Ministry of Water, Sanitation and Irrigation

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT REPORT FOR THE PROPOSED DRILLING AND EQUIPPING OF 2NR BOREHOLES, 3NO. STORAGE TANKS AND LAYING OF RAISING MAIN PIPELINE IN NGATA, NAKURU COUNTY

Proponent: NARUWASCO
12 December 2024

FINAL ESIA REPORT

Prepared by:

Prepared by:
David Moindi
Environmental Safeguards Specialist
P.O Box 746 – 00204, Athi River, Kenya
Tel: +254 720936524

DECLARATION

This EIA report was done in accordance with the requirements of the Environmental (Impact Assessment and Audit) Regulations, 2003, pursuant to the Environmental Management and Coordination Act (EMCA) 1999 and acceptable international standards.

LEAD EXPERTS:

Name: Vitalis Kibiwott Too **NEMA Registration No.** 1871

Signature: ..... **Date:** 18 December 2024

Name: David Matara Moindi **NEMA Registration No.** 1501

Signature: ..... **Date:** 18 December 2024

PROPONENT:
Nakuru Rural Water and Sanitation Company (NARUWASCO)
P.O Box, 386-20100
Nakuru
Tel: +254512213214

For and on behalf of proponent: -

Name: .....

Designation: .....

Signature: .....

Date: .....

(Official stamp)

ESIA STUDY TEAM

Name	Position
David Moindi	Team leader
Dr. Vitalis Too	Environmentalist
Susan Atieno Okisa	Assistant Environmentalist
Teresiah Awuor Ochieng	Sociologist
Walter Kipngetich Rotich	Intern

List of Abbreviations

EIA	Environmental Impact Assessment
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
MoWSI	Ministry of Water Sanitation and Irrigation
NARUWASCO	Nakuru Rural Water and Sanitation Company
OP	Operational Policy
SDG	Sustainable Development Goals
WASREB	Water Service Regulatory Board
WB	World Bank
WHO	World Health Organization
WRA	Water Resources Authority
WRUA	Water Resources User Association
WSP	Water Service Provider
WSTF	Water Sector Trust Fund

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Executive summary

E1: Project background

The Ministry of Water, Sanitation and Irrigation (MoWS&I) is implementing Water and Sanitation Development Project (WSDP) with a credit from the International Development Association (IDA) that aims at improving water supply and sanitation services in selected regions in Kenya through the Water Service Providers (WSPs). The Project Development Objective (PDO) is to improve water supply and sanitation services in select Coastal and North Eastern regions in Kenya and improve the financial performance of Water Service Providers (WSPs) affected by the COVID-19 pandemic.

Following conclusion on allocation of grants to WSPs under the CLSG-1 program, The Water Sector Trust Fund (WSTF) through the MoWSI prepared documentation for the second phase of the CLSG program now referred to as CLSG-II program. The focus of CLSG-II is to support financial recovery of WSPs to pre-COVID levels or better. During this phase, only WSPs with potential to achieve financial recovery within a period of less than 12 months are eligible to receive the support.

A total of 31 WSPs with 77 interventions costing KES 2.198 billion have been pre-qualified to implement the CLSG II programme which is expected to start in February, 2024 for implementation period of 12 months. 18 WSPs will have significant interventions and are clustered into four groups based on their location within the county.

E2: Project Description

The water project comprises of two (2No.) boreholes, DN110mm rising main and 3no. storage tanks each associated with specific environmental and social aspects, as well as its specific potential impacts. The following components will form part of the project installations.

i. Drill and equip 2nr boreholes (Boreholes at Kerma and Roret)
ii. Laying of DN110 HDPE Pipeline rising main (2.6km) from the boreholes to storage tanks
iii. Construction of steel water tanks (3no. of 100m^3 and 300m^3).

E3: Project location

The boreholes are located in Kerma, Lord Egerton and Roret in Ngata location within Rongai Sub county, Nakuru county. The pipeline will utilize the road reserve. 3no. tanks will be located in Rumwe area, Lord Egerton area and Roret area.

No	Project	Site	Description	GPS coordinates
1	Boreholes	Kerma	The land belongs to NARUWASCO	-0.3171830^0, 35.9626075^0
		Roret	The site has an existing community project within the Roret area	-0.304098^0, 35.987541^0
2	Tanks	Tulwet	Elevated 100^3	-0.2871343^0, 35.9865529^0
		Rumwe	300m^3 tank to receive water from the Boreholes	-0.330840° 35.970349°

		Lord Egerton	Elevated 100^3 tank to receive water from Tulwet tank	-0.275274°; 35.973129°
3	Rising main	From Boreholes to storage tanks	110mm diameter HDPE	

E4: ESIA Justification

Projects listed under the Amended Second Schedule of EMCA, Legal Notice No. 31 of 2019 must be subjected to Environmental Impact Assessment (EIA). The project is listed under *Low Risk Category*. The aim of the ESIA is to reduce negative environmental outcomes of the listed projects by identifying and implementing appropriate mitigation measures. This Environmental and Social Impact Assessment study was commissioned to ensure that significant impacts on the environment are taken into consideration at the construction and operation stages.

This ESIA report has identified both positive and negative impacts of the proposed project to the environment and community, and mitigation measures are elaborated in the chapter 7 of this report to address the potential negative impacts, during the construction, operation and decommissioning phases of the project, for overall environmental and social sustainability.

E5: Legislative, Policy and Institutional Framework

The ESIA has been conducted in accordance with Section 58 of Environmental Legislation, Environment Management and Coordination Act (EMCA) 1999 and its subsidiary legislation, including the Environmental Impact Assessment and Auditing Regulations (EIA/EA) of 2003 and Environmental (Impact Assessment and Audit) (Amendment) Regulations, 2019. The ESIA has also been done following the WB OP and World Bank Group Environmental Health and Safety Standards. Pertinent regulations, standards and regulatory bodies governing environmental quality, health and safety, protection of fauna and flora species, environment, economic activities, siting and land use control as relevant to the site and its immediate environs was evaluated and reported. A legal register listing all legislation, legal instruments relevant to the site has been prepared, indicating applicability to the site. In addition, permits and licenses that are required to be obtained during construction and operation has been provided. The ESIA was undertaken within the reference framework of the following standards and regulations: applicable National Environmental Management, Occupational Health and Safety, Public Health and Labour laws and regulations.

E6: Stakeholder Engagement

Stakeholder consultation and disclosures are key elements of engagement and essential for the delivery of successful projects. Stakeholders are persons or groups who are directly or indirectly affected by a project, as well as those who may have interest in a project and/or the ability to influence its outcome, either positively or negatively. Key stakeholders i.e. direct, indirect stakeholders, their representatives, those not impacted but having impact or influence and those involved in execution of the project, were identified. Key stakeholders involve community and

government institutions. The Projects have already undertaken engagement/consultation process with Nakuru county government, WRA, NEMA, KURA, KPLC and other stakeholders comprising of high-level sensitization programme with relevant government authorities, as well as community *baraza* held at Ngata chief's office (See appendix B, C and D for the Questionnaires, minutes and attendance list).

E7: Project Impacts

The table below highlights some of the key anticipated negative impacts.

Table 0-1: Anticipated negative impacts

Impacts	Descriptions of impacts	Mitigation measures
Soil Erosion	The activities involved in the construction phase of the project may have a major negative short-term impact on soil. The sloppy terrains of Tulwet area where the tank site will be constructed compounded with the intensity of rainfall, will result in soil erosion	- Excavation work in the hilly areas should be avoided in rainy days - Soil excavated should be utilized for backfilling and the remaining soil being spread evenly and compacted to the extent possible.
Waste disposal	Liquid and solid waste will be generated in the course of construction. The wastes range from general to hazardous categories. This impact is short term. However, the disposal mechanism of the wastes can have long term consequences.	- Providing waste collection bins at designated points on site for purposes of waste segregation - All solid waste should be collected at a central location at each site and will be stored temporarily until removal to an appropriately permitted disposal site. The approved disposal sites are available in all the counties and the contractor will choose the nearest disposal site. - No dumping within the surrounding area is to be permitted unless at designated disposal sites. Where potentially hazardous substances are being disposed off, a chain of custody document should be kept with the environmental register as proof of final disposal.
Air pollution	Emissions mainly associated with combustion of fuel from the construction vehicles and equipment. These emissions may be in the form of oxides of nitrogen as well as volatile organic carbons. Similar to other combustion processes, emissions from vehicles include CO, NOx, SO_2, and VOCs. This will be potentially high in construction areas especially where there are	- Emissions from the construction vehicles should comply with national or international standards. - Regardless of the size or type of vehicle, operators should implement the manufacturer recommended engine maintenance plans; - Ensure that all vehicles involved in the transport of construction material and staff, and machinery involved in the construction is properly maintained and serviced.

Impacts	Descriptions of impacts	Mitigation measures
	human settlements and institutions like schools, health centres among others.	- Machines must not be left idling for unnecessary periods of time; this will save fuel and reduce emissions.
Particulate Matter	The most common pollutant involved in fugitive emissions is dust or Particulate Matter (PM). This is released during certain operations, such as transport and open storage of solid materials, and from exposed soil surfaces. The sensitive receptors include schools, health centres and human settlements.	- Use of dust control methods, such as covers, water suppression, or increased moisture content for open materials storage piles, or controls;
Noise and vibration	The site preparation and construction phases of the project will result to negative impact to the ambient noise and vibration in the project area. However, this for temporary period restricted to construction phase only, the cumulative impact of the construction activities occurring simultaneously may increase the noise and vibration levels in the area significantly.	- Construction activities should be restricted day time only. - Construction activities should be undertaken through the use of small mechanical devices e.g., tractors and manual labour, as much as practically possible. - Where possible low noise producing (silenced) machinery and instruments should be employed to reduce the impact of noise on the existing residents and workers. - Contractors should ensure that noise level in project area should not exceed the permissible limits
Occupational Health and safety	Use of heavy machinery and various activities for construction work may pose safety hazards to the workers and the community. Vehicular movements can cause accidents especially in settlement areas resulting in injuries and probably death.	- Ensuring that the drivers and machine operators hired to work on the site are qualified. - Workers on site must be provided with appropriate PPE. - There should be safety policy clearly displayed on the site. - Machines should be properly maintained. - A first aid kit should be provided and a trained first aider should always be on site. - Proper scheduling of activities to avoid workers being overworked. - No worker should be allowed on site while under the influence of alcohol or other inebriating substances.
Community health and safety risk	Community health and safety risks refer to the potential hazards that can affect the well-being of local residents and users of community resources. These risks can arise	- Strict Adherence to Safety Protocols: - Implement and enforce safety guidelines for construction activities. Ensure that emergency response plans are in place and regularly updated. - Involve community members early in the planning process to inform them of potential risks and

Impacts	Descriptions of impacts	Mitigation measures
	during various projects (such as drilling boreholes) or due to environmental degradation.	mitigation measures. Establish open channels of communication and feedback.
Sexual exploitation and abuse of community members by project workers	This impact refers to sexual exploitation and abuse committed by Project staff against communities, and represents a risk at all stages of the Project, especially when employees and community members are not clear about prohibitions against SEA in the Project. The project will experience the influx of people who will be seeking employment during construction phase, therefore, SEA will be a critical aspect to be monitored.	- Develop and implement and SEA action plan with an accountability and Response Framework as part of the C-ESMP. The SEA action plan will follow guidance on the World Bank's Good Practice Note for Addressing Gender-based Violence in Investment Project Financing involving Major Civil Works (Sept 2018).
Gender-based violence	GBV constitutes acts of gross misconduct and are therefore grounds for sanctions, penalties and/or termination of employment. This impact refers to gender-based violence at the community level that women and girls may experience as a result of Project implementation.	- Develop and implement provisions that ensure that gender-based violence at the community level is not triggered by the Project, including: ✓ effective and on-going community engagement and consultation, particularly with women and girls; ✓ review of specific project components that are known to heighten GBV risk at the community level, e.g. employment schemes for women; delivery of supplies; etc. ✓ Specific plan for mitigating these known risks, e.g. sensitization around gender-equitable approaches to employment; supply services; etc - Ensure adequate referral mechanisms are in place if a case of GBV at the community level is reported related to project implementation.
Violation of children rights by contractor and child labour on site	Violence against Children (VAW) is defined as physical, sexual, emotional and/or psychological harm, neglect or negligent treatment of minor children (i.e. under the age of 18), including exposure to such harm, that results in actual or potential harm to the child's health, survival, development or dignity in the	- Develop and implement a Children Protection Strategy that will ensures minors are protected against negative impacts associated by the Project. - All staff of the contractor must sign, committing themselves towards protecting children, which clearly defines what is and is not acceptable behavior - Children under the age of 18 years shall not be hired on site as provided by Child Rights Act (Amendment Bill) 2014.

Impacts	Descriptions of impacts	Mitigation measures
	context of a relationship of responsibility, trust or power. This includes using children for profit, labor, sexual gratification, or some other personal or financial advantage.	
Spread of HIV/AIDS, STIs and other communicable diseases	The project will bring together groups of people, such as workers, community members, or visitors, which can lead to increased social interactions and mobility, contributing to the spread of HIV/AIDS and STIs. Economic development may also encourage behaviors associated with higher risk, such as multiple sexual partnerships. Migrant workers could introduce new infections or increase the transmission rates of existing diseases, while women and young girls may be more vulnerable due to gender inequalities and transactional relationships.	- Carry out periodic HIV/AIDS awareness training for workers and the beneficiary community. - Distribution of condoms to workers and beneficiary communities, especially the CIGs. - Carryout voluntary HIV/AIDS testing for workers and community members. - If tested positive, further guidance will be offered and directed to the nearest public hospital to receive free antiretroviral (ARVs) drugs and other services. - The project team should use the services of contracted GBV/SEAH service providers to undertake community outreach activities. - Hire local workers where possible to minimize the extent of any influx. - All workers shall sign CoC/ contract that has provisions on GBV/SEAH.
Workers/ Labour Influx Impacts	The project will attract an influx of workers and laborers to the area, which could lead to increased pressure on local resources such as housing, water, and food supply, potentially resulting in higher costs for community members. This influx may also strain local infrastructure, including transportation and healthcare services, as the population temporarily grows.	- Ensure that locally available labour force is given priority during recruitment. Especially for casual and unskilled positions. - Providing accommodation for workers in camps if the workforce is large

E8: ESMP summary and implementation arrangements

The ESMP provided in chapter 8 provides the mitigations measures of the anticipated environment and social impacts, monitoring indicators, responsible party and the cost of mitigation measures. Key impacts and risks anticipated include: waste generation, clearance of vegetation, loss of biodiversity,

air pollution, occupational health and safety risks, GBV, etc. The cost for the implementation of the ESMP shall be included in the overall design, construction supervision cost of the project. Most of the environmental cost which involves engineering design is embedded in the engineering costs. However, Ksh. 340,000 will be spent in the implementation of the mitigation measures and environmental management administration. These costs shall also cover environmental monitoring.

The ESMP shall be provided along with bidding documents. Compliance with the ESMP shall be clearly provided for in the contract documents. The Contractor shall prepare a C-ESMP to operationalize the ESIA findings and recommendations. Method statements will also be prepared and will be task-specific after undertaking specific risk assessments. In addition, the contractor will have a qualified fulltime EHS person to be based on site who will be responsible for the implementation of the ESMP. The contractor will be required to submit monthly progress reports on ESMP implementation during construction phase. Also, the contractor should submit incident reports, and any other as per the WB standards.

The Nakuru Rural Water and Sewerage Company (NARUWASCO) will be the implementing Agency of the project. The company has the capacity to supervise the implementation of the E&S activities. It has full time social and environmental safeguards staff that will be dedicated to the project. At the national level, WSTF will form a project implementation unit comprising of the E&S experts to oversee the project activities.

E9: Project cost

The total project cost for the installation of the bulk meters and associated accessories is Kenya shillings Forty-Seven Million Three hundred and Sixty Thousand One hundred and nine (Ksh.47,360,109). The EIA processing fee payable to NEMA is 0.1% of the project cost which translates to KSh. 47,360.

E10. Conclusions

The environmental, and social Impact Assessment (ESIA) of the proposed project has been conducted in accordance with national legislative requirement, the World Bank Policies, IFC's Performance Standards and World Bank's Environmental Health and Safety (EHS) Guidelines. The ESIA study has been carried out based on the site visit, baseline environmental and social condition survey including Specialized Ecological Study on biodiversity, stakeholder consultation, analysis of the possible project intervention. The experts identified and evaluated potential environmental impacts associated with all aspects of the proposed project.

The key potential environmental and social impacts due to the project construction as established by the ESIA study are loss of vegetation, air and noise pollution, loss of habitat, solid waste generation and disposal, increase in traffic, influx of workers, GBV/SEAH, spread of HIV/AIDS, occupational health and safety. The economic opportunities in terms of local employment and provision of services during construction and operation phases are assessed as positive impacts. During the

operation of the proposed project, the key issues related to the environment has been identified from the ESIA study are ecological, and occupational health and safety.

1 Introduction

1.1 Background

The Ministry of Water, Sanitation and Irrigation (MoWS&I) is implementing Water and Sanitation Development Project (WSDP) with a credit from the International Development Association (IDA) that aims at improving water supply and sanitation services in selected regions in Kenya through the Water Service Providers (WSPs). The Project Development Objective (PDO) is to improve water supply and sanitation services in select Coastal and North Eastern regions in Kenya and improve the financial performance of Water Service Providers (WSPs) affected by the COVID-19 pandemic.

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A total of 31 WSPs with 77 interventions costing KES 2.198 billion have been pre-qualified to implement the CLSG II programme which is expected to start in February, 2024 for implementation period of 12 months. 18 WSPs will have significant interventions and are clustered into four groups based on their location within the county.

1.2 Project components

The project will consist of two water schemes comprising of the following:

- Drilling and equipping of 2nr boreholes (at Kerma and Roret area)
- Construction of DN110mm HDPE Pipeline (2.6km).
- 1no Steel Ground Tank 300m^3 and 2no. 100m^3 Elevated Steel Tanks

1.3 The Project Area

The proposed project area is in Ngata area in Rongai Sub county, Nakuru county located between Longitudes 35.41 º East or 35 º 24' 36" East and 36.6 ºEast or 36 º36' 0" East and Latitude 0.23 º North or 0 º 13' 48" North and 1.16 º South or 1º 9`36" South. Nakuru County borders seven Counties: Laikipia to the north-east, Kericho to the West, Narok to the south-west, Kajiado to the South, Baringo to the North, Nyandarua to the East and Bomet to the West. Administratively, the county is divided into 11 Sub Counties/constituencies: Njoro, Molo, Kuresoi South, Kuresoi North, Rongai, Nakuru East, Nakuru West, Naivasha, Gilgil, Bahati and Subukia (with a total of 55 wards). See below the map of Nakuru county.

1.4 NARUWASCO Service Area

NARUWASCO's area of jurisdiction is the largest of Nakuru County and as per its Service Provision Agreement (SPA), it is commissioned to serve the vast Nakuru rural which covers the entire County of Nakuru, excluding Naivasha sub-county and Nakuru Municipality and its environs. At the moment NARUWASCO is only able to fulfil part of its mandate NARUWASCO's area of coverage is over 7000km^2 with a population of over 1.1 million. The current population served with water is 350,000. For ease of operations, the utility has divided its service area into 5 areas/regions as shown in *Table 1-1*.

Table 1-1: NARUWASCO Current Areas of Water Supply

No.	Region	Specific Areas
1.	Eastern	Gilgil, Langalanga, Kikopey, karunga
2.	Western	Salgaa, Sachangwan, Rongai, Mangu, Kampi ya Moto
3.	Southern	Elburgon, Molo, Arimi, Kibunja
4.	Central	Njoro, Mbaruk, Kiamunyi, Njuguini
5.	Northern	Bahati, Subukia, Kabatini, Ndungirias

1.5 Justification for the proposed project

NARUWASCO's area of jurisdiction is the largest of Nakuru County and as per its Service Provision Agreement (SPA), it is commissioned to serve the vast Nakuru rural which covers the entire County of Nakuru, excluding Naivasha sub-county and Nakuru Municipality and its environs. At the moment NARUWASCO is only able to fulfil part of its mandate NARUWASCO's area of coverage is over 7000km^2 with a population of over 1.1 million. The current population served with water is 350,000. The population projections for the utility will increase to 3,009,018 by 2026 horizon. It is significant to mention that the uncovered population will remain 45% if no interventions are implemented to increase on the coverage. NARUWASCO serves largely the rural areas where the water demand is for both domestic and livestock.

1.6 Objectives of the Assignment

The specific objective of this assignment was to undertake Environmental and Social Impact Assessment (ESIA) for cluster 2 interventions. The ESIA will identify key environmental and social issues related to the interventions, and design appropriate mitigation measures for the potential risks and impacts identified. ESMP and monitoring plan will be provided in the report. The ESIA provides information to enable approval of the proposed intervention by the National Environment Management Authority (NEMA), and guidance on environmental and social management during project implementation.

1.7 Scope of Work

The Scope of Work for the ESIA comprised of the following tasks and activities

Task 1 Detailed Project Description:

The Consultant provided a detailed information on the following

- Geographic, ecological, general layout including maps at appropriate scale where necessary.
- Land required and its availability
- Intervention design and construction processes
- Natural resources (water and construction materials) required for the construction process
- Labour requirements in all phases of the interventions
- Waste generated
- Applicable permitting process
- Applicable design and operational standards
- Project timeline

Task 2: Description of the Baseline Environment:

The Consultant collected, analysed and presented qualitative and quantitative baseline information on the existing physical and natural environment, social and economic as well as demographic conditions within the project site and its area of influence. This allowed for the positive socio-economic, environmental and health effects of the proposed interventions to be realized to the maximum extent possible, while minimizing the negative impacts related to the project.

The baselines emphasized those aspects of the natural, cultural and socio – economic environment that affected by the interventions, including but not necessarily limited to the following:

- Physical environment
    - Air quality
    - Noise
    - Water Quality and hydrology
    - Soil
    - Geology and hydrogeology
- Bio –Physical Environment
    - Terrestrial Flora
    - Terrestrial Fauna
    - Aquatic flora and fauna where applicable
- Socio- economic and cultural environmental (including gender)- The socio-economic assessments was based on NEMA's and World Bank's OP and guidelines with special attention on demography; land-use; status of existing water resource management programmes (conservation and reuse); community structure; employment; gender; local communities; livelihoods, Sources and distribution of income, goods and services, recreation, cultural properties (e.g., archaeological and historically significant sites), Education, health, waste disposal, community participation, customs/norms, attitudes; traditional knowledge, perception and aspiration and social amenities and infrastructure. In addition, it includes Risks of gender-based discrimination, threats to human security through the escalation of personal, communal or inter-state conflict, crime or violence, discrimination toward individuals or groups, economic displacement (i.e. loss of assets or access to assets that leads to loss of

income sources or means of livelihood). Consider the aspects that depends on environmental changes (public health, vulnerability to disasters, vulnerability to increasing climate variability and the expected effects of climate change, access to natural resources and associated conflicts), those that can produce environmental impacts, and, more broadly, the socio-economic conditions that might be affected by the project. This needs to show how the proposed project may increase or reduce the population's vulnerability to the effects of climate change.

Task 3: Stakeholder Engagement

The consultant reviewed the stakeholders identified both county, and non-county actors (direct and indirect affected persons) and continued with the engagement process in line with national & World Bank's OP requirements. In this regard the consultant carried out the following;

- Conduct stakeholder analysis that outlines the affected and interested parties. This was to enhance identification, analysis and categorization of project stakeholders, possible interests in the project and risks associated with any of these interests.
- Review, update and address issues identified & raised during the preliminary engagement process. This was to ensure project affected persons, relevant authorities and interested parties with concerns pertaining the project received feedback; suggest mitigation measures to such risks establish the level of knowledge and support for the project from the identified key stakeholders.
- Develop a communication strategy to engage with all levels of stakeholders, including planned consultations` activities, information materials and measures for encouraging participation of Vulnerable individuals, women, elderly, youth and PWDs.
- Keep records of all meetings organized to enable stakeholders to present their concerns and opinions regarding the proposed project, and these was signed off by the participants. Records must show the number of public consultations and list of attendees during those consultations.
- Ensure that stakeholder concerns are incorporated into the ESIA report recommendations and propose means for these to be incorporated into the project design/project activities as/where appropriate.

Task 4: Description of the Relevant National and International Legislative and Institutional Regulatory Framework:

The Consultant provided a description of the pertinent policies, regulations, standards and regulatory bodies governing water sector, environmental management, water, biodiversity, climate change, occupational Health and safety, public & community health & safety, labour, waste management, energy, gender and land.

The ESIA was undertaken within the reference framework of the following standards and regulations, the list not limiting:

- Applicable National policies, laws and regulations.

- Applicable county by-laws.
- The triggered World Bank Operational Policies
- World Bank Group/IFC EHS guidelines

Task 5: Analysis and Assessment of Potential impacts and recommendations for mitigation and potential development needs

The consultant carried out the following;

- Identify, assess and determine the significance of potential positive and adverse impacts of the project on the physical & natural environment, social, socio-economic and cultural environment of the project area. Particular attention was paid to the impacts due to pollution (air, noise & water quality), impacts on biodiversity (terrestrial & aquatic) and project affected persons.
- Carry out a climate risk vulnerability assessment to identify, assess and describe potential risks posed, effects on baselines and impacts to the project activities due to climate change (adaptation and resilience).
- Assess the magnitude and significance of the residual environmental and social impacts after the mitigation hierarchy has been applied.
- Make recommendations on the enhancement of positive impacts from the project/project activities.
- Provide analysis of alternatives (in case of adverse effects) and provide for mitigation measures.

Task 6: Cumulative Impact Assessment

The consultant assessed the cumulative impacts of the project on Valued Environmental & Social components (VESCs). The report outline ways in which the cumulative impact assessment and management could subsequently be progressed further over a period of 10-20 years.

Impact assessment addresses cumulative impacts, including but not limited to:

- Impacts created by the activities of other adjacent, upstream and downstream developments, projects and landholders.
- Cumulative Impacts Synergies and conflicts with other projects in the area will be evaluated:
- Competition for water resources.
- Competition for use of existing services and infrastructure.
- Access to natural resources and business opportunities

Task 7: Waste Management (Solid and liquid/ effluents/wastewater)

The consultant was required to.

