the project.	Resident residents were informed that the project will commence immediately after all the necessary designs have been done and required licenses issued including the NEMA license. They were further informed that the project was urgent and should start by mid this year (2017)
5	Compensation for affected assets like crops and tress	The EIA team informed those in attendance that the project is low risk since it only involves de silting of the existing water intake which is in the

		forest area so now private land and trees will be affected. Incase tress are cut down it will be upon MUSWASCO community social responsibility to replant. A pipeline will be laid parallel to the existing pipeline way leave hence no private land will be acquired. However, if any crop is affected during the construction the farmer will given a just compensation.
6	Residents wanted to know if MUSWASSCO is planning to supply water out of Muranga County	Residents were informed that MUSWASCO only supplies residents within Murang'a south. No water will be supplied outside its area of jurisdiction. They were urged not to Punic thinking that water from their area is being taken away from them.

PUBLIC CONSULTATIVE MEETING FOR ESIA WITH RESIDENTS OF KINYONA HELD AT KAMAHUHA SHOPPING CENTER

AGENDA OF THE MEETING

- Share Project information with residents.
- Current water infrastructure situation in kamahuha and other parts of Murang'a.
- Public/stakeholders concern.
- A.o.b /Adjournment.

PROCEEDINGS OF MEETINGS

The meeting started at 1430hours with introductions of the party's present and opening remark from the area chief. An opening prayer was said by Mrs. Muthoni a resident of Kamahuha.

Residents had goodwill for the water improvement project, they were happy to be consulted before commencement of the actual construction and promised to corporate throughout project implementation till completion.

Public relations officer from MUSWASCO informed residents that that the proposed project is to de silt the current water intake which will lead to a larger holding capacity of the intake. This is aimed at improving water quantity so that residents of Sabasaba, Iganjo, Kamahuha and kaharati which currently face water shortages can be supplied sufficiently. The pipeline will be laid parallel to the existing line to avoid interference with private property.

Water scheme liaison officer for Kamahua urged residents to support the project since MUWASCO is committed to providing clean reliable drinking water to all the residents within Murang'a south.

MINUTES

Minute 1 /04/2017 Water tariff

Residents wanted a clarification on why customers in urban centers like sabasaba and kenol were being charged using a lower tariff.

Response

The public relations officer informed residents that those allegations are baseless and false since all customers are charged using the same tariff despite their location. He also informed them that WASREB is the body mandated to set tariffs and it gives a uniform rate for equality purposes.

Minute 2/04/2017 Water for irrigation

Residents suggested that since they have sufficient domestic water supply, the company the company should now provide them with irrigation water.

Discussion and Response

The EIA team informed residents that water companies only deal with domestic water supply. The water they supply is treated hence it will be expensive and uneconomical to use it for irrigation. They were further informed that National irrigations board was the body responsible for irrigation water supply

Minute 3/04/2017 Employment opportunity

Residents wanted to know if they will get any employment opportunities during project implementation

Discussion and Response

EIA team informed residents that during construction phase, the contactor will source some skilled and semi skilled labour from the community to supplement his staff when such opportunities are available. Residents were further advised to be responsible when working on the project to avoid termination of their jobs pre maturely.

Minute 4/04/2017 commencement date

Resident wanted to know the expected commencement date of the project

Discussion and Response

Resident residents were informed that the project will commence immediately after all the necessary designs have been done and required licenses issued including the NEMA license. They were further informed that the project was urgent and should start by mid this year (2017).

Minute 5/04/2017 Compensation.

Compensation for affected assets like crops and tress

Discussion and Response

The EIA team informed those in attendance that the project is low risk since it only involves de silting of the existing water intake which is in the forest area so now private land and trees will be affected. Incase tress are cut down it will be upon MUSWASCO community social responsibility to replant. A pipeline will be laid parallel to the existing pipeline way leave hence no private land will be acquired. However, if any crop is affected during the construction the farmer will be given a just compensation.

MINUTES

Minute 6/04/2017 Fire hydrant.
Residents wanted to know if MUSWASSCO is planning to supply water out of Muranga County

Discussion and Response
Residents were informed that MUSWASCO only supplies residents within Murang'a south. No water will be supplied outside its area of jurisdiction. They were urged not to Punic thinking that water from their area is being taken away from them.