- Describe all the expected waste streams from the proposed project activities during the construction, operational, rehabilitation and decommissioning phases of the project.
- Describe the estimated quantity, and physical and chemical characteristics of each significant waste, any attributes that may affect its dispersal in the environment, and its associated risk of causing environmental harm.
- Define and describe objectives and practical measures for protecting or enhancing environmental values from impacts from wastes.
- Assess and describe the proposed management measures against the preferred waste management hierarchy, namely: avoid and reduce waste generation; cleaner production; reduce; recycle; reuse; reprocess and reclaim; waste to energy; treatment; disposal. This includes the generation and storage of waste.
- Provide water quality limits that are appropriate to maintain background water quality and protect other water uses.

Task 8: Assessment of alternatives:

The Consultant assessed alternatives to the proposed project, which included the "No Project" alternative, project design, location and layout. The Pros and cons of each alternative was considered in terms of environmental and social impacts.

In case the analysis of alternatives reveals an alternative with less impact, the consultant must either recommend a redesign to the project attribute to favour one with less impact or explain why the proposed attribute was selected instead of one with less impact.

Task 9: Development of Environmental & Social management & monitoring plan:

The Consultant prepared an Environmental, climate and social management plan that recommends a set of mitigation, monitoring and institutional measures to eliminate, minimize or reduce to acceptable levels of adverse environmental and impacts and/or maximize socio-economic benefits. Simple restoration measures/ plan was developed for any change of land use necessitated by the project. The Consultant provided cost outlays for the proposed measures as well as their institutional and financial support.

The monitoring plan is required to give a specific description, and technical details, of monitoring measures, including the parameters to be measured, methods to be used, sampling locations, frequency of measurements, and definition of thresholds that will signal the need for corrective actions as well as deliver monitoring and reporting procedures. The Consultant provided a time frame and implementation mechanism, staffing requirements and cost outlays.

1.8 Methodology

In order to meet the study objectives, the first step was for the consultant to undertake desk study and preliminary site visit. Based on the site visit various considerations relevant to project that could

influence the Environmental and Social Impact Assessment were identified. The stepwise activities as well as methodologies followed for this study is described below:

1.8.1 Desk Study

Various relevant documents were reviewed for a clear understanding of the terms of reference, environmental status of the project area, data on demographic trends, land use practices in the affected areas, development strategies and plans (local and national) as well as the policy, legal and institutional documents.

The team reviewed relevant literature including but not limited to the following reports:

- Design Report; to understand the project background, the preliminary designs and the implementation plan
- Hydrogeological survey report to understand the subsurface conditions and hydrogeology
- Secondary data through literature reviews to collect baseline information in the project area
- Relevant Legal, Policy and Regulatory documents with special emphasis to requirements under the EMCA, 1999, and the Environmental Impact Assessment and Audit Regulations, 2003
- World Bank's Environmental Health and Safety (EHS) Guidelines.

1.8.2 Understanding the project

The first step in environmental assessment of the proposed project was to understand the proposed site based on maps and, also analysing the direct and indirect environmental impacts; which are key in determining the scope and depth of the study.

1.8.3 Site Survey and Baseline Data Collection

Physical project site inspections and observations constituted the main baseline survey activities. The team visited the boreholes site at Kerma and Roret area inspecting the site characteristics to assess the existing baseline condition with respect to physical, biological and socio-economic environment.

1.8.4 Physical environment

The baseline data collection methodology applied for physical environment involved a combination of primary and secondary data collection methods ranging from direct observations & visual analysis to interaction with stakeholders during field survey on various parameters such as land use & topography, natural drainage, flood flows, climate, air, and noise quality etc.

1.8.5 Physical Cultural Resources

Archaeological and Cultural Heritage impact assessment has been undertaken to identify and ensure the protection of archaeological and cultural heritage assets associated with the project sites to ensure that effective management and mitigation controls are in place. The assessment included a desktop review of any available documents and records associated with archaeological and cultural heritage resources within the project sites as well as field survey of project site.

1.8.6 Biodiversity Assessment

Both qualitative (desk-stop literature review) and quantitative (field sampling) methods were employed to assess biodiversity of the study area.

The general biodiversity information gathered includes the following.

- Detailed lists of flora and fauna species (mammals, avifauna, reptiles and amphibians, fish and invertebrates) occurring in the project area.
- Fauna and flora Species of Conservation Concern (SCC) were identified based on the IUCN Red List of species i.e. Critically Endangered, Endangered, Vulnerable or Near Threatened.
- Other biodiversity value characterization criteria such as nationally threatened, nationally protected, restricted-range and endemic species, congregatory, migratory species as well as invasive species were also applied.
- Characterization of vegetation structure and habitat types i.e. modified, natural, critical

1.8.7 Data Evaluation and Analysis

Environmental assessment was carried out to identify potential impacts of the project on the environment, biodiversity and the community. The assessment was carried out in three main steps, as follows:

- Prediction of potential impacts
- Execution of specialized ecological studies on biodiversity and evaluation and assessment of the impacts in terms of their significance
- Identification/ proposing mitigation measures for minimizing the effects of the significant impacts.

After exclusion of the negligible impacts, the remaining aspects were assessed based on the following criteria:

- Magnitude of the impact;
- Duration: period of time that impact lasts;
- Mitigation measures; its availability whether integrated in the project design or implemented as management measures; and
- Residual impacts.

Where negative environmental impacts are expected, majority of them will be experienced during the construction phase. To help manage the potential negative impacts, mitigation measures are suggested and the residual impact evaluated.

1.8.8 Public Consultations.

Public consultations were undertaken during the environment and social impact assessment study to document the social impacts to the project area and general community perceptions on the project. In general, the following steps were followed in carrying out the entire consultation and public participation process:-

- Identification of institutions and individuals and compiling a list of the interested and affected parties
- Administration of questionnaires to different target groups and local community members within the proposed project site.

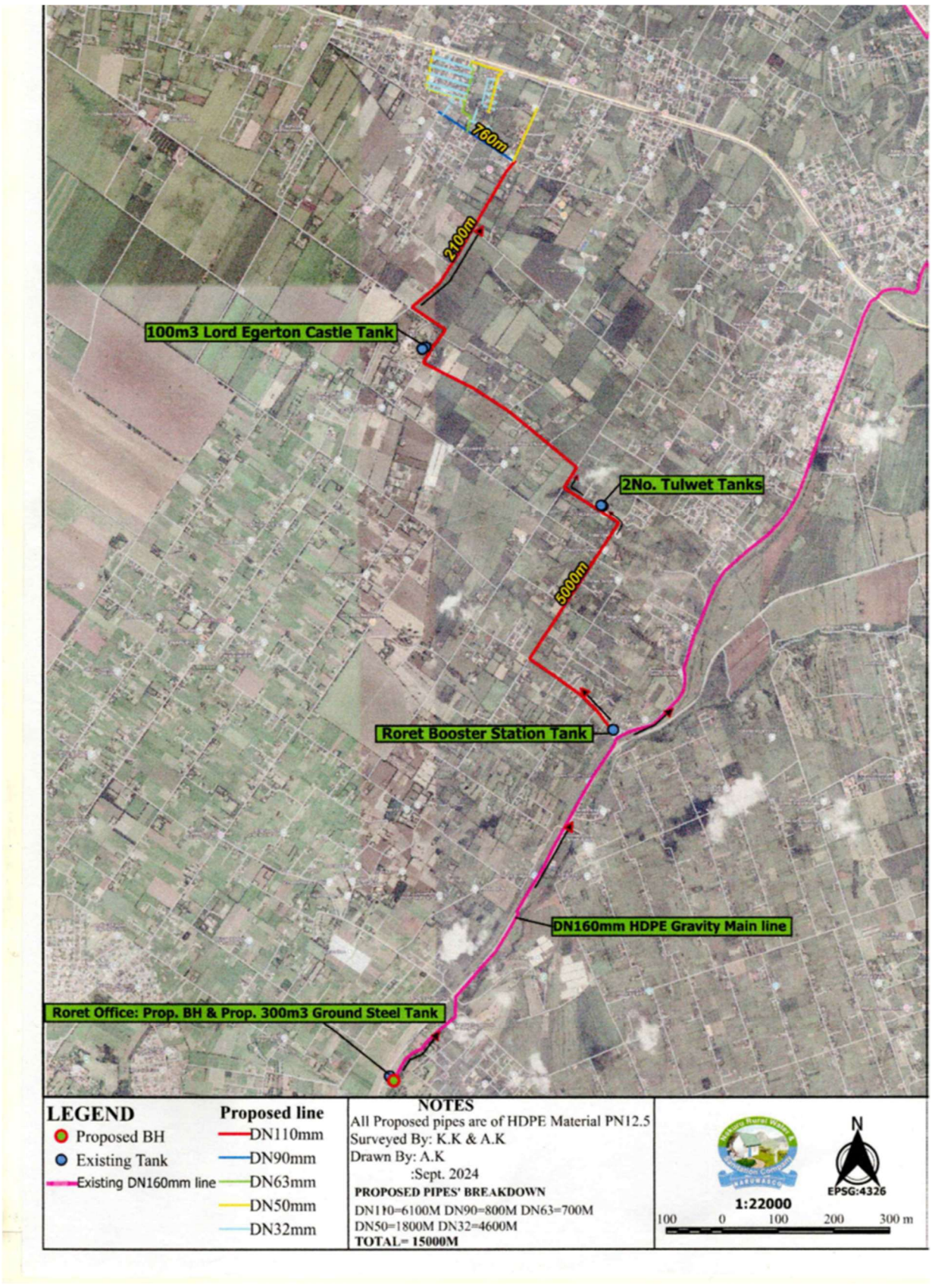
Public *baraza* was done and interviews with government agencies: Nakuru county government, KeRRA, WRA, NEMA Nakuru county and other institutions in the project area were undertaken to assist in analysis of impacts. These interviews were conducted to augment and confirm data and information obtained using the other tools and methodologies (See appendix B, C and D for the questionnaires, Minutes of the meeting and attendance list respectively). .

2 Project Description

2.1 Location of the Boreholes and pipeline route

The boreholes are located in Kerma and Roret in Ngata location within Rongai Sub county, Nakuru county. The pipeline will utilize the road reserve. 3no. tanks will be located in Rumwe area, Lord Egerton area and Roret area.

No	Project component	Site	Description	GPS coordinates
1	Boreholes	Kerma	The land belongs to NARUWASCO	-0.3171830^0, 35.9626075^0
		Roret	The site has an existing water project, land will be sufficient for the new borehole.	-0.304098^0, 35.987541^0
2	Tanks	Roret	Elevated 100m^3 to receive water from the proposed Borehole	-0.2871343^0, 35.9865529^0
		Rumwe	300m^3 tank to receive water from the existing Boreholes	-0.330840° 35.970349°
		Lord Egerton	Elevated 100m^3 tank to receive water from Tulwet tank	-0.275274°; 35.973129°
3	Rising main	From Boreholes to storage tanks	110mm diameter HDPE (2.6km)	


760m
2100m
100m3 Lord Egerton Castle Tank
2No. Tulwet Tanks
5000m
Roret Booster Station Tank
DN160mm HDPE Gravity Main line
Roret Office: Prop. BH & Prop. 300m3 Ground Steel Tank
LEGEND
Proposed BH
Existing Tank
Existing DN160mm line
Proposed line
DN110mm
DN90mm
DN63mm
DN50mm
DN32mm
NOTES
All Proposed pipes are of HDPE Material PN12.5
Surveyed By: K.K & A.K
Drawn By: A.K
:Sept. 2024
PROPOSED PIPES' BREAKDOWN
DN110=6100M DN90=800M DN63=700M
DN50=1800M DN32=4600M
TOTAL= 15000M
1:22000
EPSG:4326
100 0 100 200 300 m

2.2 Project Components

The water project comprises of two distinct water schemes of boreholes (2nr.), rising main and 3nr. storage tanks each associated with specific environmental and social aspects, as well as its specific potential impacts. The following components will form part of the project installations.

- Drilling and equipping 2nr boreholes (Boreholes at Kerma and Roret)
- Laying of DN110 HDPE Pipeline rising main (2.6km) from the boreholes to storage tanks
- Construction of steel water tanks (3nr. of 100m^3 and 300m^3).

2.2.1 Boreholes

2.2.1.1 Roret borehole site

The borehole site is at Roret area. The borehole and the water tank will be situated at the site and integrated with the existing water scheme. New connections will provide continuous water supply to the Ngata area, augmenting the current volume from the existing pumping main. Local agriculture includes crops such as maize and cabbage, and flooding in the area has been noted as a concern.



Existing water tank at Roret borehole site



Consultant, NARUWASCO team and chief at the Ndarugu booster station site

2.2.1.2 *Kerma borehole site*

This borehole will exclusively serve the Ikenye population in Irgei area. The land for the borehole has been set aside for water project. Surrounding vegetation includes eucalyptus trees, and the site will be managed for sustainability.

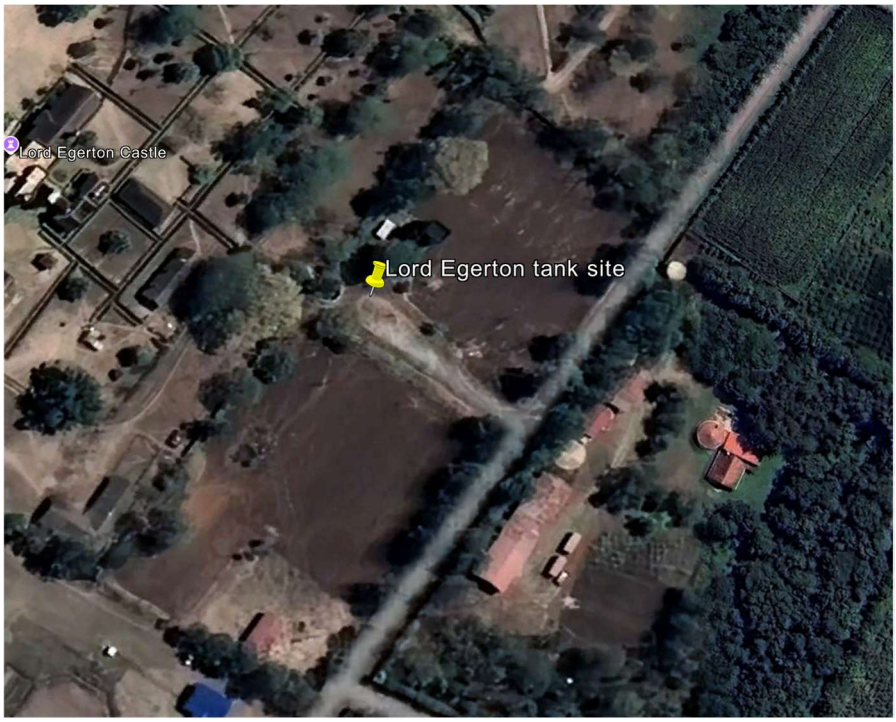


Proposed borehole site

2.2.2 Water storage tanks

2.2.2.1 Lord Egerton tank site

Water from the new borehole will be pumped using solar power to an elevated tank located at lord Egerton castle (community land). An additional elevated steel tank will be erected to replace an aging tank, thus improving the hours of supply. New connections will be added to serve the surrounding population, increasing water availability to residents. The tank site surrounding vegetation includes Grevillea trees, and crops such as sorghum, maize, and cabbage. This vegetation will not be affected since the proposed site is bare land. There is existing drainage infrastructure near Lord Egerton Castle.



Lord Egerton Tank site

2.2.2.2 Kerma Tank

An elevated tank will be constructed at Kerma area, the land earmarked for the storage tank. This site, currently has as an office for NARUWASCO and bare land. The land will be used for the borehole and tank; owned by the proponent. The tank will serve local schools and surrounding communities.

2.2.2.3 Rumwe Tank site

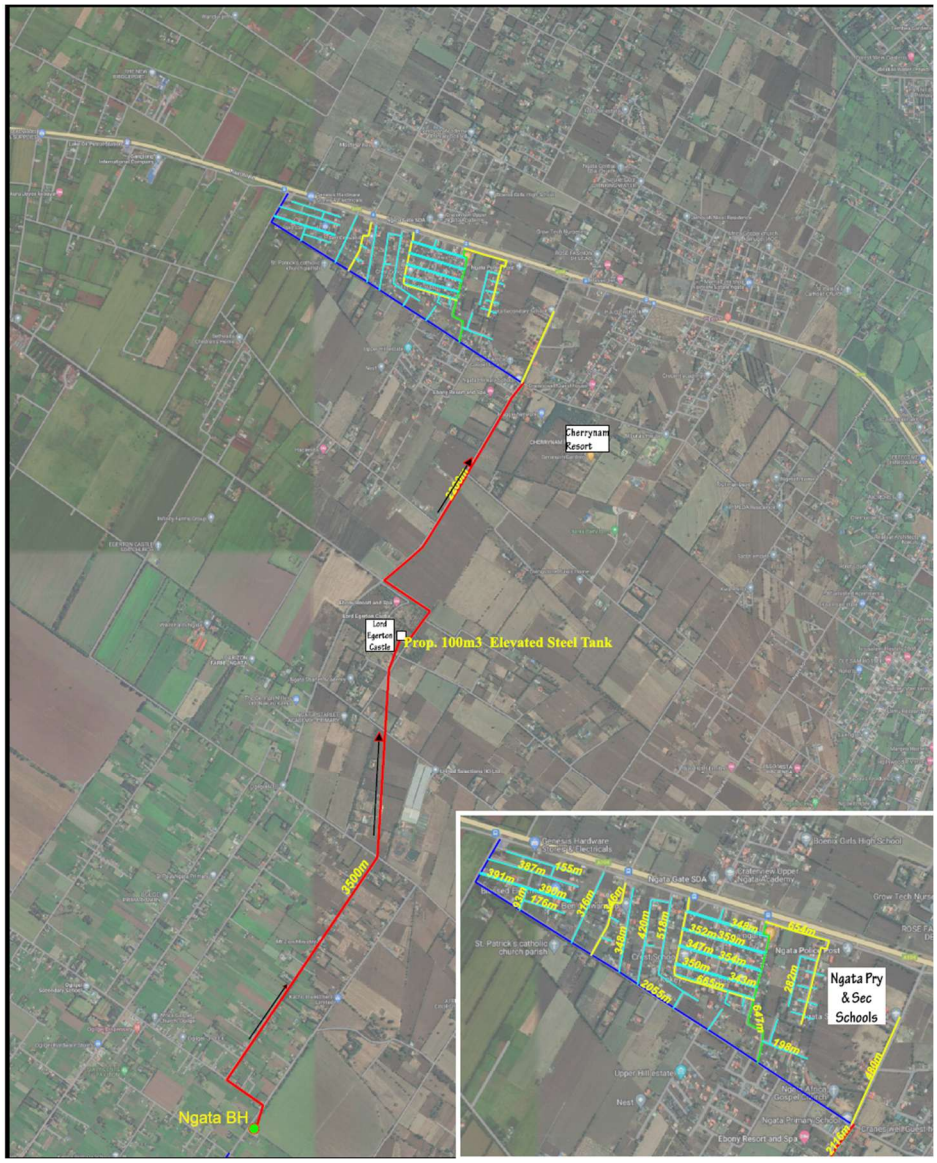
Rumwe tank, with a capacity of 300 cubic meters, serves Lower Ngata by gravity and Upper Ngata by pumping. Two boreholes with a combined production of 250 cubic meters per hour will feed into a new ground steel tank, which will connect to the existing water mains. This will increase supply reliability and distribution efficiency. The site, spanning three-quarters of an acre, is fully owned by the county government, with all legal handover documents in place.



Rumwe Tank site

2.2.3 Rising mains

The DN110mm diameter HDPE rising mains will be connected from the Tulwet storage tank to Lord Egerton tank and also the proposed new boreholes. The route will be along the access roads within Ngata area. The map below shows the route. During social screening process done during fieldwork, the team in the company of area chief and NARUWASCO staff walked through the pipeline route to ascertain any social impacts of the project. The outcome of the exercise showed that there is no social and economic displacement along the route.



Rising mains



The Raising main pipeline route will be along the road reserve

2.3 Project Activities

The project activities will consist of a range of operations that are aimed at ensuring that the proposed project will be completed in time and will be operational as required. The main activities are described below with additional information provided in subsequent sections and chapters. The borehole drilling will include the setting of drilling machines on site and actual drilling work. Machines and manual labour will be involved in this phase. Some sections will require preparation of the access roads to bring equipment, workforce and materials to the designated sites. The contractor will be responsible for the recruitment of the work force some of whom can be sourced from the local communities, given knowledge of the work schedule, quality of the work that is needed, the budget for the workforce and safety issues.

Construction works would be undertaken over a number of successive stages, comprising:

- Pre-construction activities including site inspections; identification and marking out of existing services/ground features across the proposed alignment, erection of campsites for the Contractors' workforce.
- Access track upgrading and/or construction as required. Temporary access tracks will be established for construction phase purposes and permanent access tracks for ongoing operation;
- Vegetation clearing at boreholes site and along the wayleave for the pipeline. Vegetation clearing will be done manually by use of pangas and slashers, etc.
- Transportation of equipment, materials and personnel.

2.3.1 Borehole Drilling Technique

Drilling is carried out with an appropriate tool - either percussion or rotary machines will be suitable, though the latter are considerably faster and advantageous. Geological rock samples should be collected at 2 metre intervals. Struck and rest water levels and if possible, estimates of the yield of individual aquifers encountered, should also be noted.

Well Design

The design of the well should ensure that screens are placed against the optimum aquifer zones.

Casing and Screens

The well should be cased and screened with good quality material. Owing to the depth of the borehole, it is recommended to use steel casings and screens of high open surface area. We strongly advise against the use of torch-cut steel well-casing as screen. In general, its use will reduce well efficiency (which leads to lower yield), increase pumping costs through greater drawdown, increase maintenance costs, and eventually reduction of the potential effective life of the well.

Gravel Pack

The use of a gravelpack is recommended within the aquifer zone, because the aquifer could contain sands or silts which are finer than the screen slot size. An 8" diameter borehole screened at 6" will leave an annular space of approximately 1", which should be sufficient. Should the slot size chosen be too large, the well will pump sand, thus damaging the pumping plant, and leading to gradual `siltation' of the well. The slot size should be in the order of 1.5 mm. The grain size of the gravel pack should be an average 2 - 4 mm.

Well Construction

In installing screen and casing, centralizers at 6 metre intervals should be used to ensure centrality within the borehole. This is particularly important for correct insertion of artificial gravel pack all around the screen. After installation, gravel packed sections should be sealed off top and bottom with clay (2 m). The remaining annular space should be backfilled with an inert material, and the top five metres grouted with cement to ensure that no surface water at the well head can enter the well bore and cause contamination.

Well Development

Once screen, pack, seals and backfill have been installed, the well should be developed. Development aims at repairing the damage done to the aquifer during the course of drilling by removing clays and other additives from the borehole walls. Secondly, it alters the physical characteristics of the aquifer around the screen and removes fine particles. Use of air or water jetting or the use of the mechanical plunger, which physically agitates the gravel pack and adjacent aquifer material is recommended. This is an extremely efficient method of developing and cleaning wells. Well development is an expensive element in the completion of a well, but is usually justified in longer well-life, greater efficiencies, lower operational and maintenance costs and a more

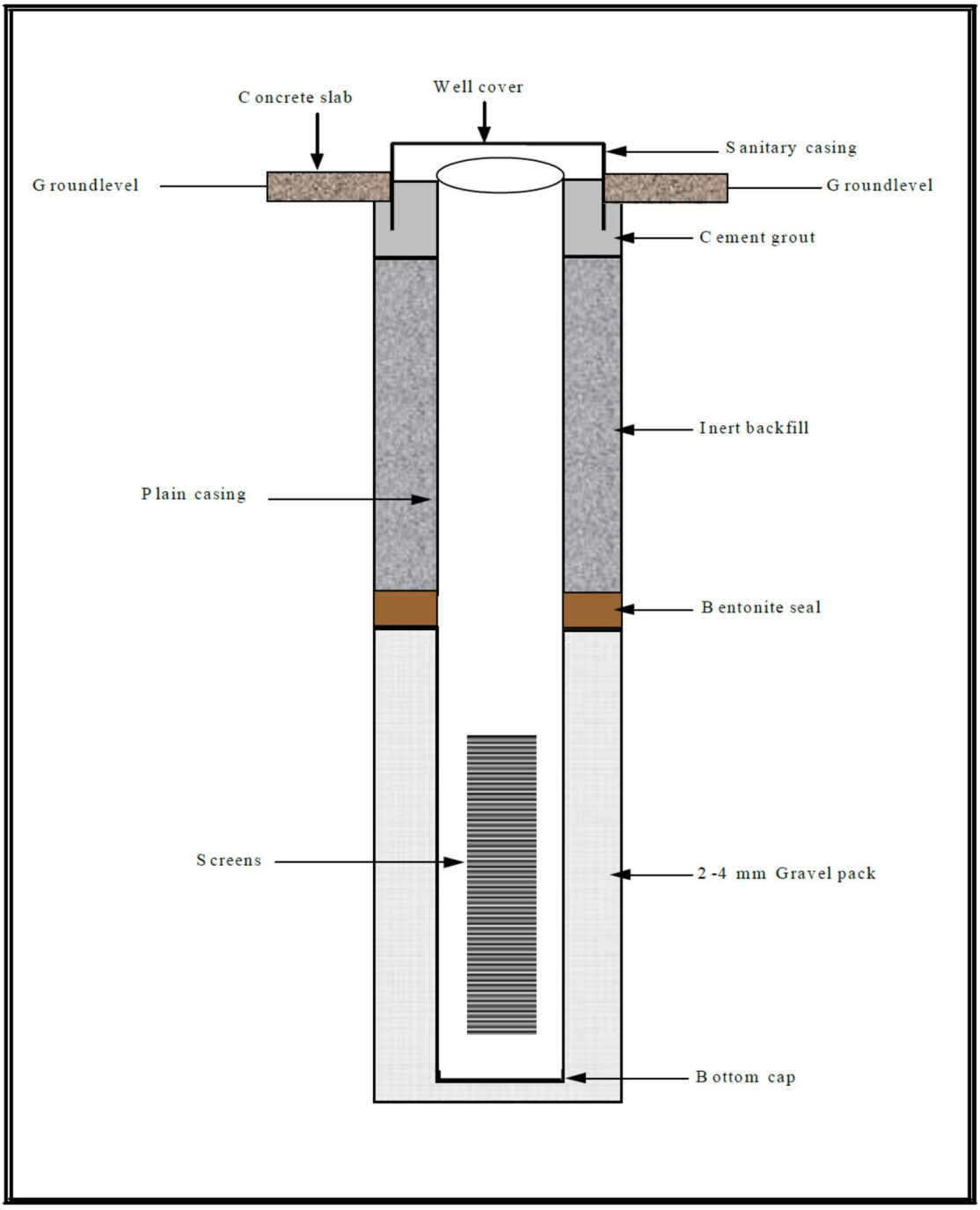
constant yield. Within this frame the pump should be installed at least 2 m above the screen, certainly not at the same depth as the screen.

Well Testing

After development and preliminary tests, a long-duration well test should be carried out. Well tests have to be carried out on all newly completed wells, because apart from giving an indication of the quality of drilling, design and development, it also yields information on aquifer parameters, which are vital to the hydrogeologist.

A well test consists of pumping a well from a measured start level (Water Rest Level - (WRL) at a known or measured yield, and simultaneously recording the discharge rate and the resulting drawdowns as a function of time. Once a dynamic water level (DWL) is reached, the rate of inflow to the well equals the rate of pumping. Usually the rate of pumping is increased step wise during the test each time equilibrium has been reached (Step Drawdown Test). Towards the end of the test a water sample of 2 liters should be collected for chemical analysis.

The duration of the test should be 24 hours, followed by a recovery test for a further 24 hours, or alternatively until the initial WRL has been reached (during which the rate of recovery to WRL is recorded). The results of the test will enable a hydrogeologist to calculate the optimum pumping rate, the pump installation depth, and the drawdown for a given discharge rate.



2.4 Population forecast for Nakuru County within Utilities Service Areas

As indicated in *Table 2-1*, the population projections for the three utilities will increase to 5,487,640 by 2050 horizon. It is significant to mention that the uncovered population will remain 45% if no interventions are implemented to increase on the coverage.

Table 2-1: Population projection for the utilities in the service areas

No.	Name of utility	Population			
		Census year, 2019	Initial, 2020	Future, 2030	Ultimate, 2050
1	NAWASSCO	511,683	527,289	712,081	1,298,644
2	NARUWASCO	510,771	526,350	710,812	1,296,330
3	NAIVAWASCO	170,220	175,412	236,886	432,016
4	Uncovered area	969,528	999,099	1,349,239	2,460,650
	Total	**2,162,202**	**2,228,149**	**3,009,018**	**5,487,640**

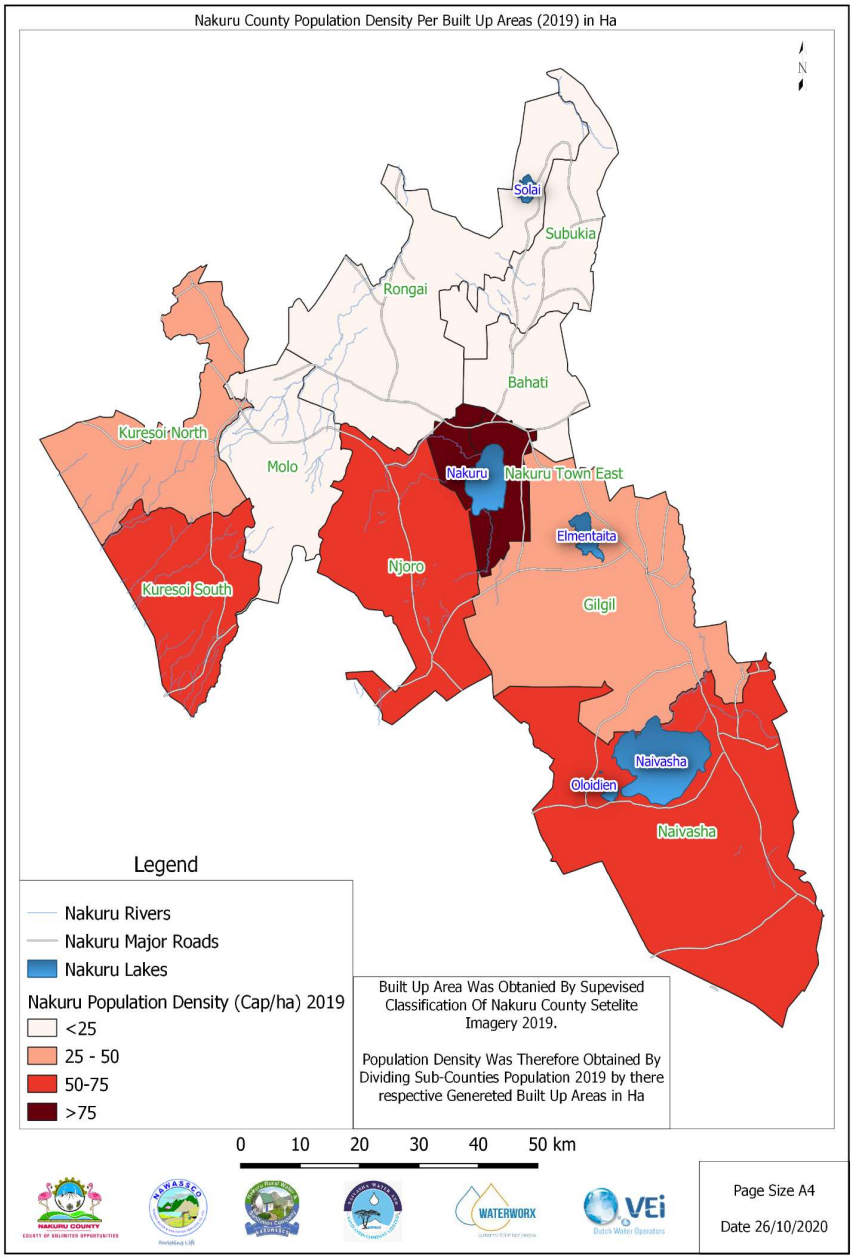


Figure 2-1: Nakuru County Population Density (Source: KPHC)

2.5 NARUWASCO Water Demand

Based on the assumption highlighted in *Table 2-2*, the daily water demand for NARUWASCO will increase from 15,000 to 121,400 m³/day as shown in *Figure 2-2*.

Table 2-2: NARUWASCO's Water Demand Assumption

Area	NARUWASCO	
Value	Unit	
8	capita	Household size in persons
3.05%	%/year	Population growth/year
4.1%	%/year	Autonomous increase water connections/year
25	lcd	litres drinking water per person per day shared / communal / public taps
85	lcd	litres drinking water per person per day house connections
80%	% drinking wat	Return ratio wastewater as % of drinking water
63%	%demand	Unaccounted For Water actual
35%	%demand	Unaccounted For Water goal 2030

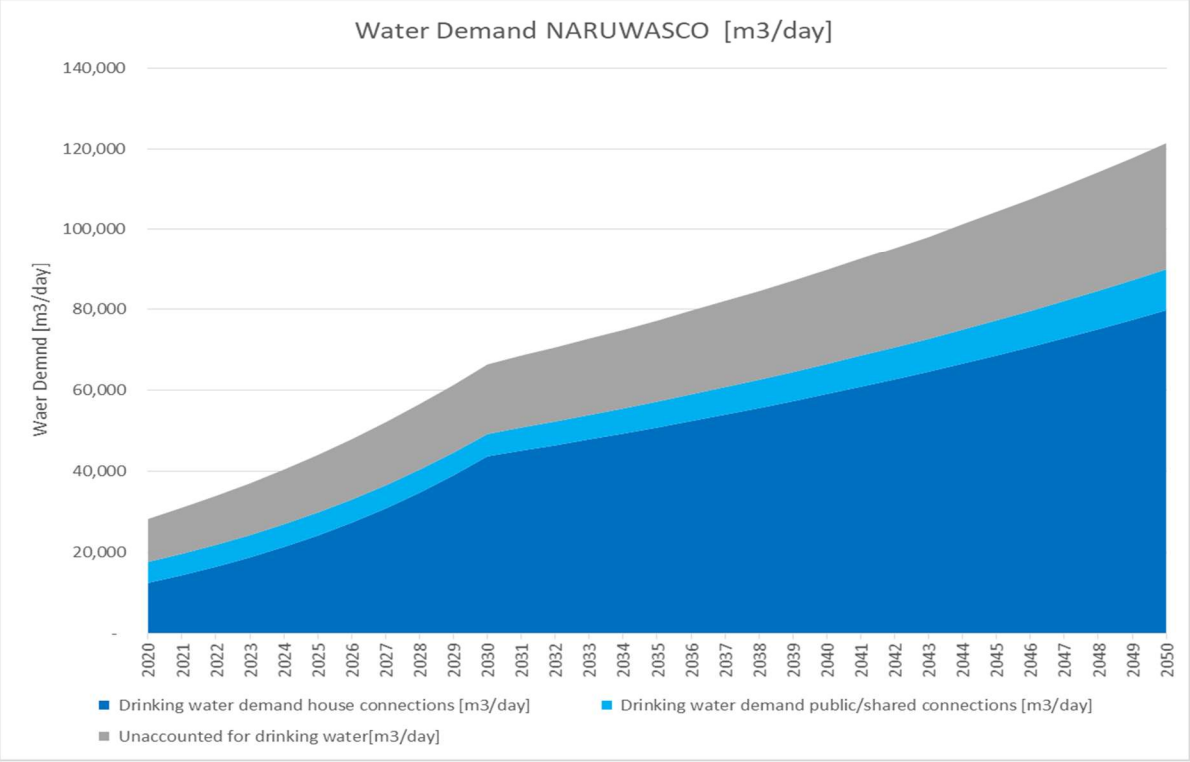


Figure 2-2: NARUWASCO's Water Demand by 2050

From the above calculations we conclude:

- In 2050, around 121,400 m³/day water is required to meet the projected demand.
- There are water projects which have been planned for construction by county government, for example the boreholes which will contribute in meeting the demand.

- Despite the plan to construct dams e.g., Itare, Molo, and Njoro, there is need to look for other alternative water sources for example roof water harvesting. NARUWASCO serves largely the rural areas where the water demand is for both domestic and livestock.

2.6 Project cost

The total project cost for the installation of the bulk meters and associated accessories is Kenya shillings Forty-Seven Million Three hundred and Sixty Thousand One hundred and nine (Ksh.47,360,109). The EIA processing fee payable to NEMA is 0.1% of the project cost which translates to KSh. 47,360.

(See appendix H: BoQ)

3 Legislative, Policy and Institutional Framework

This chapter presents a review of the current policy, legal and regulatory framework applicable to environmental management of the proposed drilling of boreholes at Kerma & Roret and laying of the rising main.

3.1 Policy framework

The following key policies are relevant to the project:

Policy	Description
Environmental Policy, 2012	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, supporting the implementation of the Forest Conservation and Management Act, 2016, and developing national standards and appropriate forest-based development mechanisms in emerging carbon markets.
The National Water Policy	The Policy is built on the achievements of the sector reform commenced with the Water Act and based on the sector principles lined out in the National Water Policy 1999. On water resources management, the policy seeks the management of water resources along natural catchment/basin boundaries following the Integrated Water Resource Management approach. It aims to ensure a comprehensive framework for promoting optimal, sustainable, and equitable development and use of water resource for livelihoods of Kenyans. Proponent, its contractors and associated Vendors will protect water catchment areas and ensure sustainable use of water. The ground water abstraction will have approvals and requisite licenses for conservative use.
Kenya's Vision 2030	Vision 2030 aspires to transform Kenya into a newly industrialized middle-income country by 2030. The blueprint recognizes that Kenya is a water scarce country and further that the economic and social development envisaged in the vision 2030 will require more high-quality water supply. Regarding environment, the Vision states that Kenya aims to be a nation living in a clean, secure and sustainable environment by 2030. The goals for 2012 are: (i) to increase forest cover from less than 3% at present to 4%; and (ii) to lessen by half all environment related diseases. Specific strategies involve: promoting environmental conservation for better support to the economic pillar flagship projects and for the purposes of achieving the Millennium Development Goals (MDGs); improving pollution and waste management through the design and application of economic incentives.
Land Policy	The National Land Policy in Chapter 3 under section 3.4, Environmental Management Principles, provides for the policy actions for addressing the environmental problems such as the degradation of natural resources, soil erosion, and pollution of air, water and land. The policy advocates 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

Policy	Description
	actions to correct the situation. Public participation has also been indicated as key in the monitoring and protection of the environment. Section 3.4.3.3 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 use of cleaner production technologies. In section 131 (d) the government undertakes to provide mechanisms for resolving grievances arising from human/wildlife conflicts for sustainable management of land based natural resources.
National Policy on Gender and Development	The National Policy on Gender and Development provides a framework for the state to reduce gender imbalances and inequality. The policy provides guidance to different sectors in line with Government's effort to spur economic growth, reduce poverty and unemployment by taking into consideration the needs and aspirations of Kenyans - women, men, girls and boys across economic, social and cultural lines.
Kenya National Climate Change Action Plan	Kenya launched its National Climate Change Action Plan in March 2013. The plan addresses the options for a low-carbon climate resilient development pathway as Kenya adapts to climate impacts and mitigates growing emissions. Also, the enabling aspects of finance, policy and legislation, knowledge management, capacity development, technology requirements and monitoring and reporting.
Environment and Sustainable Development Policy, Sessional Paper No. 6 of 1999	This Policy aims to harmonize environmental and developmental goals for sustainability. • The policy defines approaches that will be pursued by the Government in mainstreaming environment into development. • The policy harmonized environmental and developmental objectives with the broad goal of achieving sustainable development. The policy paper has provided guidelines and strategies for government action regarding environment and development. This policy is relevant to the proposed project in view of the potential impacts on the environment and involvement of the public in project planning. The proponent will harmonize environmental and developmental objectives with the broad goal of achieving sustainable development through ensuring all potential impacts of proposed development will be avoided or mitigated in an acceptable and sustainable manner.
Kenya National Youth Policy 2016	This Policy aims at ensuring that the youth play their role alongside adults in the development of the Country. The National Youth Policy visualizes a society where youth have an equal opportunity as other citizens to realize their fullest potential. Proposed project will provide direct employment to the youth as required by the Policy. Youths should be encouraged to apply and be given equal employment opportunity in the project. It is expected the proposed project will identify the needs and concerns of youth and include their views.

Policy	Description
HIV/AIDS Policy, 2009	In summary, the policy provides a mechanism for: • Setting Minimum Internal Requirements (MIR) for managing HIV and AIDS; • Establishing and promoting programs 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/AIDS; • Ensuring adequate allocation of resources to HIV/AIDS interventions; and • Guiding human resource managers and employees on their rights and obligations regarding HIV/ AIDS. Proponent & its associated contractors and suppliers will sensitise workers on HIV/AIDS prevention, supply condoms, and respect employees' rights regarding HIV/AIDS and non-discrimination/stigmatization of affected persons.
National Occupational Health and Safety Policy of 2020	This policy is intended to protect safety and health of workers in work places. The proposed project will provide employment opportunities to many workers in various categories during construction and operation. The contractor will be expected to comply with the requirements of this policy when engaging workers in various construction activities. The environmental management provides mitigation measures that can be undertaken to ensure compliance with the requirements of this policy.

3.2 Legislative Framework

3.2.1 The Constitution of Kenya

Article 42 of the Bill of Rights of the Kenyan Constitution provides that every Kenyan has the right to a clean and healthy environment, which includes the right to have the environment protected for the benefit of present and future generations through legislative and other measures. Part 2 of Chapter 5 of the Constitution is dedicated to Environment and Natural Resources. Article 69 in Part 2 provides that the State shall among others. 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

- Utilize the environment and natural resources for the benefit of the people of Kenya

Article 10 outlines the national values and principles of governance which include democracy and participation of the people, human dignity, equity, inclusiveness, social justice and human rights including non-discrimination and protection of the marginalized.

Article 33 guarantees the freedom of expression including freedom to seek, receive or impart information or ideas. Every person should feel constitutionally empowered to share information and ideas during public participation process. Article 35 provides for every citizen's right of access to information held by the state and information held by another person, and which is required for the exercise or protection of any right or fundamental freedom, this includes information required for effective public participation to take place. Article 69(d) encourages public participation in the management, protection and conservation of the environment. Under guiding values and principles of the Land Act, every public officer must ensure democracy, inclusiveness and participation of the people in matters related to land. People should participate in determining critical land matters for instance determining the economic viability of minimum and maximum acreage in respect of private land for various land zones in the country. Article 174(c) provides that one of the objects of devolution of government is to give powers of self-governance to the people and enhance the participation of the people in the exercise of the powers of the state and in making decisions affecting them.

Relevance

The proposed project complies with the Constitution by proposing a framework in its ESIA report on Social, Health, Safety and Environmental protection.

3.2.2 The County Government Act 2012

This legislation is based on chapter 11 of the constitution. It provides for the powers, functions and responsibilities of county government. Section 87 of the Act provides for citizens' participation based on timely access to information, data, documents and other information relevant or related to policy formulation and implementation.

Relevance

The Contractor will be expected to carry out implementation of the project in consultation with the County Government of Nakuru and also public participation by community members and project beneficiaries.

3.2.3 The Environmental Management and Co-ordination Act, 1999

The main objective of EMCA and the related Regulations is to provide for the establishment of an appropriate legal and institutional framework including procedures for the management of the environment in Kenya. The Act further aims to improve the legal and administrative co-ordination of the diverse sectoral initiatives in the field of environment so as to enhance the national capacity for its effective management. In addition, The Act seeks to harmonize all the 77-sector specific legislation touching on the environment in a manner designed to ensure protection of the environment. This is in line with national objectives and sustainable development goals enunciated

in Agenda 21 of the Earth Summit. As such, in terms of environmental management, EMCA provides a comprehensive and an appropriately harmonized legal and institutional framework for the handling of all environmental issues in Kenya and supersedes all sectoral laws.

The EMCA 1999 provides that every person in Kenya is entitled to a clean and healthy environment in accordance with the constitution. The Act also acknowledges that public participation is important in the development of sustainable policies, plans and processes for the management of the environment. Anyone alleging the denial, infringement, violation or threat to their right to a clean environment and healthy environment is empowered to seek legal redress in the Land and Environment Court. The court may make certain orders to stop the offence and would be guided by the principle of public participation among other sustainable development principles.

Relevance

Under EMCA, NEMA has gazetted legal tools that govern conduct of EIAs and general environmental protection. The proposed project has been screened against these tools with results outlined below.

Some key Sections of the Act relevant to the proposed project are:

Section 3 – Entitlement to Clean and Healthy Environment.	The project shall maintain a clean and healthy environment and the proponent and its contractors has a duty to safeguard and enhance environmental management in accordance with sub-sections 1, 2, 3, 4, and 5.
Section 50 – Biological Diversity	The project shall ensure that at the operation phases, conservation of biological diversity shall be observed as prescribed in (a) to (g) of this section.
Section 51 & 52 – Biological resources	The project shall enforce all measures to ensure conservation of biological resources both *in situ* and *ex situ* to ensure species threatened with extinction are protected.
Section 78 – Air quality	The proponent shall enforce air quality standards and be maintained as per NEMA's Standard and Enforcement Review Committee requirements.
Section 87 – Handling and Disposal of Wastes	The proponent shall adhere to the disposal of wastes requirement in such a manner as not to cause pollution to the environment or ill health.
Section 102 – Excess Noise	Noise during construction of the project especially from the construction vehicles and machinery is prohibited and shall be maintained to the desirable levels as is also pointed out in Cap 394.

The subsidiary legislations under EMCA is discussed in detailed as follows:

i. **Environmental Management and Co-ordination (Water Quality) Regulations 2006:**

The Water Quality Regulations provide for the protection of lakes, rivers, streams, springs, wells, and other water sources. The regulations also stipulate that all industries should refrain from any actions, which may directly or indirectly cause water pollution. This regulation gives quality standards for water supply for domestic. The table below shows the water quality parameters.

Table 3-1: Quality Standards for Domestic Water (NEMA)

No	Parameter	Guide Value (max allowable)
1	pH	6.5 – 8.5
2	Suspended solids	30 (mg/L)
3	Nitrate-NO_3	10 (mg/L)
4	Ammonia –NH_3	0.5 (mg/L)
5	Nitrite –NO_2	3 (mg/L)
6	Total Dissolved Solids	1200 (mg/L)
7	Scientific name *(E.coli)*	Nil/100 ml
8	Fluoride	1.5 (mg/L)
9	Phenols	Nil (mg/L)
10	Arsenic	0.01 (mg/L)
11	Cadmium	0.01 (mg/L)
12	Lead	0.05 (mg/L)
13	Selenium	0.01 (mg/L)
14	Copper	0.05 (mg/L)
15	Zinc	1.5 (mg/L)
16	Alkyl benzyl sulphonates	0.5 (mg/L)
17	Permanganate value (PV)	1.0 (mg/L)

Source: Water Quality Regulations - 2006 (NEMA)

ii. Environmental Management and Co-ordination (Waste Management) Regulations 2006:

The Waste Management Regulations sets out standards for handling, transportation and disposal of various types of wastes. The regulations stipulate the need for facilities to undertake, in order of preference, waste minimisation or cleaner production, waste segregation, recycling or composting. These regulations provide guidelines on how to store, transport and dispose any wastes generated during the construction. Some of these wastes may fall under the hazardous wastes category and thus require disposal arrangements.

Relevance

The Contractor will follow the Waste Management Plan to carry out segregation, storage, transportation and disposal of waste at all the operational areas (Office, and Construction site).

Table 3-2: Waste Management Regulations

	PART II – GENERAL PROVISIONS
Responsibility of Waste Generator	(1) No person shall dispose of any waste on a public highway, street, road, recreational area or in any public place except in a designated waste receptacle. (2) Any person whose activities generate waste shall collect, segregate and dispose or cause to be disposed of such waste in the manner provided for under these Regulations. (3) Without prejudice to the foregoing, any person whose activities generates waste has an obligation to ensure that such waste is transferred to a person who is licensed to transport and dispose off such waste in a designated waste disposal facility.
Segregation of Waste by Generator	5. (1) Any person whose activities generate waste, shall segregate such waste by separating hazardous waste from non-hazardous waste and shall dispose of such wastes in such facility as is provided for by the relevant Local Authority.
Cleaner Production Principles	(1) Any person who owns or controls a facility or premises which generates waste shall minimize the waste generated by adopting the following cleaner production principles: (ii) improvement of production process through: conserving raw materials and energy (iii) eliminating the use of toxic raw materials within such time as may be prescribed by the Authority (iv) reducing toxic emissions and wastes monitoring the product cycle from beginning to end by: (v) identifying and eliminating potential negative impacts of the product. (vi) enabling the recovery and re-use of the product where possible. reclamation and recycling. (c) incorporating environmental concerns in the design, process and disposal of a product.
Waste Transportation Licence	7.(1) No person shall be granted a licence under the Act to transport waste unless such person operates a transportation vehicle approved by the Authority upon recommendation from the relevant lead agency. Any vehicle used for transportation of waste or any other means of conveyance shall be labelled in such a manner as may be directed by the Authority. The Authority in consultation with the relevant lead agency may designate particular geographical areas as areas for operation for licensed waste transporters. The application for a licence to transport waste shall be in Form I of the First Schedule to these Regulations and shall be accompanied by the prescribed fee set out in the Second Schedule. A licence issued under the Act for the transportation of waste shall be in Form II of the First Schedule to these Regulations and shall be valid for one year from the date of issue.
Mode of transporting waste.	A person granted a licence to transport waste shall ensure that: 1) the collection and transportation of such waste is conducted in such a manner that will not cause scattering, escaping and/or flowing out of the waste;

	PART II – GENERAL PROVISIONS
	2) the vehicles and equipment for the transportation of waste are in such a state that shall not cause the scattering of, escaping of, or flowing out of the waste or emitting of noxious smells from the waste; 3) the vehicles for transportation and other means of conveyance of waste shall follow the scheduled routes approved by the Authority from the point of collection to the disposal site or plant; and 4) he or his agent(s) possess at all times during transportation of the waste, a duly filled tracking document as set out in Form III of the First Schedule to these Regulations and shall produce the same on demand to any law enforcement officer.
Transportation of waste by licensed transporter	9.Any person licensed to transport waste shall collect waste from the designated area of operations or storage areas and shall deliver such waste to the designated storage site, disposal site or plant.
Transitional Provision for transporting waste	10. Any person, who before the commencement of these Regulations was carrying on the business of transporting waste, shall apply to the Authority for a licence for the transportation of waste within ninety days after the commencement of these Regulations in the prescribed Form I as set out of the First Schedule to these Regulations.
Licence for disposal facility	11. (1) Any person granted a licence under the Act and any other licence that may be required by the relevant Local Authority to operate a waste disposal site or plant, shall comply with all conditions imposed by the Authority to ensure that such waste disposal site or plant operates in an environmentally sound manner. (2) An application for a licence to operate a waste disposal site or plant shall be in Form IV of the First Schedule to these Regulations and shall be accompanied by the prescribed fee set out in the Second Schedule. A licence issued under the Act for the operation of a waste disposal site or plant shall be as in Form V as set out in the First Schedule to these Regulations.
Transitional Provision for disposal facilities	12. Any person who before the commencement of these Regulations was carrying on the business of operating a waste disposal site or plant shall apply to the Authority for a licence as prescribed in these Regulations within ninety days after the commencement of these Regulations.
Waste treatment by operators of disposal sites. Cap 265	13. Any operator of a disposal site or plant shall apply the relevant provisions on waste treatment under the Local Government Act and Regulations thereunder to ensure that such waste does not present any imminent and substantial danger to public health, the environment and natural resources.
Validity of license and renewals	14. A licence to operate a waste disposal site or plant shall be valid for a period of one year from the date of issue and may be renewed for a further similar period on such terms and conditions as the Authority may deem necessary or impose for purposes of insuring public health and sound environmental management.
Requirement for Environmental Audit	15. Every licensed owner or operator of a waste disposal site or plant shall carry out an annual environmental audit pursuant to the provisions of the Act.