Minute 7/04/2017 A.O.B

The area chief thanked residents for attending the meeting though on a short notice. He urged residents especially men to avoid indulging to much in alcohol consumption and instead engage in various income generating activities. All residents were urged to maintain cohesion throughout this election period and note to be divided by politicians.

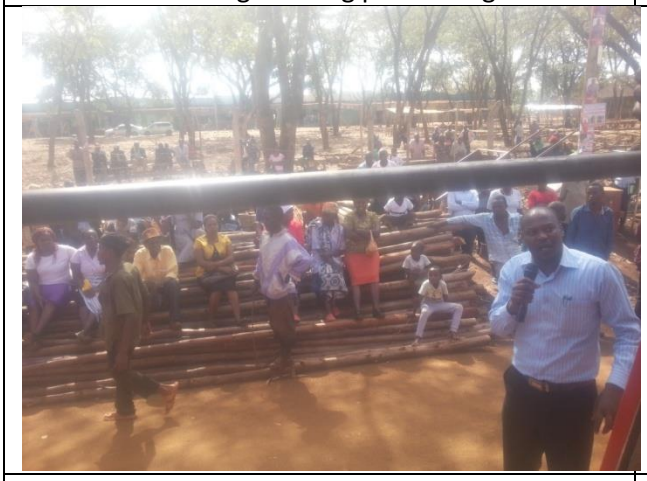
There being no other issue the meeting adjourned at 1630hrs with a word of prayer.

Minutes Signed

SECRETARY

MINUTES

PHOTO PLATE

	
Area chief addressing residents of Kamahuha	Residents of Kamahuha following proceedings.
	
Residents following meeting proceedings	MUSWASCO officer addressing residents
	
A resident raising his concern.	A resident raising his concern.

MINUTES

PUBLIC CONSULTATIVE MEETING HELD AT KINYONA SHOPPING CENTRE FOR SABASABA URBAN WATER SUPPLY PROJECT ESIA.

Meeting Session	Dates of Meeting	Participants	Number of Participants
Consultative meeting with resident s of Kinyona.	7th April 2017	Chief Kinyona location, Assistant chief kinyona sub location, MUWASCO public relations officer, Kinyona water scheme liaison person and EIA expert.	>84 persons

SUMMARY OF ISSUES DISCUSSED

No	Issues	Response and Discussions
1	The community suggested that since water intake is in their area they should be given water free or at a cheaper tariff.	The public relations officer informed residents that it was not economically viable for the company to supply water free to the area since they incur a huge treatment costs. He also informed them that WASREB is the body mandated to set tariffs and it gives a uniform rate for equality purposes.
2	Residents suggested that since they have sufficient domestic water supply, the company the company should now provide them with irrigation water.	The EIA team informed residents that water companies only deal with domestic water supply. The water they supply is treated hence it will be expensive and uneconomical to use it for irrigation. They were further informed that National irrigations board was the body responsible for irrigation water supply.
3	Residents wanted to know if they will get any employment opportunities during project implementation	EIA team informed residents that during construction phase, the contactor will source some skilled and semi skilled labour from the community to supplement his staff when such opportunities are available. Residents were further advised to be responsible when working on the project to avoid termination of their jobs pre maturely.
4	Resident wanted to know the expected commencement date of the project.	Resident residents were informed that the project will commence immediately after all the necessary designs have been done and required licenses issued including the NEMA license. They were further informed that the project was urgent and should start by mid this year (2017)
5	Compensation for affected assets like crops	The EIA team informed those in attendance that the project is low risk since it only involves de

	and tress	silting of the existing water intake which is in the forest area so now private land and trees will be affected. Incase tress are cut down it will be upon MUSWASCO community social responsibility to replant. A pipeline will be laid parallel to the existing pipeline way leave hence no private land will be acquired. However, if any crop is affected during the construction the farmer will given a just compensation.
6	Residents requested for a fire hydrant to be provided within Kinyona.	EIA team informed residents that they will notify the design engineers about the issue to be included in the final design if possible.