	PART II – GENERAL PROVISIONS
Re-use and recycling plants	16. Notwithstanding any provisions to the contrary herein, these Regulations shall apply to plants and sites established for re-use or re-cycling of wastes.

iii. Environmental Management and Coordination (Conservation of Biodiversity, Access to Genetic Resources and Benefit Sharing) Regulations 2006:

The Conservation of Biodiversity Act Sections 5-9 provides for the protection of endangered species, creation of an inventory, and monitoring of their status, protection of environmentally significant areas, provision of access permits, material transfer agreements and benefit sharing. These regulations guide the construction of the project with a view to avoiding areas of environmental significance and protection of endangered species.

Relevance

Though the project is located in a disturbed area, the ecosystems need to be protected as per the requirements of this regulation

iv. Environmental Management and Co-ordination (Noise and Excessive Vibrations) Regulations 2009:

The regulations define noise as any undesirable sound that is intrinsically objectionable or that may cause adverse effects on human health or the environment. The regulations prohibit any person from making or causing to be made any loud, unreasonable, unnecessary or unusual noise which annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and the environment. The Contractor will be expected to meet the noise level requirements as provided in the following schedules of the regulations and also carry out noise level monitoring:

Schedule 1 – Noise levels at residential and commercial sites

Schedule 2 – Noise levels at Construction sites

Relevance

The Contractor to observe noise level requirement according to the regulations.

Table 3-3: Maximum Permissible Noise Levels – Residential and Commercial (NEMA)

Zone		Sound Level Limits dB(A) (Leq,14 h)		Noise Rating Level (NR) (Leq,14 h)	
		Day	Night	Day	Night
A.	Silent Zone	40	35	30	25
B	Places of worship	40	35	30	25
C.	Residential: Indoor	45	35	35	25
	Outdoor	50	35	40	25

D.	Mixed residential (with some Commercial and places of entertainment)	55	35	50	25
E.	Commercial	60	35	55	25

Source: Noise and Excessive Vibration Pollution Control) Regulations, 2009

Table 3-4: Maximum Permissible Noise Levels for Construction Sites (NEMA)

Facility		Maximum Noise Level Permitted (Leq) in dB(A)	
		Day	Night
(i)	Health facilities, educational institutions, homes for disabled etc.	60	35
(ii)	Residential	60	35
(iii)	Areas other than those prescribed in (i) and (ii)	75	65

Source: Noise and Excessive Vibration Pollution Control) Regulations, 2009

v. Environmental Management and Co-ordination (Fossil Fuel Emission Control) Regulations 2006:

The Fossil Fuel Emission Control Regulations provide for acceptable emission standards in Kenya. Section 4 of the regulations state that any internal combustion engine for motor vehicles and generators must comply with the emission standards provided for in the First Schedule of those regulations. Hence, anyone who operates such engines whether on the road, street, public highway or any premises, which emits smoke in excess of the emissions standard in the First Schedule contravenes the regulations and is liable to prosecution. Section 8 provides that any person intending to use any fuel catalysts other than those permitted by the authority to disclose it and seek prior approval. Establishments (including construction sites) that use generators as alternative sources of energy must take account of the regulation on the emission standards.

Relevance

This regulation is applicable to the proposed project since there will be use of drilling machinery and equipment that depend on fossil fuel as their source of energy. The requirements of the regulation must be implemented to eliminate or reduce air quality degradation.

Sections of the regulation citing the standards of recommended emission levels will be given to the contractor and or pinned at strategic points in the contractor's field offices.

vi. Environmental Management and Coordination (Air Quality) Regulations, 2014:

These regulations provide for the safeguarding of the ambient air quality and give guidelines to prevent and control air pollution. The first and seventh schedules of the regulations provide a list with associated emission limits of prohibited, controlled, and un-controlled air pollutants. The regulations also give ambient air quality tolerance limits. The regulation is relevant to the construction works (including transportation).

Relevance

The Contractor will be required to observe the limits for Air Quality as provided in Schedule 1 – Ambient Air Quality Tolerance Limits. The Proponent shall ensure that the Contractor observes the policy and regulatory requirements and implement the mitigation measures proposed in this report.

Table 3-5: Schedule 1 – Ambient Air Quality Tolerance Limits

No	Pollutant	Time weighted Average	Industrial area	Residential, Rural & Other area	Controlled areas**
1.	Sulphur oxides (SOX);	Annual Average*	80 g/m3	60 g/m3	15 g/m3
		24 hours**	125 g/m3	80 g/m3	30 g/m3
		Annual Average		0.019 ppm/50 g/m3	
		Month Average			
		24 Hours		0.048ppm/125 g/m^3	
		One Hour			
		Instant Peak		500 g/m3	
		Instant Peak (10 min)		0.191 ppm	
2.	Oxides of Nitrogen (NOX);	Annual Average*	80 g/m3	60 g/m3	15 g/m3
		24 hours**	150 g/m3	80 g/m3	30 g/m3
		8 hours			
		Annual Average		0.2 ppm	
		Month Average		0.3 ppm	
		24 Hours		0.4 ppm	
		One Hour		0.8 ppm	
		Instant Peak		1.4 ppm	
3.	Nitrogen Dioxide	Annual Average	150 g/m3	0.05 ppm	
		Month Average		0.08 ppm	
		24 Hours	100 g/m3	0.1 ppm	
		One Hour		0.2 ppm	
		Instant Peak		0.5 ppm	
4.	Suspended Particulate matter (SPM)	Annual Average*	360 g/m3	140 g/m3	70 g/m3
		24 hours**	500 g/m3	200 g/m3	100 g/m3
		mg/Kg			
		Annual Average****		100 g/m3	
		24 hours***		180 g/m3	
5.	Respirable Particulate Matter (<10 m (RPM)	Annual Average*	70 g/m3	50 g/m3	50 g/m3
		24 hours**	150 g/Nm3	100 g/Nm3	75 g/Nm3
6.	PM2.5	Annual Average	35 g/m3		
		24 hours	75 g/m3		

No	Pollutant	Time weighted Average	Industrial area	Residential, Rural & Other area	Controlled areas**
7.	Lead (Pb)	Annual Average*	1.0 g/Nm3	0.75 g/Nm3	0.50 g/m3
		24 hours**	1.5 g/m3	1.00 g/m3	0.75 g/m3
		Month Average		2.5	
8.	Carbon monoxide (CO) carbon dioxid (CO2)	8 hours**	5.0 mg/m3	2.0 mg/m3	1.0 mg/m3
		1 hour	10.0 mg/m3	4.0 mg/m3	2.0 mg/m3
		mg/Kg			
		24 hours**			
9.	Hydrogen Sulphide	24 hours**	150 g/m3		
10.	Non-methane hydrocarbons	instant Peak	700ppb		
11.	Total VOC	24 hours**	600 g/m3		
12.	Ozone	1-Hour	200 g/m3	0.12 ppm	
		8 hour (instant Peak)	120 g/m3	1.25 ppm	

vii. Environmental Management and Coordination (Wetlands, River Banks, Lake Shores and Sea Shore Management) Regulation, 2009.

These regulations provide for the protection of all wetlands on both private and public land. The regulations provide for sustainable exploitation of wetlands and are aimed at maintaining both the wetlands and hydrological, ecological, social and economic functions and services.

Relevance

The proposed project has no potential of impacting wetlands on the project area but it is important to undertake appropriate mitigation measures to minimize or avoid degradation of wetlands.

3.2.4 The Environmental Impact Assessment and Audit Regulations 2003 (Legal Notice No. 101)

Regulation 24 – EIA Licence: - Environmental Impact License shall be issued after the authority approves the study report under regulations 23 and shall be issued in form.

Regulation 28 – false or incorrect information: -Substantial change or modification and when project poses an environmental threat or revelation that information or data given by the license were false, incorrect or intended to mislead.

Regulation 24 – Annual Environmental Audit: - Annual environmental auditing after presentation of an EIA study report shall be undertaken by the licensee to ensure the implementation of environmental management plan is audited on regular basis, an audit report submitted to NEMA annually and ensuring that the criteria to audit is based on environmental management plan developed during the EIA process or after the initial audit.

Regulation 40 - Monitoring changes after project implementation

Monitoring by NEMA and Lead Agencies shall be done to establish any possible changes in the environment and their possible impacts, immediate and long-term effects of its operations, identify and determine parameters and measurable indicators and conduct changes that occurred after implementation.

Relevance

The proposed project must comply with the requirements of the regulations that also include conducting regular monitoring and annual audits. The project requires an EIA license from NEMA before commencement of any activity.

3.2.5 The Water Act 2016

The Act stipulates that a permit shall be required in all cases of proposed diversion, abstraction, obstruction, storage or use of water, with minor exceptions relating to use for domestic purposes (Section.36). Under the Water Act (General) Rules, it is stated that any rights acquired under the permit are subject to the Public Health Act and the Malaria Prevention Act, in addition to the Water Act itself. The Public Health Act has wide-ranging provisions on pollutant discharges, which are set out below.

The Water Act (General) Rules make provision for discharges in a number of respects, as follows:

- Effluent shall not be returned to any body of water unless it has been purified. Further, it must not contain poisonous or injurious matter or excess silt, gravel or boulders.
- The regulating authority may determine the potential prejudicial effects of the pollutant discharges and order the removal already made.
- It is an offence to allow effluent discharges, either domestic or industrial, if this would harm fish, and a fish warden may order its removal. Plans for rendering such effluent innocuous shall be submitted to and approved by the enforcing authority.
- Additionally the applicant for a water permit is required to outline the methods to be used for treating effluent before discharge (Form WAB 13, question 18). The permit would only be issued subject to satisfactory provision being made for the treatment of effluent. The Water Act, apart from the Rules, makes only limited provision for controlling water pollution. The provision is limited to the pollution of drinking water.
- Under section 145, the water undertaker may make regulations to control polluting activities, which may threaten its source of water. It may itself construct the necessary works for intercepting, treating or disposing of foul water (s.149). Section 158 makes it an offence to pollute such waters. Similarly, under section 169, it is an offence to throw or convey polluting matter into a body of water.

Relevance

The proponent shall be expected to make applications for a water abstraction permit for sinking of the boreholes.

3.2.6 The Forests Act, 2016

The Forests Act, 2016 provides for the establishment, control and regulation of Forests. The Act created a new semi-autonomous body, the Kenya Forest Service (KFS) and supportive institutions for management and conservation of all types of forests. This Act mandates the KFS to conserve and manage all forests. It also sets out the roles and responsibilities of communities in managing forests. KFS is also responsible for formulating policies regarding the management, conservation and use of all types of forest areas in the country. The Act embraces the concept of participatory forest management and considers formation of forest community associations, which are recognized as partners in management. It enables members of forest communities to enter into partnership with KFS through registered Community Forest Associations. It also allows lease arrangements by interested groups to supplement government efforts in plantation forest.

Relevance

The project does not affect any Forest, the proponent should carry out tree planting in the project area as contribution to improvement of the vegetation cover.

3.2.7 Land Act, 2012.

The Land Act was enacted by Parliament to give effect to Article 68 of the Constitution, to revise, consolidate and rationalize land laws; to provide for the sustainable administration and management of land and land-based resources, and for connected purposes. The Act applies to all land declared as (a) public land under Article 62 of the Constitution; (b) private land under Article 64 of the Constitution; and (c) community land under Article 63 of the Constitution and any other written law relating to community land.

The Land Act guarantees security of tenure for land under (a) freehold; (b) leasehold; (c) such forms of partial interest as may be defined under the Act and other law, including but not limited to easements; and (d) customary land rights, where consistent with the Constitution and guarantees equal recognition and enforcement of land rights arising under all tenure systems and non-discrimination in ownership of, and access to land under all tenure systems. Under the Lands Act 2012, The Wayleaves Act, Cap 292 and The Land Acquisition Act, Cap. 295 have been revoked but Sections 8 and 9 allow for Compulsory Acquisition as an option in acquiring land for public utility.

Relevance

The land to be occupied by the boreholes belong the community.

3.2.8 The Wildlife management and Conservation Act 2013

The Wildlife and Conservation Act deals with the conservation and management of wildlife in Kenya. The Act provides that wildlife should be conserved so as to yield optimum returns in terms of cultural, aesthetic, scientific and economic benefits. The Act requires that full account be taken of the inter-relationship between wildlife conservation and land use. The Act controls activities within the national parks, which may lead to the disturbance of wild animals. Unauthorized entry, residence, burning, damage to objects of scientific interest, introduction of plants and animals and damage to structure are prohibited under this law.

Relevance

The construction activities will make mitigation provisions for any wildlife which might be within the project area.

3.2.9 The Occupational Safety and Health Act, 2007

This Act of Parliament was enacted to provide for the health, safety and welfare of persons employed in workplaces and for matters incidental thereto and connected therewith. Part II of the Act provides the General duties that the occupier must comply with respect to health and safety in the workplace. Such duties include undertaking S&H risk assessments, S&H audits, notification of accidents, injuries and dangerous occurrences. Several sections under this part are applicable to the project.

This Act will provide some guidance on the mitigation measures for any negative impacts in particular those concerning the workers within the site. Section 17 of the Act further highlights the importance of an employer or in this case Contractor to ensure the health and safety of persons other than his/her employees. As such this Act also ensures the inclusion of community health and safety in this ESIA.

Relevant

The project construction, operation and decommissioning activities will have occupational, public health, safety and security issues that have to be mitigated and monitored and this ESIA proposes a number of mitigation measures as provided under Chapter 7 and 8.

3.2.10 Public Health Act (Cap 242) of Revised Edition 2012

This legislation requires that Local Authorities now County Government 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. Part IX section 115 states that no person shall cause nuisance or condition liable to be injurious or dangerous to human health.

Part XI section 129 of the Rules states in part "It shall be the duty of every local authority to take all lawful, necessary and reasonably practicable measures for preventing any pollution dangerous to health of any supply of water which the public within its district has a right to use and does use for drinking or domestic purposes, and purifying such supply so polluted". Section 130 provides for making and imposing on local authorities and others the duty of enforcing rules in respect of prohibiting use of water supply or erection of structures draining filth or noxious matter into water supply as mentioned in section 129.

Relevance

The construction of the proposed project has potential for pollution risks related to soil, water, air and noise during construction. The contractor will need to ensure that air and water pollution is controlled and does not affect workers and people within the project site area

3.2.11 HIV/AIDS Prevention and Control Act (Act No.14 of 2006)

The Act provides for measures of prevention, management and control of HIV and AIDS. It Promotes public health, counselling, support and care for those affected or living with HIV. Part 11, Section 7

requires HIV and AIDs education in the workplace. The government is expected to ensure provision of basic information and instruction on HIV and AIDs prevention and control to; Employees of all Government Ministries, Departments, Authorities, and Other Agencies; and, Employees of Private and Informal Sectors. The information on HIV/AIDs is expected to be treated with confidentiality at the workplace.

Relevance

This Act will ensure that the Contractor makes provision for Voluntary Counselling and Testing (VCT) for the workers. This will greatly contribute to management of HIV and AIDS and also bringing down stigmatization.

3.2.12 The National Gender and Equality Act, 2011

National Gender Equality Commission is a constitutional Commission established by an Act of Parliament in August 2011, as a successor commission to the Kenya National Human Rights and Equality Commission pursuant to Article 59 of the Constitution. NGEC derives its mandate from Articles 27, 43, and Chapter Fifteen of the Constitution; and section 8 of NGEC Act (Cap. 15) of 2011, with the objectives of promoting gender equality and freedom from discrimination. Gender mainstreaming in the project will ensure that the concerns of women and men form an integral dimension of the project design, implementation, operation and the monitoring and evaluation ensures that women and men benefit equally, and that inequality is not perpetuated.

Relevance

The contractor will ensure gender equality is addressed to the best level possible.

3.2.13 The Employment Act, 2007

The Employment Act, 2007 defines the fundamental rights of employees including the basic conditions of employment of workers. It also regulates employment of children under section 56 which makes it illegal to employ children under the age of 13 years. Children between ages 13 – 16 years can be employed in light work while those between 16 and 18 are considered employable.

Relevance

The contractor on site will have to employ casual labourers (those who are engaged on need basis and paid daily) probably from the communities where the project is located during construction. The basic conditions of employees should be observed to avoid unnecessary conflicts during the construction works. The Contractor shall pay the entire amount of the wages earned by or payable to the workers. Payment of such wages shall be done at the end of a working day at or near the place of work. The Contractor shall also ensure that all statutory deductions are submitted without delay to appropriate government agencies e.g., Kenya Revenue Authority, NSSF, NHIF, among others.

3.2.14 The Sexual Offences Act, 2006

This Act protects people and employees from any unwanted sexual attention or advances by staff members. This act ensures the safety of women, children and men from any sexual offences which include: rape, defilement, indecent acts.

Relevance

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

3.2.15)Physical and Land Use Planning Act, No. 13 of 2019

This Physical Planning Act, 2019 provides for the preparation and implementation of physical development plans. Section 36 of the Act provides for environmental impact assessments and states that if in connection with a development application a local authority is of the opinion that proposals for industrial location, dumping sites, sewerage treatment, quarries or any other development activity will have injurious impact on the environment, the applicant shall be required to submit together with the application an environmental impact assessment report'.

Relevance

The Proponent and Contractors of the proposed project will need to comply with the requirements of this Act.

3.2.16 The Work Injury Benefits Act, 2007

Part V provides for compensation to employees for work related injuries and disease contracted in the course of their employment and for connected purposes. Key sections of the Act include the obligations of employers; right to compensation; reporting of accidents; compensation; occupational diseases; medical aid etc.

Relevance

The proponent/contractor shall comply with all requirements of the Act i.e. putting in place an insurance cover that shall protect employees, should their employees incur injuries or die in the course of work.

3.2.17 Climate change Act 2016

Under Section 3 of the Act, the objectives of the Act include to provide for a regulatory framework for enhanced response to climate change; to provide for mechanism and measures to achieve low carbon climate development.

Relevance

The project design shall be climate- proof over its lifespan and undertaken as per provisions of the act specifically on planning and implementation stages.

3.2.18 National Museums & Heritage Act, 2006

An Act of Parliament to consolidate the law relating to national museums and heritage; to provide for the establishment, control, management and development of national museums and the identification, protection, conservation and transmission of the cultural and natural heritage of Kenya; to repeal the Antiquities and Monuments Act (Cap. 215) and the National Museums Act.

Relevance

The proponent shall follow due procedures including notification of the National Museums in case of unearthing any antiquity to ensure they are protected and conserved to promote cultural resources in the context of economic development of the Country.

3.2.19 Sustainable Solid Waste Management Act 2022

The act establishes the legal and institutional framework for the sustainable management of waste, towards the realization of the constitutional provision on the right to a clean and healthy environment and for connected purposes. The objects of the act are: promote sustainable waste management; improve the health of all Kenyans by ensuring a clean and healthy environment; reduce air, land, fresh water and marine pollution; promote and ensure the effective delivery of waste; create an enabling environment for employment in the green economy in waste management, recycling and recovery; establish an environmentally sound infrastructure and system for sustainable waste management; promote circular economy practices for green growth; mainstream resource efficiency principles in sustainable consumption and production practices; and inculcate responsible public behaviour on waste and environment.

The act provides for general principles including: the polluter pays principle in which the cost of cleaning up any element of the environment that has been damaged by pollution, the cost of the beneficial uses of the environment that have been lost as a result of the pollution, and any other costs associated with or incidental to the pollution shall be paid by the polluter; and zero waste principle in which products and processes are designed and managed to reduce the volume and toxicity of waste and materials, and to conserve and recover all resources, and to prevent the burning or burying of resources, in order to treat waste as a resource that can be harnessed for wealth creation, employment and the reduction of pollution.

The Act provides for public and private entities to segregate waste and section 13 provides for extended user responsibility.

Relevance:

The client and contractors should adhere to this Act. The Act calls for sustainable waste management by ensuring zero waste generation and if unavoidable, intervention measure (reduce, recycle, repurpose etc.) should be in place. Also, the Act states the generator of the waste is responsible for its management and safe disposal.

3.3 World Banks Operational Policies (OP)

The World Bank's ten safeguard policies are designed to help ensure that programs proposed for financing are environmentally and socially sustainable, and thus improve decision-making. The Bank's Operational Policies (OP) are meant to ensure that operations of the Bank do not lead to adverse impacts or cause any harm. They include guidance on EA requirements. Of the Bank's Safeguard Policies, two are relevant for consideration under the project. These are:

- Environmental Assessment (OP 4.01);
- Involuntary Resettlement (OP/BP 4.12)

3.3.1 Environmental Assessment (OP 4.01)

The OP 4.01 requires among others that screening for potential impacts is carried out early, in order to determine the level of EA to assess and mitigate potential adverse impacts. The Bank's project screening criteria group projects into three categories:

- Category A – A proposed project is classified as Category A if it is likely to have adverse impacts that are insignificant (based on type, location, sensitivity, and scale of the project and the nature and magnitude of its environmental impacts).
- Category B –A proposed project is classified as category B if the potential impacts are typically site specific, reversible in nature, less adverse than category A projects, and for which mitigatory measures can be designed more readily.
- Category C – A proposed project is classified as a category C if there are minimal or no adverse impacts.

3.3.2 Involuntary Resettlement (OP/BP 4.12)

The Policy on Involuntary Resettlement is intended to assist displaced people arising from development projects, in order not to impoverish any affected people within the area of influence of projects. An action plan that at least restores the standard of living must be instituted, in cases where resettlement is inevitable or loss of assets and impacts on livelihood occurs.

3.3.3 Bank's Policy on Disclosure (BP 17.50)

The Bank's policy on disclosure requires that all the people residing in the given areas of a project have the right to be informed of the proposed development project. Prior to project appraisal therefore, the summary of the study of the development action along with other relevant information should be disclosed in the info-shop and in the project area as well as nationally. The ESIA will be submitted to the Bank's Info shop and disclosed on the project website. The ESIA is also being submitted to NEMA. The issues raised in the documents will continue to be discussed with different stakeholders during implementation.

3.4 Institutional Framework

3.4.1 National Environmental Management Authority (NEMA)

The National Environment Management Authority (NEMA) is established under Section 7 of the Environmental Management and Co-ordination Act Cap 387 NEMA is the institution with the legal authority to exercise general supervision and co-ordination over all matters relating to the environment and is the principal instrument of the Government charged with the implementation of all policies relating to the environment. NEMA is the body that coordinates and administers the Environmental Impact Assessment (EIA)/ Environmental Audit (EA) on behalf of the Cabinet secretary for Environment and Natural Resources. EIA/EA is applicable to both public and private sector development projects and programmes. A scheduled activity will not receive the necessary authorization from NEMA to proceed or continue operating, until all EIA/EA requirements have been fulfilled and accepted by NEMA.

3.4.2 National Environmental Complaints Committee

The National Environment Complaints Committee performs the following functions:

- To investigate;
  - i. any allegations or complaints against any person or against the Authority in relation to the condition of the environment in Kenya;
  - ii. on its own motion, any suspected case of environmental degradation, and to make a report of its findings together with its recommendations thereon to the CS;
- To prepare and submit to the CS, periodic reports of its activities which report shall form part of the annual report on the state of the environment under section 9(3);
- Undertake public interest litigation on behalf of the citizens in environmental matters; and

To perform such other functions and exercise such powers as may be assigned to it by the CS.

3.4.3 Environmental and Land Court

The Court was established under Section 4 of the Environment and Land Court Act No. 19 of 2011. It has the Jurisdiction to hear any other disputes relating to environment and land.

3.5 Legal Register

A legal register listing all legislation, legal instruments relevant to the site has been prepared, indicating applicability to the site. In addition, permits and licenses that are required to be obtained by the project during construction and operation has been provided.

No.	Licenses/Permits	Legislation
1.	ESIA License for project	EMCA 1999
2.	Water extraction permit from water resource authority	Water Act 2016
3.	Workplace Registration License from DOSHS	OSHA 2007
4.	NEMA License to transport waste	EMCA 1999
5.	NEMA Noise Vibration Permit	EMCA 1999

4 Baseline Information

This section presents the geographic characteristics, baseline environmental conditions including the socio-economic conditions within the area. For convenience, the description of the larger Nakuru City area is provided followed by presentation of details that are more specific to the project site.

Gathering of baseline data was necessary to meet the following objectives:

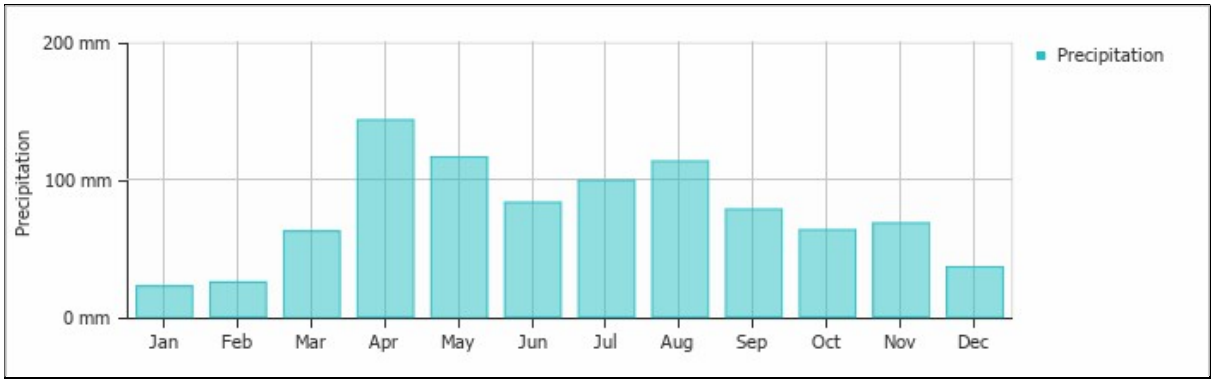
- To *understand* key biological, physical, ecological, social, cultural, economic, and political conditions in areas potentially affected by the proposed project;
- To *provide data* to predict, explain and substantiate possible impacts;
- To *understand* the expectations and concerns of a range of stakeholders on the proposed development;
- To *inform* the development of mitigation measures; and
- To *benchmark* future socio-economic changes/ impacts and assess the effectiveness of mitigation measures.