PUBLIC CONSULTATIVE MEETING FOR ESIA WITH RESIDENTS OF KINYONA HELD AT KINYONA SHOPPING CENTER

AGENDA OF THE MEETING

- Share Project information with residents.
- Current water infrastructure situation in kinyona and other parts of Murang'a.
- Public/stakeholders concern.
- A.o.b /Adjournment.

PROCEEDINGS OF MEETINGS

The meeting started at 1430hours with introductions of the party's present and opening remark from the area chief. An opening prayer was said by Mr. Kamau a resident of Kinyona .

Residents had goodwill for the water improvement project, they were happy to be consulted before commencement of the actual construction and promised to corporate throughout project implementation till completion.

Public relations officer from MUSWASCO informed residents that that the proposed project is to de silt the current water intake which will lead to a large r holding capacity of the intake. This is aimed at improving water quantity so that residents of Sabasaba, Iganjo, Kamahuha and kaharati which currently face water shortages can be supplied sufficiently. The pipeline will be laid parallel to the existing line to avoid interference with private property.

Water scheme liaison officer for Kinyona urged residents to support the project since MUWASCO has supplied their location adequately. He informed residents that the water is aimed at improving supply within Murang'a so there is no need for alarm.

MINUTES

Minute 1 /04/2017 Water tariff

The community suggested that since water intake is in their area they should be given water free or at a cheaper tariff.

Response

The public relations officer informed residents that it was not economically viable for the company to supply water free to the area since they incur a huge treatment costs. He also informed them that WASREB is the body mandated to set tariffs and it gives a uniform rate for equality purposes.

Minute 2/04/2017 Water for irrigation

Residents suggested that since they have sufficient domestic water supply, the company the company should now provide them with irrigation water.

Discussion and Response

The EIA team informed residents that water companies only deal with domestic water supply. The water they supply is treated hence it will be expensive and uneconomical to use it for irrigation. They were further informed that National irrigations board was the body responsible for irrigation water supply

Minute 3/04/2017 Employment opportunity

Residents wanted to know if they will get any employment opportunities during project implementation

Discussion and Response

EIA team informed residents that during construction phase, the contactor will source some skilled and semi skilled labour from the community to supplement his staff when such opportunities are available. Residents were further advised to be responsible when working on the project to avoid termination of their jobs pre maturely.

Minute 4/04/2017 commencement date

Resident wanted to know the expected commencement date of the project

Discussion and Response

Resident residents were informed that the project will commence immediately after all the necessary designs have been done and required licenses issued including the NEMA license. They were further informed that the project was urgent and should start by mid this year (2017).

Minute 5/04/2017 Compensation.

Compensation for affected assets like crops and tress

Discussion and Response

The EIA team informed those in attendance that the project is low risk since it only involves de silting of the existing water intake which is in the forest area so now private land and trees will be affected. Incase tress are cut down it will be upon MUSWASCO community social responsibility to replant. A pipeline will be laid parallel to the existing pipeline way leave hence no private land will be acquired. However, if any crop is affected during the construction the farmer will be given a just compensation.

MINUTES

Minute 6/04/2017 Fire hydrant.
Residents requested for a fire hydrant to be provided within Kinyona

Discussion and Response
EIA team informed residents that they will notify the design engineers about the issue to be included in the final design if possible

Minute 6/04/2017 A.O.B

The area chief thanked residents for attending the meeting though on a short notice. He also commended them for maintaining peace and order in the entire village. Residents were urged to maintain cohesion throughout this election period and note to be divided by politicians.

There being no other issue the meeting adjourned at 1600hrs with a word of prayer.

Minutes Signed

SECRETARY

MINUTES

PHOTO PLATE

	
Area chief addressing residents of Kinyona	Area assistant chief addressing Residents
	
Scheme liaison officer addressing residents	MUSWASCO officer addressing residents
	
A resident raising his concern.	Area chief giving his closing remarks

MURANG'A SOUTH
WATER & SANITATION COMPANY LIMITED

MUSWASCO

KANDARA HEAD OFFICE
P.O. Box 87- 01034 KANDARA
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Email: **murangasouthwater@yahoo.com** OR
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KAMAHUHA SHOPPING CENTRE 6/04/2017.

SABASABA URBAN WATER SUPPLY PROJECT
ATTENDANCE LIST

VILLAGE: Kamahuha

S/N	NAME	PHONE	SIGN
1	Poly F. Kamau	0719 400 969	[signature]
2	Samson N. Machana	0725656510	[signature]
3	ALEX GICHUHI MWANGI	0729542752	[signature]
4	SAMSON MWEHOKI	0725 761 609	[signature]
5	JOHN MWAURA	0719 200 256	[signature]
6	OWEN MBURU MWANGI	0716 212 101	[signature]
7	ALEX MWANGI	0721 549 675	[signature]
8	JOSEPH KAMANJU K.	0722 479 296	[signature]
9	JOSEPH MWANGI	0799 307 037	[signature]
10	MANLEY WANJIKU	—	[signature]
11	HARRY KIRUKI	0707 202 744	[signature]
12	DAVID KAMANDE	—	[signature]
13	EVANS MBURU	—	[signature]
14	Mukia Ndolu	0728747431	[signature]
15	Samuel Maruhu M.	072378547	[signature]
16	KARUKI KAMAU	0711328938	[signature]
17	JOHANNA NGONGO	—	[signature]
18	JOSEPH RANGETHE	0722 242 960	[signature]
19	JORAM NDUNGU	—	NDUNGU
20	EZEKIEL MWAURA	—	[signature]
21	JAMES MUIRURI	—	[signature]
22	MWANGI KAMAU	—	[signature]
23	MUREI	—	[signature]
24	KIMANI WANDER.	—	[signature]
25	KAMAU WAWERU	—	[signature]
26	Samuel mungai	0725758764	SM
27	DANIEL MURIGI	0710 181 206	[signature]
28	PATRICK MUGUMWA	0726 130 962	[signature]
29	MAINA MURANGA	0721 256 547	[signature]
30	JOSEPH IRUNGU	0721 763 476	[signature]
31	JANE WANJIRA	0702 635 705	[signature]
32	ALICE WAIRIMU	0717 684 727	[signature]

33	MARIA NJOROGE	0721 577 215	M.N
34	[illegible]	0725781693	
35	[illegible]	07 —	
36	RUTH KIAIRIMU	0710886868	R.W
37	MARY NJOKI MUIRURI	0715766426	M.N
38	Michael Mwangi	0721275320	
39	PETER MWANDERI	0713 861 623	
40	Lucy [illegible]	0724 895 060	
41	[illegible]	0724 536801	
42	[illegible]	0713 702410	
43	HENRY [illegible]	0713 544370	
44	MARY [illegible]	0728 489330	
45	Susan Wanjiru	0729242727	Susan
46	John Muraga Njoroge	0722494745	
47	Stanley Mwangi	0704614175	
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KAMAHUHA STAPPING CENTRE 6/04/2014.

SABASABA URBAN WATER SUPPLY PROJECT
ATTENDANCE LIST

VILLAGE: Kamahuha

S/N	NAME	PHONE	SIGN
1	BEATRICE KIBE	0728933118	
2	BEATRICE WANGECHI	0728280840	
3	PETER KANYI	0724574752	
4	WILSON MWANGI	0722926453	
5	PRISCAH WAIRIMU	0727231693	
6	JOHN KAMANDE	0721314482	
7	EPHANTUS MWANGI	07	
8	HELEN V WAMAITHA	0724904646	
9	KARUKI S. MUIRURI	0727749601	
10	ROBINSON MBURU	0729542735	
11	NAHASON GACHORU	0723791856	
12	JANE MUTHONI	07 N/A	
13	[illegible] KANYIKU	0718833755	
14	NANCY NGONYO	0708343308	
15	SIMON MWANGI	0721964295	
16	JERUSHA WAIRIMU	0714789521	
17	Susan Njeri	0727097599	
18	John Ndumo	0729560010	
19	JAMES KIMANI	0722881015	
20	PETER GITAU	0722905625	
21	MARY NJERI	0716600278	
22	[illegible] KINUTHIA	0720172979	
23	SAMUEL MAINA	0718032805	
24	NGIGI MBURU	0726859839	
25	MOSES W. NJOROGE	0729777235	
26	JOHN MWANGI	0724569513	
27	DUNCAN KIMANI	0724974116	
28	DUNCAN KIMANI	0790762250	
29	SAMUEL MARUBU	0710998349	
30	JOHN KAMANDE	0705179986	
31	PAUL KARUKI	0726351093	
32	JOHNSON BABA M	0710703849	