4.1 Physical environmental condition

4.1.1 Climate

i. Rainfall

The rainfall in Nakuru is moderately high with average rainfall between 950mm -1500m per year. The area has bimodal pattern of rainfall although distributed throughout the year. There is a precipitation even during the driest month. The project area receives its long rains in March, April and May with the highest rainfall being received in April. The short rains occur in August to November. January is the driest month while April is the wettest.

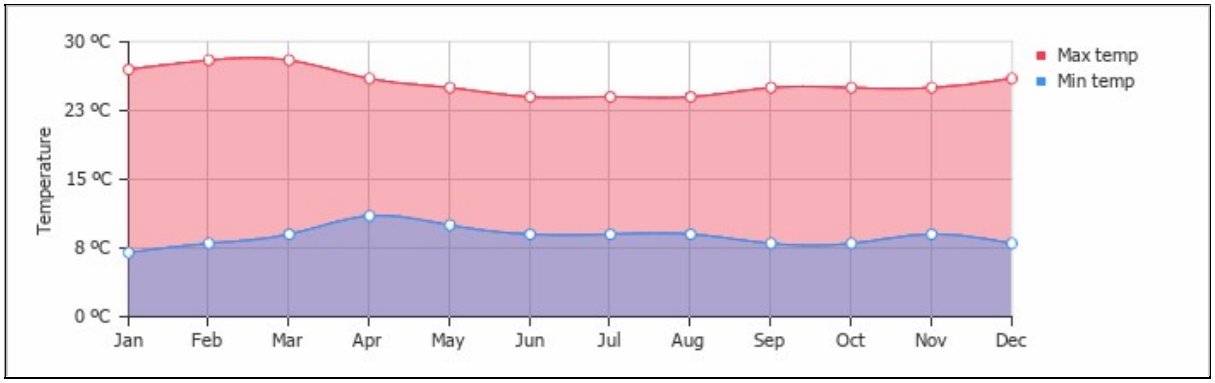


Source: www.weather-and-climate.com, 2023

ii. Temperature

The hottest months are January, February and March where temperatures go up to 19^{0}C with the month of March being the hottest. The cold season is experienced in July and August with an average temperature of 16.5^{0}C as seen in the figure below. The temperatures indicate that the area

experiences good sunshine period which can be harvested using solar panels and used for lighting and other purposes hence reducing greatly the expenditure on electricity bill. Figure below shows the maximum, minimum and average monthly temperatures within the project area.



Source: www.weather-and-climate.com, 2023

iii. Evaporation

For Nakuru city, total annual evaporation is estimated at 1579mm with maximum monthly estimated at 152mm, minimum 108mm and average 131mm. The evaporation for July is 115mm with that in April being 114mm.

4.1.2 Topography

The Nakuru peri-urban is fairly diverse from steep slopes to flat areas. Areas around the Tulwet have the steep slopes while Ngata area is fairly sloppy with undulating terrain. In Kerma, the area is gently sloppy towards the Ngata but the slope raises significantly upto tank site at Tulwet.



Topography in Tulwet area

4.1.3 Surface water and Hydrology

The project area falls under the great Lake Nakuru Drainage Basin, which is a closed drainage basin. All the water in the region flows into the Lake which is a salt water lake. It is a closed basin sandwiched between the Menengai crater, Bahati escarpment, Mau Escarpment, Eburru crater and the gentle grasslands between Lake Nakuru and Elementaita basins. In the wider Nakuru urban context there, are four main rivers namely River Njoro/ Ndarugu, Lamuriak, Enderit and Meroroni. Presence of ground water is evident in the area due to the numerous boreholes sunk for substitute water supply. There are aquifers in the area which are mostly layered discontinuous aquifers of variable potential. This project has great impacts on developments with respect to foundations and other underground excavations. The location of the boreholes are considered rich aquifer and no adverse hydrological impacts are anticipated though the rate abstraction of water during operation is envisaged to affect the aquifer.

Currently, NARUWASCO draws bulk of its water from surface water e.g., springs, rivers namely Nguso springs, Chania river, Subukia springs, and Rongai south surface water system. The water yield from these sources is 23,500m^3/day.

The water sources are as indicated in the table below.

Table 4-1: Water sources NARUWASCO

No.	Source	Output (m^3/day)
1	Great easters supply surface water (Turasha) minus supply to NAWASSCO	9,000
2	Rongai – south surface water system	5,000
3	Nguso spring	4,500
4	Chania river and Subukia springs	5,000
	Total	**23,500**

(Source: WWX WOP Nakuru, 2020)

4.1.4 Geology

The rocks of the project area are limited to the Tertiary and Pleistocene volcanic suite of central Kenya and are largely pyroclastic in origin and lava flows. Within the study area, the geological formation encountered range from grey and bleached agglomerates with Eutaxitic welded tuffs and sediments, Mau ashes with basal tuffs and are underlain at relatively shallow depths by Kericho Phonolites and Phonolitic nephnelites. Nakuru Zone is part of the Rift Valley, a tectonic structure that makes up the main geological feature of Central Eastern Africa. The Rift Valley system has faults with a variety of orientations, and the principal structures adjacent to Nakuru. There is no direct evidence of any tectonic episodes prior to the tertiary period rift faulting. The tertiary and quaternary periods contain extensive faulting, where the main feature is normal faults characterized by steep hades, commonly near the vertical and as low as 60 degrees. The geology of the project county is characterized by three main geological units, these being volcanic rocks, the Bukoban system and alluvium. The Bukoban system, which is further divided into andesites, rhyolites, basalts and the

volcanic rocks, which include phonolites, trachites and tuffs. The soil typology follows closely the underlying geology. The soils that are appearing in the volcanic foot ridges in the upper reaches as well as in the upper middle level uplands include: humic Nitosols; and mollic Andosols and Humic Ferralsols. On the lower level uplands, Rankers with Lithosols and rock outcrops occur. On the lower middle uplands, eutric Cambisols occur. In some places, these soils are gravelly and stratified and referred to as ferralic Arenosols, and in other places orthic Luvisols.

4.1.5 Land and Land Use

Nakuru, especially Ngata area is an agriculturally rich area blessed with fertile soil. Agriculture include; maize, beans, Irish potato farming and dairy production. There will be less impact on land use since the project in Kerma is in a bare land while the borehole in Roret will be within existing water project and pipeline located along the road reserve.



Maize farming and livestock rearing

4.1.6 Groundwater quality

Nakuru is known to have high fluoride levels in the groundwater. Gevera and Mouri (2018) report fluoride levels ranging from 0.5 to 72 mg/l, with an average of 11.08 mg/l. Additionally, they report a strong positive correlation with the dominant physicochemical parameters and borehole depth, and a negative correlation with calcium and water hardness. These correlations suggest that mineral dissolution and evaporative enrichment are the main processes of fluoride release and concentration in groundwater, which means that the older the groundwater, the higher the fluoride concentration. Moreover, spatial analysis showed that fluoride concentrations were not confined to a certain type of aquifer, but rather to their locations. Low-fluoride aquifers were located close to the rift's Bahati and Mau escarpments, while high fluoride aquifers were found in the rift valley floor. Dilution of groundwater by high rainfall and short residence times in the escarpment recharge zones lead to low fluoride concentrations. Dissolved solutes accumulate in the rift valley floor aquifers due to and evaporative enrichment as groundwater flows for a longer time through the sub-surface, driven by high temperatures underground. This process leads to higher fluoride concentrations.

These conclusions are somewhat confirmed by the borehole database used in this study (*Figure 4-1*). Boreholes tend to have a higher fluoride in the bottom of the Rift Valley while lower concentrations

occur on the escarpments. However, the availability of mineral data for boreholes in the latter area is very limited.

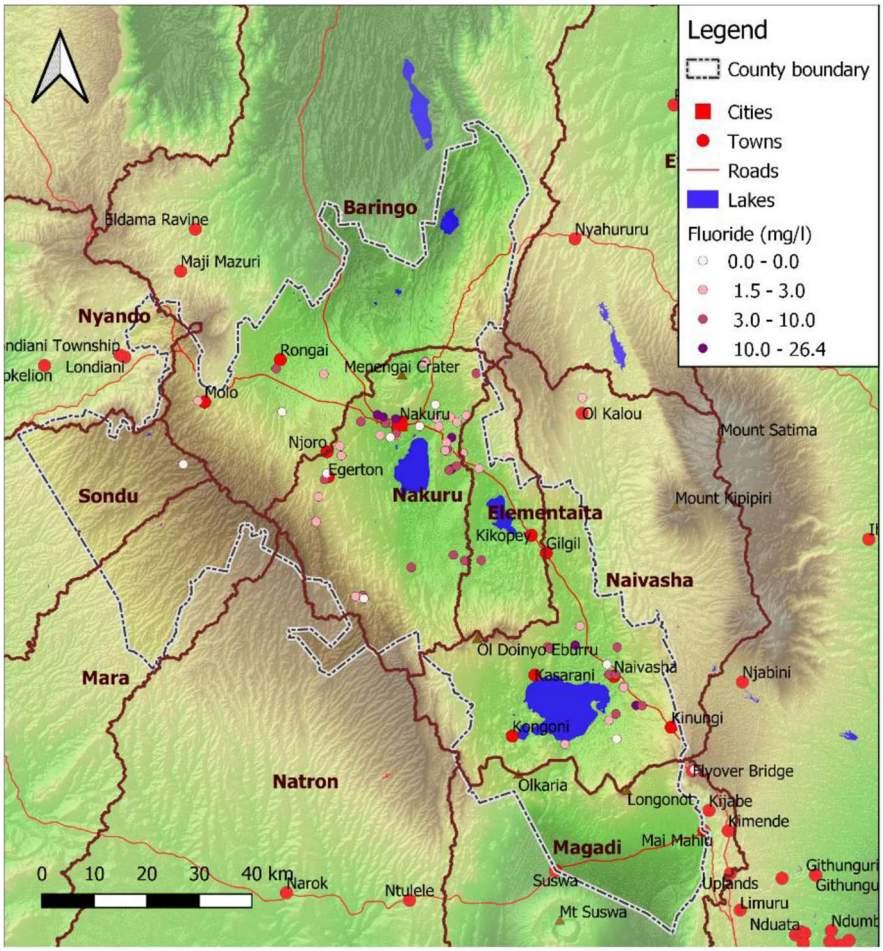


Figure 4-1. Fluoride levels in Nakuru county
(Source: Nakuru water resources report, 2009)

In general, groundwater has good microbiological and biological properties and requires minimal treatment. Unfortunately, groundwater in Nakuru is contaminated with a naturally occurring toxicant: fluoride, with levels beyond the recommended World Health Organisation (WHO) upper limit of 1.5mgF/l. The beneficial effects of ingesting fluoride to human health are limited to fluoride levels approaching 1.0 mgF/l in potable water. It is reported that drinking of water with such levels of fluoride improves skeletal and dental health. The water quality figures in terms of fluoride vary from source to source in the service area. Surface water is almost fluoride free while groundwater varies between 2.7 and 8.8mgF/l. This results in an average fluoride level in the mixed groundwater of 4.5mgF/l, see **Error! Reference source not found.**.

4.2 Biological Environment

4.2.1 Flora

The varied combination of altitude and soil result in the occurrence of seasonal vegetation types like montane forests and evergreen bush land are found in higher areas of Nakuru. Savannah (mixture of trees such as acacia and shrubs standing in tall dense perennial grass) type of vegetation and grassland is predominant in the outskirts of Nakuru city.

The project will affect few natural vegetation at the tank sites and along the pipeline route. The species of the vegetation include the shrubs, kai apples, cypress live fences etc.

4.2.2 Fauna

The Lake Nakuru is known as Important Bird Area (IBA) and holds over two hundred bird species, including the endangered and rare species such as Great Crested Grebe (critical), Maccoa Duck (endangered), African Darter, Great Egret, Saddle-billed Stork, White-backed Duck, Baillon's Crake and African Skimmer (all vulnerable). Coot and Yellow-billed Duck, which formerly could be enumerated in ten thousand, reappear in single thousands in the years when submerged aquatic plants are found. Jacana or Lily Trotter, formerly present in thousands can now only be counted in few hundred at most, concentrated on tightly-packed Hyacinth fringes in northern areas.

4.3 Socio-Economic and Cultural Environment

The socioeconomic survey was carried out during stakeholder's engagement in August 2024. The survey targeted the community within the service area of NARUWASCO. The section below discusses the findings of the survey.

4.3.1 Population characteristics and Growth Patterns

According to the Kenya National Population & Housing Census 2019, the county population stood at approximately 2,162,202. From the table, Rongai, sub county has high population of 199,906.

Table 4-2: Distribution of Population and projections by Sub-County

Name	Area (ha)	Census year 2019
Rongai	98,810	199,906

The average household in Nakuru, according to the 2019 census is approximately 5 persons. At an estimated growth rate of 3.05%, the population is estimated to be 5,487,640 people by 2050. *Figure 4-2* provides the population projection by 2050. The high population growth rate has created a predominantly youthful population, meaning that the burden to provide potable and industrial water would be high on demand.

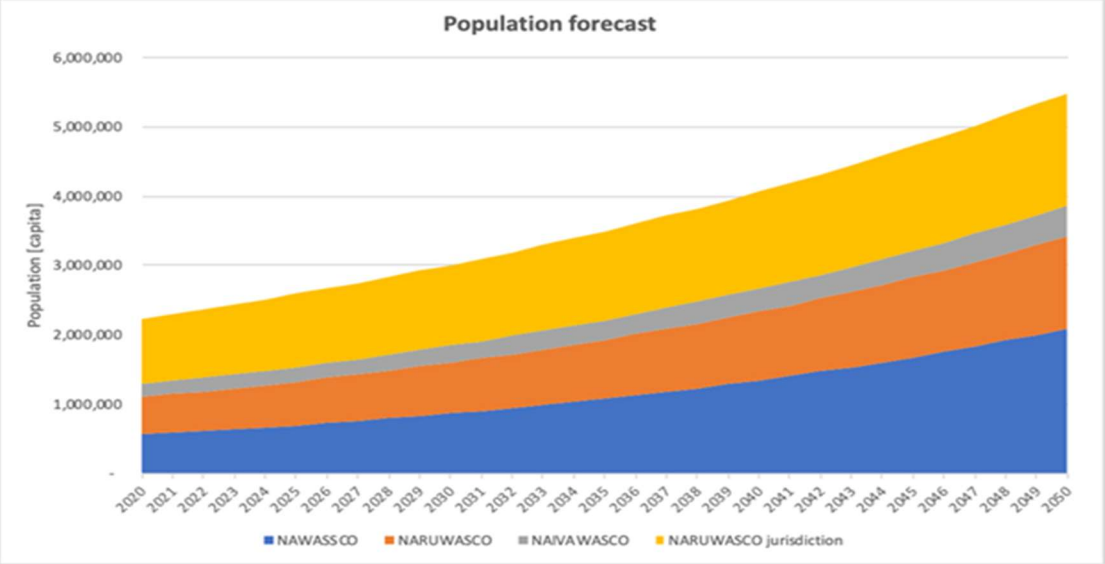


Figure 4-2: Population forecast for Nakuru County within Utilities Service Areas

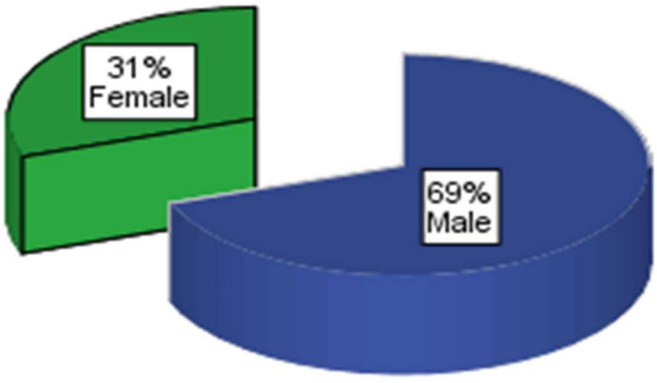
4.3.2 Survey findings

The sampling size was determined using proportionate random sampling. As shown on the table below, a sample size of 89 was selected spread across the project area under the jurisdiction of NARUWASCO.

4.3.2.1 Demographic information

(i) Gender

As indicated in the figure below, 69% of the respondents were male while 31% were female.



(ii) House hold size

As indicated in the table below the majority (72%) of the households have family members between the range of 1-5 while the least (1%) household size being between the range of 11-15.

HH Size	Percentage (%)
1-5	72%
6-10	27%
11-15	1%

(iii) Average monthly income

Most respondents (over 70%) have income of less than ksh. 20,000 per month as indicated in the table below

Amount (Kshs)	Percentage (%)
Less 5000	14
5000-10000	26
10001-20000	36
20001-50000	17
Above 50000	7

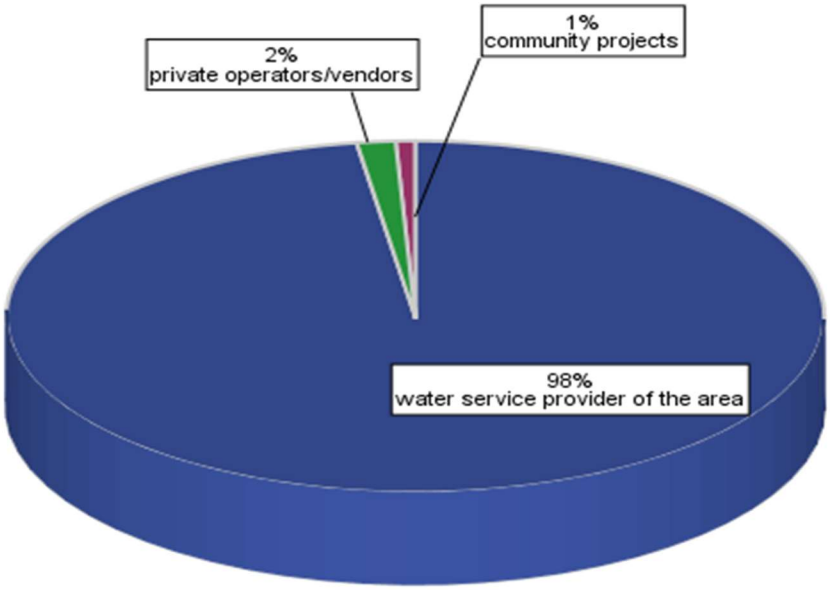
(iv) Source of income

From the table below, it was established that over 70% of the residents in the area depend on agriculture and business as their main source of income.

Source of income	Percentage (%)
Agriculture	39
Permanent employment	5
Temporary employment	16
Business	39
Others	2
Total	100.0

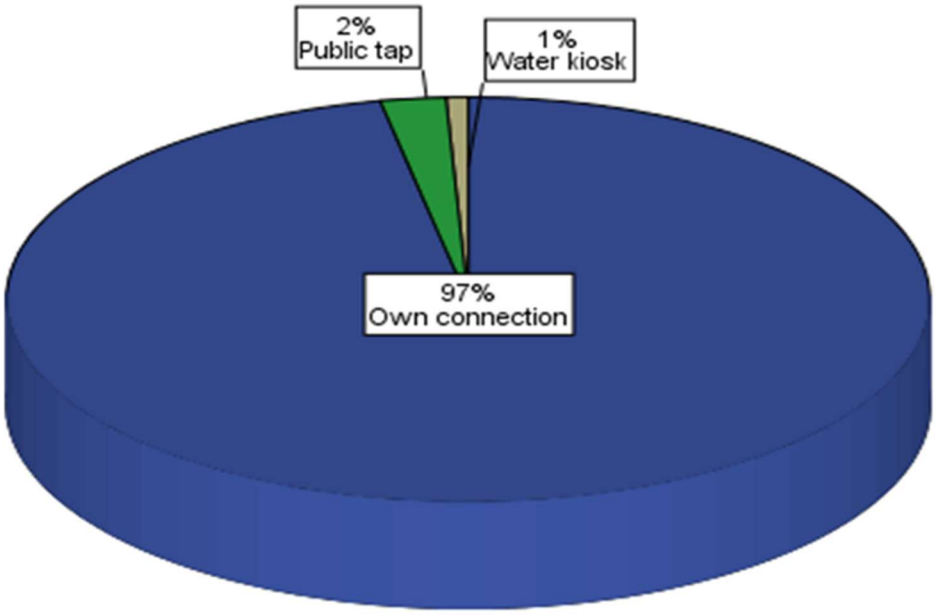
4.3.2.2 Main water supplier

As indicated in the figure below, 96% of the respondents indicated that the main water supplier is private water providers.



4.3.2.3 How do you access water from main source of water

As indicated in the figure below, 97% of the respondents are connected by own sources/neighbours while the rest get water supply through water kiosk and public tap.



4.3.2.4 What do you consider to be the main disadvantage of your most important source of water?

As per the table below, the major complain by respondents was that there was No water or not enough water supply.

Disadvantage of your important source of water	Percentage (%)
Sometimes we are not allowed to fetch water	3.8
Poor management of infrastructures	3.1
No opinion	0.8
No or not enough water	15.3
pipes and taps are leaking	9.2
Water pressure is too low	9.2
Poor water quality	3.8
Price of water is too high	9.2
Distance to the source is too long	4.6
The surroundings of the source are clean	1.5

4.3.2.5 Sanitation waste disposal

As indicated in the table below, the main method of human waste disposal for most respondents was pit latrines at 75%. Septic connection was the at 25%. There was no sewer connection in the entire service area.

Waste disposal	Percent (%)
Septic tank	25
Pit latrines	75

4.3.2.6 Spending on water supply

As indicated in the table below 78% of respondents spend less than ksh1000 per month to obtain water from the main sources.

How much can be spent per month in (Kshs)	Percentage (%)
Less than 1000	78
1000-2000	15
2001-3000	3
3001-4000	1
4001-5000	2
Above 5000	1

4.3.2.7 Ability and willingness to pay

The respondents were asked to state the amount they would be able to pay for water as well as the amount they would be willing to pay for good supply of quality water in an accessible and clean environment.

Willingness to pay

As indicated in the table below majority of consumers (85%) were willing to pay less than ksh 1,000 followed by those who are willing to pay between ksh 1001-2000. It is worth to note that, none of the respondents were willing to pay above ksh 10,000.

How much are you willing to pay per month in (Kshs)	consumers
Less than 1000	85%
1001-2000	11%
2,001-5,000	4%
5,001-10,000	0
Above 10,000	0
Total	**100%**

Ability to pay

As indicated in the table below, 90% of the consumers have the ability to spend less than 1000 per month for water supply.

How much are you able to pay per month in (Kshs)	Domestic consumers
Less than 1000	90%
1001-2000	7%
2,001-5,000	3%
5,001-10,000	0
Above 10,000	0
Total	**100%**

4.3.3 Existing water sources for NARUWASCO

Currently, NARUWASCO draws bulk of its water from surface water e.g., springs, rivers namely Nguso springs, Chania river, Subukia springs, and Rongai south surface water system. The water yield from these sources is 23,500m^3/day.

The water sources are as indicated in the table below.

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3	Nguso spring	4,500
4	Chania river and Subukia springs	5,000
	Total	**23,500**

(Source: WWX WOP Nakuru, 2020)

4.3.4 Economic activities

The main economic activities in Nakuru County are subsistence and commercial agriculture which contribute to 48% of income. Tourism in Lake Nakuru National park, energy generation in Menengai and Olkaria, large and small-scale commercial Businesses and manufacturing are the major economic activities in Nakuru county.

4.3.5 Infrastructure and Access

Nakuru County has a total of 9,654.10 Km of roads. These roads are classified into class A (International Trunk), B (National Trunk), C (Primary), D (Secondary), E (Minor), SPR (Special Purpose), U (Unclassified). Agriculture being the lifeline of the people in almost all Nakuru's sub-counties, enhanced connectivity through the provision of adequate roads by the County Government of Nakuru cannot be gainsaid. Nakuru is home to the Lanet Airstrip that was in 2017, approved for upgrade to an international airport by the ministry of Transport and county government. The proposed site is served by a network of murram roads.

4.3.6 Education and Institutions

Nakuru is also a home to numerous public and private secondary schools. Institutions and schools in the project area and will benefit from the project include: Kirobon secondary school and Kirobon primary school.

4.3.7 Industry

Nakuru is rich and diverse in industrial sector. These industries include flour milling and grain ginneries. Dairy farming is a key economic activity and provides the inputs for various milk processing plants around the town. Other manufacturing industries include cement factory in Salgaa.

4.3.8 Health facilities.

Nakuru hospital is one of the largest in the county previously the biggest in Rift Valley province. It is also home to the Nakuru War Memorial Hospital opened shortly after world war 1 by Norman Jewell to commemorate troops both African and European. There are many other private health facilities within Nakuru town offering health services to residents of Nakuru county people.

4.4 Archeological, Historical, and cultural significance

Archeological and historical sites are protected resources. They are important and increasingly rare tools for learning about the past. They may also have religious significance. Pipeline construction and drilling of boreholes can damage sites by digging, crushing by heavy equipment, uprooting trees, exposing sites to erosion or the elements, or by making the sites more accessible to vandals. Impacts can occur wherever soils will be disturbed, or where heavy equipment is used.

The proposed project is not expected to cause any damage to historical, archeological and cultural sites since the area earmarked is has no cultural or historical significance.

Chance Find Procedure

In the event that an archeological resource is discovered during the construction process a Chance Find Procedure will be implemented. A Chance Find Procedure, as described in Performance Standard 8 of IFC, is a process that prevents archeological sites from being disturbed until an assessment by a competent specialist is made and actions consistent with the requirements of PS8 are implemented. It is a project-specific procedure that outlines what will happen if previously unknown physical resources are encountered during project construction or operation. The procedure includes record keeping and expert verification procedures, chain of custody instructions for movable finds, and clear criteria for potential temporary work stoppages that could be required for rapid disposition of issues related to the finds. In accordance with this procedure, work will cease on a site where archaeological material is found. The site Environmental Officer will inspect and secure the site, and will then contact Museums of Kenya for advice and arrange for a survey or salvage work as appropriate.