33	JOHN NJOGU N	0792966 583	[signature]
34	SARA		
35	CAROL NJERI	0702372427	[signature]
36	KIVAN Mbaru Ndungu		GM
37	Francis Mwangi Kinyanjui		
38	FRANCIS MWANGI	0798715544	FM
39	DUNCAN NJOROGE	0724831406	D.N
40	ROBERT GITAU	0724249677	[signature]
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KINYONA SHOPPING CENTRE

7/04/2017.

SABASABA URBAN WATER SUPPLY PROJECT
ATTENDANCE LIST

VILLAGE: KINYONA

S/N	NAME	PHONE	SIGN
1	JOHN H. NJUGUNA	0722809542	[signature]
2	CYRUS K. IREGI	0723 786263	[signature]
3	JOSEPH CHEGE .T.	0718 167269	[signature]
4	PETER KIGEU AIDAH	0713767973	[signature]
5	DANIEL MWANGI MUGWE	0708 415528	[signature]
6	JAMES NJOROGE GITAU	0725 384896	[signature]
7	Luke Nderu	0728592208	[signature]
8	JAMES KIRUMBA	0729080839	[signature]
9	PETER KAMAU	0710184816	[signature]
10	SIMON MAINA NDIRANGU	0713 841271	[signature]
11	Ndirangu Njeria Kamau	0734461035	[signature]
12	PAUL Kigo Njiiri	0724904662	[signature]
13	Stephen Muthua	0723622453	[signature]
14	JULIUS MWANGI	0725 011 185	[signature]
15	Cyrus Macharia	0718842395	[signature]
16	Julius W. KURIA	0701886920	[signature]
17	PHILLIP CHEGE	0706 281833	[signature]
18	JOSEPH CHEGE	0722 634469	[signature]
19	DANIEL NJOROGE	0722766914	[signature]
20	STEPHEN M. CHEGE	0713974052	[signature]
21	IRENE KAMANDIRANGU	0716046116	[signature]
22	M. NGUNJIRI KAMAU	0724955585	[signature]
23	JOSEPH MBUGUA	0738167179	[signature]
24	JAMES KARANJA	0713502959	[signature]
25	Julius Mwangi	0721905411	[signature]
26	Jason Kibunel	0712869680	
27	JOSEPH KARIUKI M	0711773005	[signature]
28	Julius Muchai	0714908873	[signature]
29	John NJUGUNA	0725375179	[signature]
30	Samuel NJihia	0763117317	[signature]
31	MARGARET WANJIRU	0728374278	[signature]
32	Esther Wanjiku	0702655518	[signature]

LINTONA SHOPPING CENTRE

33	ESTHER W. CHEGE	0720 643221	
34	LUCY K. NJUIRU	0736 93 8413	Lucy
35	EDWARD M. WAIGATI	0724 406592	
36	JOSEPH NJUCHAN	0723 332 821	
37	J.R. KURIA	0715 727166	
38	DAVESMAS CHEGE	0728 336920	
39	STANLEY K. MWANGI	0720 706856	
40	ELIUD KURIA	0729 32 88 73	
41	CYRUS K. MUGANG	0726 22 1449	
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KINYONA SHOPPING CENTRE 7/04/2017

SABASABA URBAN WATER SUPPLY PROJECT
ATTENDANCE LIST

VILLAGE: KINYONA

S/N	NAME	PHONE	SIGN
1	PETER NJAREA KIRATHI	0726086805	
2	FRANCIS MWANGI NJUHIA		Francis
3	CHEGE KIGO	0702248165	
4	KAMAU KAHORO	0716234423	
5	Grace Karanja	0712244003	
6	Dorcas Nyambura		D N
7	ULICE WAKUBU	0727320137	
8	BETH WAIRIMU NGARE	0712940570	Beth
9	LEYDIAH WARIMU	0729302307	
10	BETH KURIA	0713378045	
11	PAUL KAMAU	0713767828	P.K.W
12	CHARES KARANJA	0706673001	
13	Julius Kiranga	0716188799	
14	JASAN KUNJA	0714334085	
15	Fred Mwangi	0716591326	
16	Amos chege	0717731589	
17	Grace Maina	0700156626	
18	W. Mwangi Wachira	0706984830	
19	ONESMAS KAMORE	0719895574	
20	JAMES KARIOKI	0701839354	
21	GODFLY MAINA	0711625759	
22	BENSON MACHARIA	0714193267	
23	Julius Mwangi	0718215002	
24	Paul Githinga	0797420014	
25	Joseph Ruchiu	0705589480	JMR
26	JOSEPH MAINA	0728259568	
27	ABEL GICHUA R.	0723694128	
28	Raymond WANJAU	0723118119	
29	PETER MUIRI	0710 799545	PETER
30	Bonface Ndegwa	0720170565	
31	PELER MAINA	0728285123	
32	Simon Kimani	0711811641	

KINYONA SHOPPING CENTRE.

33	Richard Karanja	0723315991	
34	Stephen Kang'ethe	0711772920	
35	NORMAN G. KINUTHIA	0707165614	
36	JOHN K. KARIUKI	0725699535	
37	Elijah Muiru Kamau	0727557219	
38	KARUIRU NGARAMGIRA	—	
39	SAMUEL MWANGI	0712-416940	
40	Lucas Gachioka	0723 200 386	
41	DANIEL GITONGA	0726007393	
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DATE: 4 APRIL 2017

S/NO	NAME	COMPANY	DESIGNATION	EMAIL ADDRESS	PHONE NO	SIGN	DATE
1	RUTH GICHUKI	SOCIAL	SCSDO	wanguiruth82@yahoo.com	0727026990	[signature]	5th. APRIL-17
2	B. U. NJIHIA	M. G. Govt	SCA	njihiabe.@yahoo.com	0711174291	[signature]	5/4/1[illegible]
3	KIRIKA D. CHEGE	[struck out]	CEO	[struck out] NSG KENOL	0727996750	[signature]	6/4/[illegible]
4	TITUS MACHARIA	GK	ACC	dcmrgsouth@yahoo.com	0722360254	[signature]	6/04/[illegible]
5	BENSON KIMOTHO	WATER	SLT	nduatikn@gmail.com	0722922289	[signature]	6/4/2017
6	DAVID GICHONI	WATER	SSWS	dgichoni@yahoo.com	0720943140	[signature]	7/4/2017
7	DICKSON MBATIA M.	W.R.U.A	CHAIRMAN		0716080101	[signature]	7/4/2017.
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EMAIL: murangasouthwater@yahoo.com OR murangasouth@gmail.com

DATE: 4 APRIL 2017

S/NO	NAME	COMPANY	DESIGNATION	EMAIL ADDRESS	PHONE NO	SIGN	DATE
1	ELIAS K- GACHAU	M.O.H	S.P.H.O	eliasgachau@gmail.com	0720309966	[signature]	4/4/017
2	MUSANIKI S.	G.O.K	DSDO	smusanki71@yahoo.co	0726691369	[signature]	4/4/017
3	MOSES N. MBARUKU	GOK	DCCC	marjemba@yahoo.com	0722-783392	[signature]	4/4/2017
4	MATHEWS WAWERU N	MOH	S.P.H.O	Mwndambiri17@gmail.com	0733589449	[signature]	4/4/2017
5	JOSEPH KARURI	SUB COUNTY W/OFFICER	W/OFFICER	Joseka@gmail	0724586701	[signature]	5/4/2017
6	Wanjumbe W.K. Thuku	WRMA	WRESO	thukukingagmail.com	0723311394	[signature]	5/4/2017
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