4.5 Cross-cutting issues

4.5.1 HIV/AIDS

HIV prevalence in Kenya is estimated based on the Demographic and Health Survey (2003 and 2008/9), AIDS Indicator Surveys (KAIS 2012) and Antenatal Clinic (ANC) sentinel surveillance. A trend analysis starting from 1990 shows that prevalence in the general population reached a peak of 10.5% in 1995-96, after which it declined by about 40% to reach approximately 6.7% in 2003. Since then, the prevalence has remained relatively stable. The decline of the prevalence from 1995 to 2003 is partly attributed to high AIDS related mortality while the stabilization of the epidemic in the last 10 years is largely due to the rapid scale up of anti-retroviral therapy (ART) and reduction in the number of new infections that occurred during this period. (Source: Kenya AIDS Response Progress Report 2019).

Nakuru County is among the regions with low prevalence of HIV/AIDS, which were generally estimated between 3-5%. The prevalence of HIV/AIDS infection increases with proximity to the urban centers where the prevalence is estimated to be above 4.4 %. (Source: Kenya AIDS Response Progress Report 2019).

The disease has weakened the economically productive population. The most affected age group is between 15 and 49 who constitute the majority of the workforce. The scourge has contributed significantly to high incidences of poverty. The greatest impact has been on the widows who are left with the heavy burden of caring for their households. This explains the increasing number of female-headed households in the region. The number of Aids orphans has also been on the increase, resulting in a rise in the number of families headed by orphans. Most of the orphans are forced to drop out of school due to lack of school fees. Others become street children as a coping mechanism. A large amount of family resources is used for medication and other forms of care to the infected. Poverty is among the major pre disposing factors to HIV/AIDS, influx of people from outside the project area during construction and operation phases may further worsen the prevalence rates in the county.

Also, important to note is the reversal of prevalence rates during the operation phase due to improved economic situation in the counties.

4.5.2 Gender

Gender can be defined as being a male or female and translated into the opportunities enjoyed by either of the two sexes as prescribed by the societal values and norms. The society has put restrictions on these opportunities thus causing disparities between males and females. Gender pre-determines different expectations about appearances, qualities, behaviors and roles appropriate for males and females in the society. Violence occurring in the family and within the general community is a gender concern. The common violence includes wife battering, sexual abuse to girl child, rape, sexual harassment and intimidation at work.

Despite women playing a major role in provision of food, men are mainly the major decision maker which is an impediment to development. Discriminatory socio-cultural practices, low level of illiteracy and education among women has led to low participation and representation of women in decision making and economic activities. The proponent will ensure women will be given employment opportunity during construction.

4.6 Resettlement Action Plan

The project will be implemented within the already acquired land and the pipeline route will be along the road reserve. As per World bank policy, any disturbance created by the project to land improvement and businesses are entitled to compensation. The land earmarked for the boreholes and water storage tanks belong to NARUWASCO and no land acquisition is required. Also, the project will not affect structures, trees and crops which requires compensation as per the policy.

5 Public Consultation, Participation and Stakeholder Engagement

5.1 Introduction

This chapter describes the process and activities related to public consultation and stakeholder engagement that were undertaken to ensure that the relevant stakeholders and the public / community are informed about the project and are involved in the identification of key issues and impacts of the proposed project. Stakeholders are defined as persons or groups who are directly or indirectly affected by a project as well as those who may have interests in a project and / or the ability to influence its outcome, either positively or negatively.

The objectives of stakeholder engagement were;

- Share project information.
- Obtain feedback from the stakeholders.
- Bring the stakeholders up to date on the progress of the project as well as next steps to be undertaken.
- Garner support for the project hence acquiring the social license /acceptability.
- Reduce possibility of conflict through early identification of contentious issues.
- Understand culturally sensitive information about the stakeholders.

5.2 Consultation method and approach used in ESIA

Stakeholder mapping and analysis was undertaken in order to determine the particular stakeholders in the project area of influence (individuals, groups, communities, institutions/ organizations, agencies etc.) that will be affected directly or indirectly, either positively or negatively by the proposed project; or those who can contribute to, or hinder its success, and those with interests, have mandate over various issues related to the project. Overall, the critical guiding participation principles used are outlined below.

Table 5-1 Principles of Participation and how they were ensured in the ESIA process

Principle	How observed
Adaptive, communicative, meaningful and pro-active consultation	• Project information was shared in Swahili and English languages. In some cases where necessary translation was provided by a local person / someone appointed by the community or the chief. Some questions were however asked in Kiswahili, local language or English. • Information provided was extensive, detailed and providing as much information as possible but mainly revolving around dissemination of fundamental project background, objectives, scope, description of the proposed alignment, administrative footprint, potential positive and negative lenders, compensation entitlements, safety. • Effort was put towards simplification of technical processes and concepts.

Principle	How observed
Accessibility	• The locations for consultation were convenient to the stakeholders – in their offices or places where they live in the community. • Meeting venues were accessible to all those who wanted to attend; meetings were held within settlements, mainly in venues used for community meetings e.g. chiefs baraza, social halls, churches, schools, vocational centres, open air, tents, under trees. • There were no restrictions for attendance.
Inclusivity	• All the stakeholders – men, women, youth, leaders, vulnerable peoples, households etc. were notified of the meetings and involved in the meetings. • Notices for meetings were posted well in advance, announcements were made in community gatherings. • Community mobilizers were used to reach more people.
Right to questions and responses	• In line with Article 33 of the Constitution, which states that public participation should respect the freedom of expression of the participants, the stakeholders were allowed to ask questions, share their views, make recommendations, seek clarifications, make comments about all aspects of the project. • All the questions, requests for clarifications, or additional information were responded to. • Time was dedicated to a question-response session in all the engagements.

5.3 Public consultation

Public participation was mainly achieved through direct interviews, and a Baraza. The ESIA team began the public consultation process by holding preparatory meetings to strategize on how to engage the stakeholders in the ESIA process together with the chiefs, who helped in the process of identification of the significant actors/stakeholders who could provide data relevant to the proposed project.

5.3.1 Consultation with the NARUWASCO team

The consultant held a meeting with the WSPs team to understand the project design and availability of land for construction. The team was led by the Technical manager (see **Appendix A** for the attendance list).

Key issues discussed

Project design: the design of the project remains unchanged except for the change of Borehole site in Ogilgei area which was shifted to Roret because the site earlier earmarked was taken over by CRVWWDA and a borehole was drilled there. The new site belongs to Nakuru county

government which was initially earmarked by the community for the project. The county government had carried out hydrogeological survey for the site and the report was available.

Community engagement: the team assured the consultant of maximum cooperation from the community and also, they provided contact details of the area chiefs to the consultant.

5.3.2 Key informant Interviews

Key informant interviews were conducted with government agencies in Nakuru between 6th and 8th August 2024. Their comments were sought through engaging them in discussions about the proposed project and the compliance required during implementation. This kind of engagement gave the respondents the opportunity to give insights and details about the issue at hand. (see **Appendix B** for the filled questionnaires).

Table 5-2 Key Stakeholders Consulted

No	Name	Designation	Organization	Response
1.	Albert Chemju	Design Engineer	Kenya power lighting company	• The respondent is aware of the proposed project and he thinks that the project will affect the existing lines since they have to be removed to enable laying of the new pipes. • He also thinks that the implementation of the proposed project will cause interruptions of power supply to their customers which will lead to loss of revenue. • He supports the proposed project and suggests that having stakeholder engagement from the beginning of the project planning stage to completion stage will help reduce or avoid the negative impacts which may be caused during the implementation process.
2.	Gerald Mueelin	Regional engineer	KURA-South rift	• The respondent is aware and supports the proposed project and he thinks that the project will affect activities such as road wayleaves and crossings. • He anticipates that there will be traffic disruption and destruction of pavement section because the pipeline will pass along the road. • He suggests that in order to avoid the disruptions and destructions adequate provisions for reinstatement of road works for proper traffic management should be allowed.
3.	Rahap N. Nyururu	Senior hydrologist	Water Resource Authority(WRA)	• The respondent is aware of the project and he says that the proposed project will not affect their operations because he thinks the project follows the legal requirement of WRA. • He supports the proposed project and suggests that for the smooth implementation of and avoidance of the negative impacts that may occur,

No	Name	Designation	Organization	Response
				seeking authorization that is permits from WRA and installation of smart meters will help a lot.
4.	Kevin Kimwede	Water engineer	County government of Nakuru	• The respondent supports the proposed project because it will lead to an increase in water supply in Nakuru city and Njoro town. • He is aware of the proposed project, and he says that the project will not affect their operations in any other way. • He suggests that to avoid the negative impacts for example over obstruction which can lead to aquiver depletion, obstructing the safe yield from the borehole will help a lot.
5.	Dr. Maara Nelson	CEC-water	Nakuru county government	• The respondent is aware of the proposed project and supports the project because the Nakuru residents will benefit from the increased water supply, improve in sanitation and hygiene.

5.3.3 Public *baraza* with the community

Objectives of community consultation meetings

- To share and sensitize the community about the proposed project
- To obtain feedback from the community about the project.
- Promote community understanding of the issues and scope of the project with respect to the key project components.
- Learn how to work with the community to ensure that their concerns and aspirations are understood and considered in the ESIA report, and to assure them that their aspirations would be directly reflected in the report.
- Empower the community to make them partners in every aspect / stage of decision making of the project
- Identify and establish a communication channel between the community, the consultants, project proponents and government.

The Notices were distributed to the community, posted in public spaces including markets and chiefs offices. Also, the chief shared in his whatApp platform/group the notices with the community and also sending messages to community members at random. Details of Minutes of Meetings and attendance list is placed at **Appendix- C, and Appendix D** respectively. The meeting was held on 6th August 2024.

Participants

i. The community
   The 82 people (Males =65, Females = 17)
ii. Consultant
iii. Technical team (NARUWASCO)

iv. Leaders present

- Alex Langat - Area MCA
- Augustine Rotich- Area Chief
- Lucia Akai-SNR. Asst Chief
- Richard Rotich-ASN. Asst Chief
- Koech Charles-Asst Chief
- Timothy Tirop Manyibei-Asst Chief

Issues raised

No.	Issues raised	Responses
1	There is insufficient amount of water within the area particularly Kerma area, how will they benefit from the new proposed project.	NARUWASCO staff (Caroline Rotich) responded that water infrastructure within the area is not well developed, community is facing challenges of continuous water Supply due to poor network system. She assured the community that first thing they will do is to do the hydrological survey there after construct tanks after which customers will get the supply of water near their homesteads. The new project will improve water reliability and quality.
	When will the proposed project start?	The Consultant responded that the project will commence immediately after getting the license from NEMA which will take a period of 21 days after getting the report there after if licensed by NEMA the contractor will be assigned to start the project.
2	How will the people from Mambwe village in Kirobon area get access to the new proposed project?	The consultant responded that it is not necessarily you are near a borehole that you can only get access to water rather the new tanks will be placed at high points for example at Tulwet area where the water will then be supplied to the people at the lower regions by gravity and Kirobon area being one of them will benefit.
3	Which routes will the pipelines pass through?	The consultant responded that the road reserves will be used for the pipelines and if the line passes through someone's land he or she will be notified in advance on the same to avoid disputes and other factors that may lead to the interference of the proposed project.
	Which are the exact places where the bore holes will be placed?	M/s. Rotich responded that the bore holes will be situated at Kerma and Roret area.
4	How will the people living far from the project area benefit?	The consultant responded that since there will be installation of two 100m^3 and one 300m^3 tanks there will be enough amount of water to be distributed to the people living around the area, M/s. Rotich further explained how they can be connected to their homes under a procedure that is required and which the community is aware.
5	How will the people from the lower regions receive water?	The consultant responded and explained that the water from the boreholes will be pumped to higher regions for

No.	Issues raised	Responses
		example at Tulwet area where now the water will be supplied to the people living in the lower regions through gravity.
6	Which role does the county government play in the proposed project?	The consultant explained that the project is funded by the world bank through WSTF and the county government through NARUWASCO has the role to ensure the project is implemented.
7	Who is concerned with the risks of the proposed project?	The project will be supervised by NARUWASCO to ensure the risks are avoided and minimized.
8	What is the capacity of the tanks that will be put in place?	1no steel ground tank 300m^3 and 2no .100m^3 steel tanks.
	What is the type of the tank that will be constructed?	The material that will be used is steel.
9	Which safety measures will be taken during and after the project is being done?	The ESIA consultant provided comprehensive safety mitigation measures that will be taken during and after the project to ensure community well-being and improve water reliability and quality: 1. Construction sites will be secured with appropriate barriers and signage to prevent unauthorized access. 2. Regular updates will be provided to the community regarding project progress, potential disruptions, and safety guidelines. A dedicated contact point will be established for residents to report concerns or incidents.
10	How will NARUWASCO ensure that all people get water?	M/s. Rotich responded that the everybody will get water starting with few people as the time goes by and eventually everybody will get access to water and she urged the community members to follow due process in pipeline connections to their homes from NARUWASCO office and assured everyone will be served well.





Public meeting at chief's office, Ngata

6 Project Alternatives

This chapter seeks to identify project alternatives that can help achieve the desired objectives of the Project while at the same time causing minimal damage to the environment and the natural resource base. Other considerations include project sustainability in terms of management capabilities and technology used. The purpose of including alternative in the ESIA is to identify and evaluate alternative actions that accomplish similar goals and promote sustainability development.

Alternatives may include both design and location options. Allowing new alternatives and objectives to evolve in relation to environmental conditions and public preferences may be a solution to most of the environmental and socio-economic problems associated with the implementation of new projects.

An important alternative to be analyzed always is the "no project". This is a very important analysis because it helps the proponents measure the impacts from the project against those which would have taken place without the project.

6.1 'No Project' Alternative

The no-action alternative is often defined by the baseline information and is crucial in the assessment of impact because other alternatives are weighed with reference to it. This alternative would mean that the project does not proceed. Without the project, the environmental situation will neither improve nor can we say that it will necessarily deteriorate. Development of the project on the other hand will improve water provision to the communities living within Ngata area, Rongai subcounty. The no-project option will however lead to the following (general) major negative and long-term impacts:

- The targeted populations (for water provision) will continue to use the existing water supply sources which is erratic, inadequate and expensive; and in some cases, the quality of the source is unknown.
- Stagnating growth of Ngata area and Nakuru County in general
- There will be loss of productivity and reduced ability to create wealth.

The *No Project alternative* is therefore not a viable alternative as the proposed water supply project will relieve the people of water problem. If this is applied then the shortage of water in the area will persist.

6.2 Project Location for Proposed Boreholes

The boreholes will be located in Kerma and Roret areas. Hydrogeological survey reports were done and this are the guiding study on availability of a very rich aquifer in the proposed sites. Also, several factors have been considered in the selection of the site including.

- Available land
- Area not be susceptible to flooding

- It should be close to electricity services
- It should not require the construction of a long length of pipeline

6.3 Alternative pipeline Routes

The proposed route will be a long road reserves of Ngata access roads which are murram and 9m width. Alternative siting will involve rerouting the water pipeline network to other sites other than along road networks. This will be very costly for the proponent as it will require them to search and negotiate for land. It also does not make any economic sense not to take advantage of the land available along road networks clearly demarcated for such projects.

6.4 Alternative sources of water

The surface water resources is an alternative source within Nakuru. These resources vary in terms of quality and quantity depending on the source and the formation of where the rivers and streams flow along. The main river within Rongai sub county is Ndarugu which has no sufficient water for abstraction. The river is small in size and other rivers are seasonal and flow only in selected months of the year mainly during the wet/rainy seasons.

6.5 Alternatives pipeline material

Materials commonly used to construct water pipes include polyvinyl chloride (uPVC), cast iron, copper, steel and in older systems concrete or fired clay. Joining individual water pipe lengths to make up extended runs is possible with flange, nipple, compression or soldered joints. The project will use High-density polyethylene (HDPE) is a thermoplastic polymer produced from the monomer ethylene with a high strength-to-density ratio, HDPE is used in the production of corrosion-resistant piping.

7 Potential Environmental & Social Impacts and Mitigation Measures

This chapter describes possible impacts during construction, operation and decommissioning phases as well as corresponding mitigation measures to minimize the negative impacts of the proposed project. The identified impacts/risks are further analyzed and evaluated based on the nature of impacts in terms of their occurrence, extent, duration, probability and intensity apart from the stakeholders and/or values affected.

7.1 Methodology for Impact Assessment

Environmental assessment was carried out to identify potential impacts of the project on the environment, biodiversity and the community. The assessment was carried out in three main steps, as follows:

- Prediction of potential impacts
- Execution of specialised ecological studies on biodiversity and evaluation and assessment of the impacts in terms of their significance
- Identification/ proposing mitigation measures for minimizing the effects of the significant impacts.

After exclusion of the negligible impacts, the remaining aspects were assessed based on the following criteria:

- Magnitude of the impact;
- Duration: period of time that impact lasts;
- Mitigation measures; its availability whether integrated in the project design or implemented as management measures;
- Residual impacts.

Where negative environmental impacts are expected, majority of them will be experienced during the construction phase. To help offset the potential negative impacts, mitigation measures are suggested and the residual impact evaluated.

7.1.1 Identification of Project Impacts

The identification of project impacts was by subjecting the project activities to a process of screening. This was an iterative process that comes to an end only when the effects of all the identified impacts generated by the project, including residual impacts have been assessed and assigned a mitigation strategy. The process involved the following steps:

- Impact Prediction and evaluation
- Mitigation and Enhancement
- Residual Impact Evaluation

7.1.2 Impacts that will occur during construction

The construction activities that will give rise to environmental and social Impacts are listed below:

- Site Clearing

- Site Excavation and Levelling
- The process of Hauling Earth and other materials and wastes
- Handling and Storage of material
- Drilling and Cutting activities
- Generated domestic and other site wastes including sanitary waste

Evaluation was carried out on the positive and negative impacts considering the following:

- The Health and Safety Aspects
- Ecological Aspects
- Environmental Aspects
- Social Aspects

7.1.3 Categorization of Impacts

The key issues identified during the assessment were evaluated using various components that individually or in combination with others give rise to impacts that require mitigation measures and monitoring. The significance of the potential impacts has been considered before and after mitigation measures have been applied. The following criteria was used to evaluate the significance of impact of the project on the physical environment, community and the biological environment.

Table 7-1: Categorization of Impacts

No	Impact	Criteria	Classification
1	Impact Nature	An assessment of the type of effect the activity is likely to have on the surrounding project's environment	***Positive*** *– Affecting the environment positively*
			Negative *– Affecting the environment negatively*
			Neutral *– No effect on the environment*
2	Impact Type	Evaluation of how the impact will affect the project's environment	***Direct*** *– Impacts will be generated directly from project activities*
			Indirect – *Impact generated from secondary sources*
3	Impact Severity	This defines the degree to which the project affects the environment	***Insignificant***– *Potential impacts are minor. The natural environment is not affected by the project*
			Low *– There is minimal effect on the natural environment. The social, cultural and natural, cultural and social functions and processes can be reversed to their original state if mitigation measure are applied*

No	Impact	Criteria	Classification
			Medium *– Environment is Impacted but can still function. Negative impacts can only be partially reversed*
			High *– Environmental, Cultural and social functions and processes are* *Impacted and cannot be fully reversed*
			Very High *- Environmental, Cultural and social functions and processes are* *Permanently Impacted and cannot be reversed*
4	Impact Duration	The period of time that the impact lasts on the environment	***Short Term*** *– The potential impacts only last for a short time - the period of construction or less.*
			Medium – Term *– The potential impacts last for approximately 10 years or half the lifetime of the project*
			Long – Term *–potential impacts can last for complete life cycle of the project*
			Permanent But Mitigated - *Impact will remain after operational life of project but appropriate mitigation measures have been used to reduce the impacts*
			Permanent But Not Mitigated - *Impact will remain after an operational life of the project. No mitigation measures will reduce impact after implementation*
5	Impact Extent	Defines the spatial or geographical extent that may be affected by the project or associated facilities	***Project Site*** *– Within the project boundary*
			Local *– Impacts extend beyond the project site*
			Regional *– Impacts extend beyond the administrative area*
			National *– Impacts are considered nationally*
			Transboundary *– impacts are considered beyond the nation's boundary*
6	Likelihood of Occurrence	Defines the chances that the impact will take place	***Unlikely*** *– No chance that impact will occur*
			Likely *– There is a good chance that the impact will occur*
			Certain *– The impact will occur whether mitigation measures are implemented or not*
7	Potential for irreplaceable	This defines the degree to which	***Low*** *– No or minimal impact will occur on irreplaceable resource*

No	Impact	Criteria	Classification
	loss of resource	the project can cause the loss of a resource that cannot be replaced	***Medium*** *– Impacted unique resource can be replaced with mitigation measures after a period of time*
			High *– A high chance the irreplaceable resource will be impacted*
8	Impact Magnitude	This defines the intensity of the change that has the potential to occur	***Insignificant*** *– The magnitude of the impact has no effect on the environment*
			Low *- There is magnitude of the impact has minimal effect on the natural environment*
			Medium-Low *– The magnitude of the impact has some effect on the environment but can be easily reversed with mitigation measures*
			Medium-High *– The magnitude of impact is significant and requires more effort to reverse them through mitigations*
			High *– The intensity of the impact high and only a small and mitigations can only reverse a very small portion.*
			Very High *– The environmental, social and cultural aspects of the project are permanently impacted and mitigation measures cannot reverse the impacts*
9	Impact Significance	The significance will be rated by combining the consequence of the impact and the probability of occurrence	***Negligible – No Action required***
			Low *– The impacts are within the acceptable range*
			Medium-Low *- Impacts are within the acceptable range but should be mitigated to lower significance levels wherever possible*
			Medium-High - Impacts are significant and require attention
			High *- Impacts are of great importance, mitigation is crucial*
			Very High *– Impacts are very significant. Potential impacts such as loss of a significant portion of a valued species or loss of effective ecosystem function*

7.2 Positive Impacts

7.2.1 Creation of employment

During the construction of the proposed Project, there will be employment opportunities for both professionals and unskilled workers. Several workers including casual labourers, plumbers and

engineers are expected to work on the project during the construction period. Semi-skilled, unskilled labourers and formal employees are expected to obtain gainful employment during the period of construction. With labour intensive construction technologies, the project will provide employment for youths and provide support to the Government of Kenya initiatives on creation of jobs.

The creation of employment opportunities is also beneficial from social point of view given the engagement of workers in productive employment, minimizing social ills like alcohol abuse. This positive social change in the social behaviour will be one of the anticipated transformational indicators in the project area.

7.2.1 Access to safe drinking water

The proposed drilling of 2no. boreholes and distribution network proposed will increase access to safe drinking water to the people of Ngata area leading to improved standard of living; and changes in exposure to both communicable and non-communicable diseases.

7.2.2 Injection of money into the local economy

A large sum of the project money shall be released into the local economy due to the construction activities. This money will be in form of payments for skilled and unskilled labour; Purchases of construction materials; and payments for local provisions including fuel, foods and accommodation.

7.2.3 Gender Considerations

Access to water would improve the quality of life and reduce the time for women especially during fetching of water, hence, availing more time for other activities. Many literatures on gender and water suggests that access to water promotes gender empowerment, better access to education, and healthcare to women and girls.

7.3 Negative Impacts during construction

7.3.1 Soil Erosion & Slope instability

The activities involved in the construction phase of the project may have a major negative short-term impact on soil. This is due to the change of soil structure due to vegetation clearance, and excavation during pipeline layout which will leave considerable areas of soil exposed to the elements, which may result in soil erosion. Heavy machinery will be traversing the site due to the construction activities this may lead to soil compaction and erosion of the soil. Drilling of boreholes and excavation would involve generation heaps of excavated earth. After utilizing the excavated earth for backfilling any surplus earth should be properly managed to minimize impact on the surrounding environment. Soil erosion and slope instability will be a major issue particularly in sloppy areas like Tulwet area, for which contractor shall require to take additional measures to prevent soil erosion. During excavation of trenches, there are

Impact	Soil erosion and slope instability from Construction Activities
Impact Nature	Negative

Impact Type	Direct
Impact Severity	Low
Impact Duration	Short Term
Impact Extent	Project Site
Likelihood of Occurrence	Low
Potential for Irreplaceable loss of resource	Medium
Impact Magnitude	Medium Low
	The impact magnitude is considered medium-low because the activities will be localized.
Impact Significance	Low
	The impact significance is considered low because small areas will be disturbed during water storage tank construction and laying of pipeline.

Mitigation Measures:

- excavation in the sloppy areas should be avoided in rainy days
- soil excavated for pipeline should be utilized for backfilling and the remaining soil being spread evenly and compacted.
- Top soil disturbed during the development of sites are used to restore the surface of the platform.
- Only remove vegetation from areas for the project footprint construction;
- Avoid as far as possible the traversing of bare soil by vehicles to reduce soil compaction;

7.3.2 Waste disposal

Drilling of the boreholes will result in generation of wastewater e.g. the drilling fluid; water from flushing; ground water influx, Cuttings and waste material which must be handled carefully to prevent the leaching of contaminants into the aquifer.

The construction activities: site preparation, clearance, excavation works, servicing and repair of machinery & vehicles, tank construction, equipping of boreholes will generate solid and liquid waste. At the end of construction, the demobilisation will also generate significant waste from demolishing laydown areas, other construction wastes and removal of drilling machinery. The wastes range from general to hazardous categories. This impact is short term. However, the disposal mechanism of the wastes can have long term consequences. Solid waste like packing materials, pipes, cables, sand, aggregate material, and steel generated during construction will be carefully handled and removed from the sites periodically to avoid any contamination. Also, the system helps in avoiding accidents through contamination, spills and fire.

The above wastes include the following:

Domestic waste – Waste food, food wrappings, cans, bottles and other spoilt containers. Sanitation wastewater.

Construction wastes – Packaging waste, scrap metals, construction debris, disused parts.

Receptors

The improper handling of domestic solid waste that includes papers and food wrappings may lead to them littering the site compound and being blown away to neighbouring areas. The other domestic solid wastes may litter the site compound and make it unhealthy for workers. Waste from construction activities if not well handled may pose health and safety risk to workers and other persons visiting the site.

The sanitation facilities at the site must be made to work properly. Sanitation waste can also overflow and cause health risk to workers and people visiting the site.

Table 7-2: Generation, Storage and Disposal of Solid and Liquid Waste

Impact	Waste Impacts from Construction Activities
Impact Nature	Negative
Impact Type	Direct
Impact Severity	Low
Impact Duration	Short Term
Impact Extent	Project Site
Likelihood of Occurrence	Medium
Potential for Irreplaceable loss of resource	Low
Impact Magnitude	Low
	The impact magnitude is considered low since the construction waste will be minimal
Impact Significance	Low

Mitigation measures

- Implementing strict protocols for the handling and disposal of drilling waste and chemicals.
- Adopting Cleaner Technologies: Using drilling techniques and machinery that minimize dust, noise, and chemical usage.
- Providing waste collection bins at designated points on site for purposes of waste segregation
- All solid waste should be collected at a central location at each site and will be stored temporarily until removal to an appropriately permitted disposal site. The approved disposal sites are available in Nakuru county and the contractor will choose the nearest disposal site.
- No dumping within the surrounding area is to be permitted unless at designated disposal sites. Where potentially hazardous substances are being disposed off, a chain of custody document should be kept with the environmental register as proof of final disposal.
- Waste generated at the site should be segregated by the contractor and disposed of in recommended manner. Wherever possible recycling should be carried out.
- Following EMCA regulations on Waste Management, 2006 Legal Notice 121, the Contractor should prepare for use an elaborate Waste Management Plan
- Reducing material residual wastes through accurate estimation of size and quantity.

- Recycle and re-use of construction materials. Use of durable long-lasting materials that will not need to be replaced as often, thereby reducing the amount of construction waste generated over time.
- Reuse of materials and packaging material to reduce waste.
- Disposal of waste to be done by a NEMA licensed waste handler.
- Appropriately positioned waste bins shall be provided (easy to locate and near areas where waste is generated).

7.3.3 Air pollution

a) Gaseous Emissions

Emissions associated with combustion of fuel from the drilling equipment and vehicles. These emissions may be in the form of oxides of nitrogen as well as volatile organic carbons. Similar to other combustion processes, emissions from vehicles include CO, NOx, SO_2, and VOCs. Emissions from the construction vehicles should comply with national or international standards. This will be relevant to sensitive receptors e.g. borehole drilling at Roret.

Mitigation measures

- Regardless of the size or type of vehicle, operators should implement the manufacturer recommended engine maintenance plans;
- Contractor should consider additional ways to reduce potential impacts including implementing a regular vehicle maintenance and repair plan.
- Ensure that all vehicles involved in the transport of construction material and staff, and machinery involved in the construction is properly maintained and serviced.
- Machines must not be left idling for unnecessary periods of time; this will save fuel and reduce emissions.

b) Particulate Matter/ dust

The most common pollutant involved in fugitive emissions is dust or Particulate Matter (PM). This will be released during excavations, drilling works, movement of vehicles as well as materials delivery. Also, open storage of solid and dry materials such as sand, cement, gravel, will generate dust. The borehole site at Kerma and Roret project area is accessed through tarmacked and murram roads, the pipeline route will be along the road reserve which is expected to generate dust.

Impact	Air pollution Impacts from Construction Activities
Impact Nature	Negative
Impact Type	Direct
Impact Severity	Medium
Impact Duration	Short Term
Impact Extent	Local
Likelihood of Occurrence	Medium
Potential for Irreplaceable loss of resource	Medium

Impact Magnitude	Medium High
	The impact magnitude is considered medium-high due to residential areas in the project site.
Impact Significance	Medium-High
	The impact significance is considered medium-high due to presence of settlements within the project site.

Mitigation measures

- Use of dust control methods, such as covers, water suppression, or increased moisture content for open materials storage piles, or controls;
- Extra care must be taken to reduce dust in periods when wind speed is greatest and the rainfall amounts are lowest. This will involve extra wetting of the construction area to suppress dust particles.
- All raw materials must be sourced as close as possible to the construction site thus reducing the emissions from vehicular traffic.
- Exposed soils should be compacted for prevention of dust

7.3.4 Impacts on fauna

During construction of the project, there will be localised disturbance of fauna especially during drilling works, excavations for pipeline and construction of storage tanks. The pipeline route will affect vegetation along the road. There will be potential loss of habitats for small mammals, reptiles, birds, invertebrates etc when vegetation is affected. The species at sites has been discussed in detailed in section 4.2.

Impact	Impact on Fauna
Impact Nature	Negative
Impact Type	Direct
Impact Severity	Medium -Low
	The impact severity is medium- low since the project area is located in the disturbed areas.
Impact Duration	Long Term
Impact Extent	Project site
Likelihood of Occurrence	Medium
Potential for Irreplaceable loss of resource	Medium
Impact Magnitude	Medium Low
	The impact magnitude is considered medium low since the boreholes and pipeline will take a small area.
Impact Significance	Medium-Low
	The impact significance is considered medium-low due to presence of mammals within the project site.

Mitigation Measures

The mitigation measures to minimise the potential impacts on mammals include:

- There should be no killing or harassing of any wildlife escaping/fleeing to other areas during vegetation clearing process
- Restrict construction works within the site and avoid unnecessary disturbance of habitats

Significance of Impact

The mitigation measures provided are intended to reduce impacts on the fauna. If the mitigation measures are not implemented, the impact magnitude would be medium-low. However, with the proposed mitigation measures in place, the impact on fauna would be significantly reduced and the impact significance would be reduced to low. It is therefore important that the proposed mitigations are implemented to ensure the fauna at the site is protected.

Impact	Scenario	Duration	Extent	Severity	Impact Magnitude	Potential for Irreplaceable loss of resource	Impact Significance
Impact on Fauna (Mammals)	Without Mitigation	Long Term	Local	Medium	Medium-low	Medium	Medium-Low
	With Mitigation	Long Term	Local	Low	Low	Low	Low

7.3.5 Impact on Flora (Natural Vegetation)

The vegetation at boreholes site and along the pipeline route is dominated by indigenous and exotic vegetation. No threatened species was found in the area which is also protected against trade under CITES. During project implementation of the project, there will be clearing of vegetation. This may lead to removal or disturbance of the vegetation.

Impact	Impact on Flora
Impact Nature	Negative
Impact Type	Direct
Impact Severity	Medium
	The impact severity is low since the project area has few vegetation (trees).
Impact Duration	Long Term
Impact Extent	Project site
Likelihood of Occurrence	Low
Potential for Irreplaceable loss of resource	Low
Impact Magnitude	Medium Low
	The impact magnitude is considered low due to presence of trees.
Impact Significance	Low
	The impact significance is considered medium low due to presence of vegetation within the project site.

Mitigation Measures

The impact on ground cover will be restricted to the initial construction period, after which the ground cover is expected to be restored by re-vegetation.

Significance of Impact

The mitigation measures provided are intended to reduce impacts on the flora. If the mitigation measures are not implemented, the impact would be medium-low. However, with the proposed mitigation measures in place, the impact on flora would be reduced and the impact significance would be low and turn to positive gain since the site plants will be rejuvenated.

Impact	Scenario	Duration	Extent	Severity	Impact Magnitude	Potential for Irreplaceable loss of resource	Impact Significance
Impact on Flora	Without Mitigation	Long Term	Project Site	Medium	Medium-Low	Medium	Medium-Low
	With Mitigation	Long Term	Project Site	Low	Low	Low	Turn to Positive

7.3.6 Noise and vibration

The site preparation for the storage tanks and drilling of boreholes during construction phases may have the most negative impact to the ambient noise and vibration in the project area especially the settlement and Roret within the proximity of the active sites. Some noise is unavoidable during drilling like noise produced by drilling machine which are temporary and only in day time. A number of measures may be undertaken by the Contractors to reduce the impact of noise on residents as well as the workers involved in the project. This is temporary, however, and the aim at this point is to make the increase in noise as small as possible until this phase is complete. The cumulative impact of the construction activities occurring simultaneously may increase the noise and vibration levels in the area significantly.

Impact	Noise and vibration from Construction Activities
Impact Nature	Negative
Impact Type	Direct
Impact Severity	Medium
Impact Duration	Short Term
Impact Extent	Local
Likelihood of Occurrence	Medium
Potential for Irreplaceable loss of resource	Medium
Impact Magnitude	Medium High
	The impact magnitude is considered medium-high due to presence of settlements within the project sites.
Impact Significance	Medium-High

	The impact significance is considered medium-high due to presence of settlements within the project sites.

Mitigation Measures

- Construction hours should be limited to the hours of 8:00 a.m. and 6:00 p.m. daily
- Construction activities should be undertaken through the use of small mechanical devices and manual labour, as much as practically possible.
- Ensure that construction activities for the project are staggered to decrease the levels of noise and vibration in the area
- Where possible silenced machinery and instruments should be employed to reduce the impact of noise on the existing residents and workers.
- Machinery, vehicles and instruments that emit high levels of noise should be used on a phased basis to reduce the overall impact. Equipment such as drills should also be used when the least number of residents can be expected to be affected, for example during periods where most residents are at work.

The noise emissions will largely take place inside the site and therefore attenuate to manageable levels when going beyond the site boundary. The impact magnitude is considered medium-high due to presence of sensitive receptors like settlements and schools close to the site but if the mitigation measures are implemented the significance of impact will be low.

Impact	Scenario	Duration	Extent	Severity	Magnitude	Potential for Irreplaceable loss of resource	Impact Significance
Noise Impacts	Without Mitigation	Short Term	Local	Medium	Medium-High	Medium	Medium-High
	With Mitigation	Short Term	Local	Low	Low	Low	Low

7.3.7 Impacts on soil and water

The impacts will be related to the borehole drilling. if the impacts occur, they would be caused by:

- oil spills resulting from fueling or maintenance activities of construction machines or poorly maintained construction machines,
- sediment runoff from borehole site works or route clearing,
- disturbance of vegetation.

The magnitude of this impact is likely to be low considering the water bodies are far from site.

Impact	Impacts on soil and Surface water from Construction Activities
Impact Nature	Negative
Impact Type	Direct
Impact Severity	Medium
Impact Duration	Long Term

Impact Extent	Local
Likelihood of Occurrence	Medium
Potential for Irreplaceable loss of resource	Medium
Impact Magnitude	Low
	The impact magnitude is considered low since no water bodies around
Impact Significance	Low
	The impact significance is considered low

Mitigation Measures

- Set up measures for spill prevention and measures to prevent seeping of contaminants i.e., designated concrete impervious areas for repairs, refueling and oiling.
- Products such as lubricants and oils should also be well labelled and stored appropriately at their designated storage areas.
- Prepare and display on site spill response procedures and train all the workers on response management.
- Carry out inspection of all machinery and vehicles working at the do not have any oil, hydraulic fluid or fuel leaks before being used at the site
- Maintain spill response kits at the site office.
- Exercise use of water-based fluids including non-toxic chemicals.
- Ensure that no sanitary or waste water is discharged irrationally and ensure compliance with the set legislation on waste water treatment before discharge
- If construction is in progress during rainy periods, temporary catch basins or sediment traps could be prepared if excessive erosion occurs at any particular project site.

Significance of Impact

The impacts of soil and surface water contamination can be significant if mitigation measures are not implemented. The impact magnitude is considered medium due to presence fragile ecosystem, however, if the mitigation measures are implemented the significance of impact will be low.

Impact	Scenario	Duration	Extent	Severity	Magnitude	Potential for Irreplaceable loss of resource	Impact Significance
Impact on soil and Water Sources	Without Mitigation	Long Term	Project Site	Medium	Medium	Medium	Medium
	With Mitigation	Short Term	Project Site	Low	Low	Low	Low

7.3.8 Interference with drainage pattern

As the water pipelines are constructed along the road reserves and the blockage of ground surface is very high, there is high possibility of affecting drainage along Ngata roads. However, management

measures like appropriate siting of the pipeline route should be undertaken during design to avoid any incidence of flooding hazards due to interference with drainage patterns. In the infrequent instances where the natural flow/drainage is affected, flow will be trained and guided to safe zones. Similarly, due to excessive rainfall, water pipelines might be washed away due to high runoff.

Impact	Interference with drainage pattern
Impact Nature	Negative
Impact Type	Direct
Impact Severity	Low
Impact Duration	Short Term
Impact Extent	Local
Likelihood of Occurrence	Low
Potential for Irreplaceable loss of resource	Low
Impact Magnitude	Medium Low
	The impact magnitude is considered medium-low due to sloppy areas in Kerma and Roret.
Impact Significance	Medium-low
	The impact significance is considered medium-low due to high rainwater surface run off from Tulwet.

Mitigation measures

- Reduce the use of heavy machinery where possible.
- Avoid construction activities near drainage channels
- Use existing road network to minimize clearance of pipeline corridor

7.3.9 Disturbance of Traffic or blockage of access

The entire project will use road reserve for the pipeline route. The murram roads, which will be affected, have low traffic. The disturbance of traffic or blockage of access will be low though pipeline road crossing can result to blockage.

Access to the premises will be affected because the project will be aligned along the road which is used by the residents to access their premises. The excavation works for the laying of pipeline will cut-off this access hence, inconveniencing the users.

Impact	Disturbance of Traffic or blockage of access
Impact Nature	Negative
Impact Type	Direct
Impact Severity	Medium
Impact Duration	Short Term
Impact Extent	Local
Likelihood of Occurrence	Medium
Potential for Irreplaceable loss of resource	Medium
Impact Magnitude	Medium

	The impact magnitude is considered medium due to traffic along the pipeline route.
Impact Significance	Medium
	The impact significance is considered medium due to road access

Mitigation measures

- Measures will be put in place to ensure that same-day operation of trenching and backfilling is implemented; excavate only what can be backfilled in a day; prioritize backfilling at accesses; provide access ramps across open excavations
- Micro-tunnelling across the tarmacked road would also be an option if it is applicable
- Erect warning signs of on-going works when a pipeline crosses the road. Adequate care/caution is taken so as not to cause any hindrance to the movement of traffic.
- Excavation should be carried out during lean traffic period in consultation with the concerned authorities.
- Expedite construction works so as to reduce the times where roads are blocked.
- Alternatives access ways should be communicated to the community.
- The Contractor shall post traffic controllers/marshals at active vehicle movement areas to ensure there is order and observance of traffic requirements.

7.3.10 Loss of Biodiversity

Environmental and biodiversity compliance is crucial when constructing the project. Ground protection is important in biodiversity sensitive areas with remote access. During construction of the project, there will be localised disturbance of flora and fauna especially during excavations and drilling. Construction at the site will result in potential loss of habitats for small mammals e.g. Rats, small reptiles etc.

Impact	Impacts on Biodiversity
Impact Nature	Negative
Impact Type	Direct
Impact Severity	Medium
Impact Duration	Short Term
Impact Extent	Local
Likelihood of Occurrence	Low
Potential for Irreplaceable loss of resource	Low
Impact Magnitude	Low
	The impact magnitude is considered Low due to vegetation clearance
Impact Significance	Low
	The impact significance is considered low due to degraded habitats within the project area.

Mitigation Measures

The impact on ground cover will be restricted to the initial construction period, after which the ground cover is expected to be restored.

To address losses associated with ecological functionality of the vegetation, such as habitat loss, soil and water conservation; compensatory planting is recommended. In addition, proponent should strive to minimize unnecessary cutting of trees. During clearing of wayleaves, displacement and mortality of less mobile animals should be avoided by systematically and sequentially clearing vegetation to allow animals to flee to nearby safe habitats.

7.3.11 Occupational Health and safety risks (Community and workers)

Use of heavy machinery during construction presents safety hazards to the workers and the community. Community health and safety risks refer to the potential hazards that can affect the well-being of local residents and users of community resources. These risks can arise during various projects (such as drilling boreholes, excavation of trenches laying pipeline) or due to environmental degradation.

Below is a summary of key community health and safety risks and considerations: The sources of impact on the health and safety will arise from the following construction activities:

- Site clearing activities
- Excavation works and ground levelling,
- Working at trenches and excavated areas,
- Handling of heavy machinery,
- Construction noise,
- Active construction zones or operational machinery (like drilling rigs) pose risks of physical injuries to workers and nearby community members.

Arising from the above-mentioned activities that will take place during construction, the workers and community at the project will be exposed to impacts as follows:

- Injuries associated with operation of machinery
- Injuries arising from loading, unloading and lifting heavy materials
- Health impacts arising from being exposed to fugitive dust and exhaust emissions
- Potential injury from a fall due to deep trenches; collapse of trench/excavation.
- Impacts from exposure to excessive noise
- Injury from slips and fall
- Overexertion injuries/illnesses
- Injury from project vehicle accidents

Impact	Occupational health and safety risks
Impact Nature	Negative
Impact Type	Direct
Impact Severity	Medium

Impact Duration	Short Term
Impact Extent	Local
Likelihood of Occurrence	High
Potential for Irreplaceable loss of resource	Medium
Impact Magnitude	Medium high
	The impact magnitude is considered Medium-High due to high chance of injury occurring.
Impact Significance	Medium-high
	The impact significance is considered Medium-High due to high chance of injury occurring

Mitigation Measures:

- Involve community members early in the planning process to inform them of potential risks and mitigation measures. Establish open channels of communication and feedback.
- Provide training and resources to local communities and workers on safety procedures, emergency response, and environmental protection practices
- Ensuring that the drivers and machine operators hired to work on the site are qualified.
- Workers on site must be provided with appropriate PPE.
- Appropriate signs must be erected on the site to warn workers and visitors.
- There should be safety policy clearly displayed on the site.
- Machines should be properly maintained.
- A first aid kit should be provided and a trained first aider should always be on site.
- Fire extinguishers should be provided.
- Proper scheduling of activities to avoid workers being overworked.
- Machines/equipment for the intended purpose.
- No worker should be allowed on site while under the influence of alcohol or other inebriating substances.
- The abstract of the Occupational Safety & Health Act 2007 must be displayed at prominent places within the site.
- Ensure the working hours are controlled and that employees are not allowed to extend the working hours beyond an acceptable limit for purposes of gaining extra pay.
- Ensure that all site personnel are provided with an adequate supply of safe drinking water, which should be at accessible points at all time.
- Provide conveniently accessible, clean, orderly, adequate and suitable washing facilities within the site.

Significance of Impact

The impacts can cause long term impacts to the health and safety of the construction workers hence the severity of the project is considered medium and impact magnitude is considered high due to the likelihood of getting injuries, however if mitigations are implemented, then the magnitude of impact would be low and the impact significance would also be low.

Impact	Scenario	Duration	Extent	Severity	Impact Magnitude	Potential for Irreplaceable loss of resource	Impact Significance
Occupational Health and Safety Risks	Without Mitigation	Short Term	Local	Medium	Medium-High	Medium	Medium-High
	With Mitigation	Short Term	Local	Low	Low	Low	Low

According to World bank standards on Labour and Working Conditions and Community Health, Safety, and Security, the mitigation measures and actions proposed are summarized in table below.

Issue	Mitigation measure/Action to be implemented
Working Conditions and Management of Worker Relationship	Develop a policy for working conditions and management of worker relationships. Aspect to be addressed include human resources policies and procedures, working conditions and terms of employment, workers' organisations, measures to ensure non-discrimination and equal opportunities, procedures for retrenchment grievance mechanisms.
Protecting the workforce	Provide undertaking that no child labour or forced labour practices (including trafficking) will be allowed in strict accordance with national legislation and the WB requirements
Occupational health and safety.	Ensure that the legal and WB requirements for occupational health and safety are integrated into a practical health and safety policy and procedure, that must be communicated to all staff.
Workers engaged by third parties.	Develop a policy with associated contractual obligations to ensure that institutions that employ third party workers are compliant with WB requirements. This focus must include measures to ensure that contractors are reputable and legitimate, have realistic performance management and monitoring procedures and the associated ESMS in place. It must be ensured that contracted workers have access to a functional grievance mechanism, either one provided by the contractor, or that of the project.
Supply Chain Management	Implement policy and contractual requirements to address the risk of child and forced labour practices, effective occupational health and safety measures within the primary supply chain organisations.
Community Health, and Safety	A community health and safety plan must be developed. This must evaluate the impacts and associated risks on the affected communities during the project lifecycle and must establish preventative and control mechanisms in line with good international industry practice. Aspects to consider include infrastructure and equipment design and safety, hazardous materials management and safety, ecosystem services, and exposure of communities to a variety of diseases. Emergency preparedness and response is also a requirement for consideration.
Security personnel	An approach for the provision of project security must be developed. This approach will assess the risk posed by security measures to those inside and outside of the project site. This approach must be guided by good international practice and the principles of proportionality. The training, of security personnel will include safety measures, working with communities, and knowledge of and adherence to the law.

Issue	Mitigation measure/Action to be implemented
	Whether to use private or government security sources must be assessed and the respective risks and advantages determined before selecting an approach. The activities of security personnel should be monitored and all abuses or unlawful behaviours be investigated. The grievance mechanism indicated previously will form the mechanism for community interaction regarding the security processes.

7.3.12 Heritage, Monuments and other cultural resources

No heritage and monuments were identified within the project area during the ESIA study. However, during construction, if any treasure, archaeological artefacts are found, a chance finds procedure will be triggered.

World Bank Standards requires that projects:

- Protect cultural heritage by ensuring that internationally recognised practices for the protection, field-based study, and documentation of cultural heritage are implemented. Where relevant this includes the retention of a competent professional to assist in the identification and protection of cultural heritage.
- Develop provisions for managing chance finds, requiring any chance find to be undisturbed until an assessment by competent professional is complete and management actions are identified.
- Consult with affected communities to identify cultural heritage of importance and to incorporate their views into the decision-making process. This should involve national and local regulatory agencies.
- Allow continued access to cultural heritage sites by affected communities within living memory for long-standing cultural purposes.
- Avoid impacts to or where not feasible minimise (negative impacts) or restore in situ the functionality of replicable cultural heritage.
- Do not remove any non-replicable cultural heritage unless the following criteria are met namely, that – there are no technically or financially feasible alternatives; the overall benefit of the project outweigh the anticipated cultural heritage loss from removal; and the removal of cultural heritage is conducted using the best available techniques.
- Should not remove, significantly alter, or damage critical cultural heritage. In exceptional circumstances where impacts are unavoidable, the Project will use a process of Informed Consultation and Participation (ICP).

Impact	Heritage, Monuments and other cultural resources
Impact Nature	Neutral
Impact Type	No Physical Cultural Resources present at the site hence no impact
Impact Severity	Insignificant
Impact Duration	None
Impact Extent	Project Site
Likelihood of Occurrence	Unlikely
Potential for Irreplaceable loss of resource	None

Impact Magnitude	None
Impact Significance	None

7.3.13 Sexual exploitation and abuse of community members by project workers

This impact refers to sexual exploitation and abuse committed by Project staff against communities, and represents a risk at all stages of the Project, especially when employees and community members are not clear about prohibitions against SEA in the Project. The project will experience the influx of people who will be seeking employment during construction phase, therefore, SEA will be a critical aspect to be monitored.

Mitigation:

- Develop and implement and SEA action plan with an accountability and Response Framework as part of the C-ESMP. The SEA action plan will follow guidance on the World Bank's Good Practice Note for Addressing Gender-based Violence in Investment Project Financing involving Major Civil Works (Sept 2018).
- The SEA action plan will include how the project will ensure necessary steps are in place for:
  - ✓ *Prevention of SEA*: including Code of Conducts (CoC) and ongoing sensitization of staff on responsibilities related to the COC and consequences of non-compliance;
  - ✓ *Response to SEA*: including survivor-centered multi-sectoral referral and assistance to complainants; staff reporting mechanisms; written procedures related to case oversight, investigation and disciplinary procedures at the project level
  - ✓ *Engagement with the community*: including development of confidential community-based complaints mechanisms discrete from the standard GRM; mainstreaming of PSEA awareness-raising in all community engagement activities; IEC materials; regular community outreach to women and girls about social risks and their PSEA-related rights;
  - ✓ *Management and Coordination*: including integration of SEA in job descriptions, employments contracts, performance appraisal systems, etc.; development of contract policies related to SEA, including whistleblower protection; training for all project management; management of coordination mechanism for case oversight, investigations and disciplinary procedures; supervision of dedicated Prevention of Sexual Exploitation and Abuse (PSEA) focal points and trained community liaison officers.

7.3.14 Gender-based violence at the community level:

GBV constitutes acts of gross misconduct and are therefore grounds for sanctions, penalties and/or termination of employment. This impact refers to gender-based violence at the community level that women and girls may experience as a result of Project implementation. This includes, for example, an increase in intimate partner violence (IPV) when compensation schemes that share funds equally among husband and wife at the household level do not provide adequate sensitization and safety measures to reduce potential for increased tensions due to females receiving funds. This also refers to other GBV-related risks incurred as a result of project implementation that do not adequately

consult women and adolescent girls in the community about safety and security issues related to the delivery of water services.

Mitigation:

- Develop and implement provisions that ensure that gender-based violence at the community level is not triggered by the Project, including:
  - ✓ effective and on-going community engagement and consultation, particularly with women and girls;
  - ✓ review of specific project components that are known to heighten GBV risk at the community level, e.g. employment schemes for women; delivery of supplies; etc.
  - ✓ Specific plan for mitigating these known risks, e.g. sensitization around gender-equitable approaches to employment; supply services; etc
- Ensure adequate referral mechanisms are in place if a case of GBV at the community level is reported related to project implementation.

7.3.15 Violation of children rights by contractor and labour force on site:

Violence against Children (VAW) is defined as physical, sexual, emotional and/or psychological harm, neglect or negligent treatment of minor children (i.e. under the age of 18), including exposure to such harm, that results in actual or potential harm to the child's health, survival, development or dignity in the context of a relationship of responsibility, trust or power. This includes using children for profit, labor, sexual gratification, or some other personal or financial advantage. This also includes other activities such as using computers, mobile phones, video and digital cameras or any other medium to exploit or harass children or to access child pornography.

The Children Act of Kenya prohibits contractors from "employing children in a manner that is economically exploitative, hazardous, and detrimental to the child's education, harmful to the child's health or physical, mental, spiritual, moral, or social development. The possibility of contractor children abuse is through hiring of child labour, also labour force on site might abuse children within the Project area through sexual advance that could lead to early pregnancies and school dropout including exposure to communicable diseases such as HIV and AIDS. It is also important to be vigilant towards potential sexual exploitation of children, especially young girls. The contractor should adopt a 'Child Protection Code of Conduct'; that all staff of the contractor must sign, committing themselves towards protecting children, which clearly defines what is and is not acceptable behaviour. That notwithstanding, the contractor should take responsibility if any of the suppliers and subcontractors contravene this law.

The contractor will undertake the below listed mitigation measures.

Mitigation:

- Develop and implement a Children Protection Strategy that will ensures minors are protected against negative impacts associated by the Project.
- All staff of the contractor must sign, committing themselves towards protecting children, which clearly defines what is and is not acceptable behavior

- Children under the age of 18 years shall not be hired on site as provided by Child Rights Act (Amendment Bill) 2014.

7.3.16 Spread of HIV/AIDS, STIs and other communicable diseases

The project will bring together groups of people, such as workers, community members, or visitors, which can lead to increased social interactions and mobility, contributing to the spread of HIV/AIDS and STIs. Economic development may also encourage behaviors associated with higher risk, such as multiple sexual partnerships. Migrant workers could introduce new infections or increase the transmission rates of existing diseases, while women and young girls may be more vulnerable due to gender inequalities and transactional relationships.

Mitigation Measures:

- Carry out periodic HIV/AIDS awareness training for workers and the beneficiary community.
- Distribution of condoms to workers and beneficiary communities, especially the CIGs.
- Carryout voluntary HIV/AIDS testing for workers and community members.
- If tested positive, further guidance will be offered and directed to the nearest public hospital to receive free antiretroviral (ARVs) drugs and other services.
- The project team should use the services of contracted GBV/SEAH service providers to undertake community outreach activities.
- Hire local workers where possible to minimize the extent of any influx.
- All workers shall sign CoC/ contract that has provisions on GBV/SEAH.

Impact Criteria	Spread of HIV/AIDS, STIs, and Other Communicable Diseases
Impact Nature	Health-related, social, and cultural impacts
Impact Type	Negative impact
Impact Severity	High – the spread of communicable diseases can lead to significant morbidity and mortality
Impact Duration	Long-term – may persist for years or even decades if not addressed
Impact Extent	Local to regional – affects the immediate project area and potentially surrounding areas
Likelihood of Occurrence	High – given the increased social interactions, migration, and possible gaps in health systems
Potential for Irreplaceable Loss of Resource	Moderate to high – the loss of health and well-being can have long-lasting effects on the community's development
Impact Magnitude	Large – can significantly affect the overall health of the community and hinder project success
Impact Significance	Very high – can affect community stability, project outcomes, and public health in the region

7.3.17 Workers/Labour Influx Impacts

The project will attract an influx of workers and laborers to the area, which could lead to increased pressure on local resources such as housing, water, and food supply, potentially resulting in higher costs for community members. This influx may also strain local infrastructure, including transportation and healthcare services, as the population temporarily grows. Additionally, there may be social tensions between local residents and the incoming workforce, especially if there is perceived inequity in job opportunities or access to benefits. The potential for increased incidences of crime and conflicts may arise, as well as concerns about the impacts of a transient labor force on the local culture and social dynamics.

Impact Criteria	Workers/ Labour Influx Impacts
Impact Nature	Social and economic strain
Impact Type	Negative
Impact Severity	Moderate to High
Impact Duration	Temporary to Medium-term
Impact Extent	Localized to project area, but could spill over into surrounding communities
Likelihood of Occurrence	Likely
Potential for Irreplaceable Loss of Resource	Low to Moderate (depends on resource strain)
Impact Magnitude	Moderate to High
Impact Significance	High due to potential for social unrest and resource scarcity

Mitigation measures:

- Ensure that locally available labour force is given priority during recruitment. Especially for casual and unskilled positions.
- Providing accommodation for workers in camps if the workforce is large

7.4 Potential impacts and mitigation measures during operation phase

7.4.1 Water system leaks and loss of pressure

Water system leaks can reduce the pressure of the water system compromising its integrity and ability to protect water quality (by allowing contaminated water to leak into the system) and increasing the demands on the source water supply and the quantity of chemicals. Leaks in the distribution system can result from improper installation or maintenance, inadequate corrosion protection, stress from traffic and vibrations and overloading among other factors.

Significance of impact

Mitigation	Spatial	Duration	Severity	Frequency	Frequency	Consequence	Likelihood	Significance

status	extent			of activity	of Impact			
Without Mitigation	4	2	4	5	3	10	8	80
	Regional	One month to one year	Harmful	Daily	Infrequent			Medium-High
Mitigation Measures	• Ensure construction meets applicable standards and industry practices; • Conduct regular inspection and maintenance; • Implement a leak detection and repair program (including records of past leaks and unaccounted- for water to identify potential problem areas);							
With mitigation Measures	2	1	1	5	1	4	6	24
	Area specific	One day to one month	Non harmful	Daily	Almost impossible			Very Low

7.4.2 Water Discharges

Water lines may be periodically flushed to remove accumulated sediments or other impurities that have accumulated in the pipe. Flushing is performed by isolating sections of the distribution system and opening flushing valves or, more commonly, fire hydrants to cause a large volume of flow to pass through the isolated pipeline and suspend the settled sediment. The major environmental aspect of water pipe flushing is the discharge of flushed water, which may be high in suspended solids and other contaminants that can harm surface water bodies.

Significance of impact

Mitigation status	Spatial extent	Duration	Severity	Frequency of activity	Frequency of Impact	Consequence	Likelihood	Significance
Without Mitigation	3	1	2	2	2	6	4	24
	Regional	One day to one month	Potentially harmful	Six monthly	Highly unlikely			Very low
Mitigation Measures	• Where possible, flushed water should be carried in bowsers for discharge • Discharge the flush water into a separate storm system with storm water management measures such as a detention pond, where solids can settle and residual chlorine consumed before the water is discharged; • Where water is flushed into the environment, erosion should be minimised during flushing by avoiding discharge into areas that are susceptible to erosion and spreading the flow to reduce flow velocities.							
With mitigation Measures	2	1	1	2	1	4	3	12
	Area specific	One day to one month	Non harmful	Six monthly	Almost impossible			Very Low

7.4.3 Deficiencies in water distribution system

The water distribution system is a critical component in delivery of safe potable water. Even if water is effectively treated to remove contaminants and destroy pathogens, waterborne diseases outbreaks can occur because of deficiencies in the water distribution system. Exposure of water to pathogens from storage facilities and from external sources may lead to long term impacts whose effects will be experienced regionally. The severity of the impacts will be high without mitigation measures.

Significance of impact

Mitigation status	Spatial extent	Duration	Severity	Frequency of activity	Frequency of Impact	Consequence	Likelihood	Significance
Without Mitigation	4	2	4	5	4	10	9	90
	Regional	One month to one year	Harmful	Daily	Likely			Medium - High
Mitigation Measures	(i) Construct, operate, and manage the water distribution system in accordance with applicable national requirements and internationally accepted standards; (ii) Construct and maintain the distribution system so that it acts as a barrier and prevents external contamination from entering the water system by: • Inspecting storage facilities regularly, and rehabilitating or replacing storage facilities when needed. This may include draining and removing sediments, applying rust proofing, and repairing structures • Ensuring that all installation, repair, replacement, and rehabilitation work conforms to requirements for sanitary protection and materials quality • Testing material, soil, and water quality and implementing best practices to prevent corrosion, such as cathodic protection (iii) Maintain adequate water pressure and flow throughout the system by: • Implementing a leak detection and repair program • Reducing residence time in pipes • Maintaining positive residual pressure of at least 20 pounds per square inch (psi) • Monitoring hydraulic parameters, such as inflows, outflows, and water levels in all storage tanks, discharge flows and pressures for pumps, flows and/or pressure for regulating valves, and pressure at critical points, and using system modelling to assess the hydraulic integrity of the system (iv) Prevent introduction of contamination from the distribution system itself by: • Minimizing microbial growth and biofilm development (e.g. by ensuring adequate residual disinfection levels). Collect samples from several locations throughout the distribution system, including the farthest point, and test for both free and combined chlorine residual to ensure that adequate chlorine residual is maintained • Using construction materials that do not contribute to release undesirable metals and other substance or interact with residual disinfectants							
With mitigation Measures	2	1	1	5	1	4	6	24
	Area specific	One day to one month	Non harmful	Daily	Almost impossible			Very Low

7.4.4 Groundwater Depletion

Over-Extraction: One of the primary concerns with borehole water supply is the over-extraction of groundwater. Excessive pumping can lead to a decline in the water table, making it harder to access water over time. This can result in the drying up of nearby wells and springs, and negatively affect the availability of water for future generations.

Aquifer Depletion: Continuous extraction without adequate recharge can lead to aquifer depletion, reducing the natural water storage capacity of the ground. In severe cases, this can lead to subsidence (sinking of the ground surface), which can damage infrastructure.

Mitigation measures

The proponent should ensure it complies with the conditions of the water abstraction permit issued by WRA.

7.5 Potential impacts during Decommissioning Phase

The potential impacts of the project during decommissioning phase are summarized in the table below.

No	Impacts	Description
1.	Concerns over Occupational Safety and Health	Hazards that the project may pose to workers and residents during the decommissioning phase are similar to those discussed in the construction phase above.
2.	Vehicular and Human Traffic Impacts	Movement of heavy machinery and equipment during the decommissioning is expected. These machineries will be used for ferrying workers and materials from the active site while equipment will be used for dismantling of the water project components.
3.	Impacts from Solid and Liquid Wastes	Decommissioning activities will generate both solid and liquid wastes such as: HDPE pipes, steel casings, planks of wood, sealants and other domestic wastes.
4.	Noise and Vibration Impacts	The decommissioning activities will be similar in nature as those during the construction phase. The impacts will be as a result of moving machines, communication of workers and outgoing vehicles transporting project materials and workers to and out of the project sites.
5.	Emissions and air pollution	Decommissioning phase activities of the proposed project will give generation to dust and exhaust fumes from vehicles and machinery. Dust emissions will emanate from pit excavation activities and movement of

No	Impacts	Description
		machinery in the project area. This directly affects the air quality of the project area.
6.	Increase in Social Vices	Just as in the construction phase, population of the project area is expected to increase due to an influx of workers during the decommissioning phase. This will directly affect the normal social set up of communities living in the project area thereby possible decay of morality, increase in school drop-outs due to available unskilled labour, possible child labour, petty thieves and increased HIV/AIDS incidence and communicable diseases.

7.6 Climate change and vulnerability assessment

Climate Change Act of 2016 is an Act of parliament to provide for a regulatory framework for enhanced response to climate change, to provide for mechanism and measures to achieve low carbon climate development and for connected purposes. The purpose of climate risk vulnerability assessment (CRVA) is to understand the climate and assess climate change threats to the proposed development to assess adaptation measures that are proposed in the design; to determine to what extent the performance and design of the project is vulnerable to climate change, and to recommend measures that will improve the climate resilience of the proposed project.

Climate change have been observed in Kenya. These include general warming, reduced amount of intense rainfall during the rainy season, and more intense and frequent rainfall during the rest of the year (Government of Kenya, 2010). Other literature also reports changes in the climate of Kenya, such as severe or prolonged drought (UNICEF, 2010), desertification (Plan Kenya, 2013), and changing rainfall patterns (de Wit & Stankiewicz, 2006; UNICEF, 2010). A report by Chaocheva (2016) observed a slight and insignificant increase in precipitation in Nakuru county and a more significant increase in minimum temperature, while National Climate Change Response Strategy (NCCRS, 2010) state that climate change in Kenya is *"already unmistakable and intensifying at an alarming rate with evident countrywide temperature increases and rainfall irregularities and intensification"*.

The observed trends are expected to intensify under expected climate change scenarios. Temperature increases are also expected for Nakuru county. In a study combining 21 different climate change forecast models in mild to extreme scenarios, an increase in minimum and maximum projected temperature is clearly visible even for mild scenarios (see **Error! Reference source not found.**) and Higher temperatures lead to higher evaporation rates. It may also lead to increased water demand, especially in the agricultural sector.

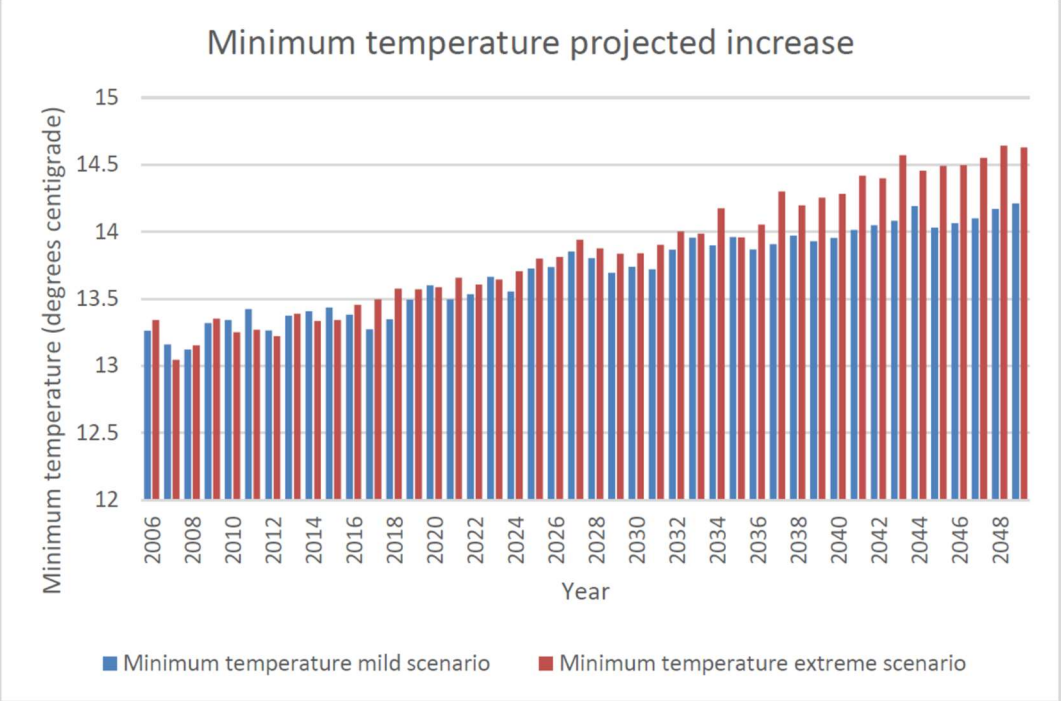


Figure 7-1: Projected increase in minimum temperature based on a combination of 21 climate change models.

(Source: Nakuru county water assessment report, 2019)

Results of various studies indicate that rainfall in Nakuru County is expected to increase as well, by at least 6%. This seems positive, but more annual precipitation does not necessarily mean that more water is available for consumption or for agricultural use. Higher temperatures will cause higher rates of (evapo)transpiration. Besides, the precipitation surplus is expected to fall during heavy rainfall events, and if the infiltration capacity of the soil is limited, the excess water will quickly run down to the lakes. Results of various studies indicate that it is likely that the amount of rain in heavy rainfall events will increase by 32%. This will lead to a considerably increase in runoff, flash floods, landslides, gully formation and soil erosion, all leading to serious land degradation. Erosion and landslides can have destructive impact on infrastructure, including water pipes.

Climate change affects the four components of food security - food availability, food accessibility, food utilization and food system stability - in various direct and indirect ways. As a result of climate change, there will be increased frequency and intensity of extreme weather events like droughts and floods, which will lead to losses of productive assets, personal possessions and even life. This has already been observed but will intensify in the future if efforts are not raised to stop global warming. For instance, due to droughts, the country's famine cycles have reduced from 20 years (1964-1984) to 12 years (1984-1996), to two years (2004-2006) and to yearly (2007/2008/2009), necessitating the Government's distribution of 528,341.77 metric tonnes of assorted foodstuffs. Extreme climatic

variations coupled with improper land use including deforestation have resulted into Kenya reporting successive seasons of crop failure, increasing the country's food insecurity.

Climate change can impact the availability and quality of both surface and groundwater and affect agricultural production and associated ecosystems. Increasing variability of rainfall can influence the flow of water in surface systems and the rates of recharge and discharge from aquifers. Currently, main water sources in the county are groundwater. The potential effects of climate change on groundwater will be much on shallow aquifers.

Risk Impacts Identified:

- Reduced water availability due to decreased rainfall or prolonged droughts.
- Degradation of water quality from higher temperatures and altered flow patterns.
- Infrastructure stress and potential damage from extreme weather events.

Adaptation Strategies:

- Upgrade and design water infrastructure to be more resilient to extreme weather.
- Implement water conservation measures and diversify water sources (e.g., rainwater harvesting, recycled water).
- Establish robust monitoring systems and early warning mechanisms for rapid response.
- Enhance community engagement and capacity building to ensure local preparedness.

7.7 Cumulative Impacts

The Environmental and Social Assessment have taken into consideration assessment of potential cumulative impacts of this project and other project planned and ongoing along/adjacent to the project area. The cumulative impacts are summarized in Table below.

Environmental Topic	Potential Cumulative Impacts
Increased Traffic	Cumulative impacts may be considered significant during construction. The pipeline route will be along the existing road reserves. The report has proposed mitigations on the ESMP which are adequate and need to be enforced.

8 Environmental & Social Management and Monitoring Plan

8.1 Introduction

The purpose of developing an Environmental and Social Management Plan (ESMP) for the proposed project is to initiate a mechanism for implementing mitigation measures for the potential negative environmental impacts and monitor the efficiency of these mitigation measures based on relevant environmental indicators. The ESMP identifies certain roles and responsibilities for different stakeholders for implementation, supervision and monitoring.

The objectives of the ESMP are:

- To provide evidence of practical and achievable plans for the management of the proposed project.
- To provide the Proponent and the relevant Lead Agencies with a framework to confirm compliance with relevant laws and regulations.
- To provide community with evidence of the management of the project in an environmentally acceptable manner.

Conversely, Environmental monitoring provides feedback about the actual environmental impacts of a project. Monitoring results help judge the success of mitigation measures in protecting the environment. They are also used to ensure compliance with environmental standards, and to facilitate any needed project design or operational changes. A monitoring plan, backed up by powers to ensure corrective action when the monitoring results show it necessary, is a proven way to ensure effective implementation of mitigation measures. By tracking a project 's actual impacts, monitoring reduces the environmental risks associated with that project, and allows for project modifications to be made where required.

8.2 Management Responsibilities

In order to implement the management plan, it is recommended that NARUWASCO, oversee environment and management aspects including the water abstraction sustainability, pollution control, water loss control and equity access, throughout the project area. The supervisor would also be expected to co-ordinate and monitor environmental management during construction and provide monitoring schedules during operations. Other recommended participants could include the respective Environmental and Social officers (fulltime staff of NARUWASCO), Water Officers and the Physical Planning Officers (Nakuru county) among others. The WSP has internal capacity to supervise ESMP implementation during the project implementation.

The ESMP shall be provided along with bidding documents. Compliance with the ESMP shall be clearly provided for in the contract documents. The Contractor shall prepare a C-ESMP to operationalize the ESIA findings and recommendations. Method statements will also be prepared and will be task-specific after undertaking specific risk assessments. In addition, the contractor will have a qualified fulltime EHS person to be based on site who will be responsible for the

implementation of the ESMP. The contractor will be required to submit monthly progress reports on ESMP implementation during construction phase. Also, the contractor should submit incident reports, and any other as per the WB standards.

8.3 Environmental Management Guidelines

Upon completion and commissioning of the water project, 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 or community management committees at various water points. It is recommended that the communities' in-charge of the water intervention facilities must have an accountable structure. While appreciating that there is an existing social framework, it should be recognized that they lack in organizational capacity to manage water facilities at a commercial level. The groups will therefore, need to get re-organized to provide for clear responsibilities, documentation and record keeping as well as resource accounting.

8.4 Environmental Education and Awareness Raising

NARUWASCO field staff and the beneficiaries will need to understand the basic environmental, water use principles associated with the projects. In this regard, therefore, the following steps will need to be considered;

(i) Creation of liaisons on all matters related to environment, utilization of water, issues of the water resource development,
(ii) Encourage contribution of improvement ideas from the beneficiaries on specific issues related to the management of the facilities, water accessibility, water availability, sharing, etc. say through a questionnaires or direct interactions,
(iii) Establish initiatives that would instil a sense of ownership of the facilities and related components to all beneficiaries,

8.5 Decommissioning Process

Due to the long-term life of the intervention facilities and related components, a decommissioning audit will be undertaken 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;

(i) Contractor's 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,

(ii) 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,

(iii) 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.

8.6 Environmental & Social Management Plan (ESMP)

This ESMP is prepared for the three project stages where potential significant negative impacts manifest.

These are:

i. Construction Phase ESMP;

ii. Operation Phase ESMP; and

iii. Decommissioning Phase ESMP.

Potential Impact	Proposed Mitigation Measure	Responsibility	Monitoring and Measurement	Cost, (Ksh)
Construction phase				
Soil erosion and slope stability	• Complete removal of vegetation exposing soil should be minimized and restricted to project footprint only • Stockpiling of soil shall not exceed 2 m height and must be located away from drainage lines • Diversion of runoff flows from construction sites. • Backfilling and compaction of excavated earth should occur as quickly as possible • Need for access tracks shall be minimized, as far as possible & existing tracks/trails will be used for transportation of materials • Regular visits lead to the identifying of areas that have problems in regards to erosion and thus are given priority, so that corrective plans are implemented. • Cutting and benching should be minimized in steep slope	Contractor	Incidents of erosion (monthly) Amount (m^3) of fill disposed (monthly) Regular report on status	50,000
water and soil contamination	• Oil residuals including waste oil, lubricants, used filters, should be carefully collected and stored for safe disposal, in order to prevent spilling of contaminant hydrocarbons into runoff or groundwater. • Regular maintenance of site equipment and machinery should be carried out to ensure any leakages are detected and controlled. • Construction solid waste generated by activities can be disposed in areas approved by the county government that will be identified before commencement of construction activities. • Supervision of a E&S expert on the implementation of the above mentioned mitigation measures.	Contractor	Provision of Hazardous Waste Chain of Custody Forms Availability of incident response procedure at various working places where such incidences are likely to occur Water Quality monitoring report Incident Reports	40,000

Potential Impact	Proposed Mitigation Measure	Responsibility	Monitoring and Measurement	Cost, (Ksh)
Air Quality and Dust emission	• Sprinkle water on exposed dusty surfaces to reduce dust generation. • Checking, repairing and fixing the engines of vehicles and heavy machineries. All machineries and equipment should be maintained in good working order to ensure minimum emissions including carbon monoxide, oxides of nitrogen and sulphur, as well as suspended particles. • Utilizing masks for workers who are directly in the location where dust is dispersed. • Staff training before the commencement of construction activities.	Contractor	Air Quality Monitoring Report Reports on induction of drivers on site operation requirements	10,000
Excess Noise	• Measuring the intensity of noise by utilizing the noise meter. In the case that, the level measured is higher than the permissible amount, all the methods to conserve the mental health of workers must be utilized to lessen the level of noise and decrease it to the standard level and shortening the period of noise generated should be taken under consideration. • The Contractor should adopt the best practicable means of minimizing noise. • All equipment should be maintained in good mechanical order and fitted with the appropriate silencers, mufflers, or acoustic covers where applicable. Lubricating and regular repair of equipment and machinery • Pneumatic drills and other noisy appliances should not be used after normal working hours. • Workers should be given noise protection equipment such as earmuffs and be taught how to use them and supervised to ensure such safety procedures are being adhered to. • The public should be informed that short periods of noise may be inevitable but prior warning of when noisy activities	contractor	Noise Monitoring Reports Reports on induction of drivers on speed limits	10,000

Potential Impact	Proposed Mitigation Measure	Responsibility	Monitoring and Measurement	Cost, (Ksh)
	are to take place and the days and times noise of when they could be expected should be widely publicized before the activity takes place. • Observe and practice the recommended noise regulations.			
Loss of flora	• Minimize vegetation clearance. • No use of herbicides/ pesticides for vegetation clearing • Re-vegetation of disturbed areas with native plant species. • Use of soils resulting from excavation, soil tabulation and reclamation through planting native trees • Control of invasive alien plant species through monitoring and physical removal of invasive species as they appear as well as routine cleaning of newly deployed machines to the sites	Contractor	Tree planting Plan Report of Tree Planting Exercise	20,000
Fauna	• Avoid harassment and mortality of less mobile fauna by systematically and sequentially clearing vegetation to allow animals to flee to nearby safe habitats • Prevention from spilling oil and grease compounds of vehicles and machinery on the ground so as to prevent soil pollution in the terrestrial ecosystem and its secondary impacts on wildlife through the food chain. • Create awareness among project staff (esp. plant operators) and local community on animal welfare and against animal persecution.	Contractor	Reports on programme to implement recommendations	20,000
Occupational Safety and Health (OSH)	• Workers shall be provided with appropriate personal protective equipment, such as coveralls, boots, mittens, gloves, dust and fume masks, all of which must be regularly replaced. • Contractor to arrange for regular health and safety training sessions • The abstract of the Occupational Safety & Health Act 2007 must be displayed at prominent places within the site.	Contractor	Availability of detailed Occupational Safety Management Plan Programme and records of Safety induction and Toolbox Talk	50,000 (contractor through contract conditions)

Potential Impact	Proposed Mitigation Measure	Responsibility	Monitoring and Measurement	Cost, (Ksh)
	• Well stocked first aid box which is easily available and accessible should be provided within the construction site as well as at least an ambulance. • Ensure the working hours are controlled and that employees are not allowed to extend the working hours beyond an acceptable limit for purposes of gaining extra pay. • Ensure that all site personnel are provided with an adequate supply of safe drinking water, which should be at accessible points at all times. • Provide conveniently accessible, clean, orderly, adequate and suitable washing facilities within the site.			
Historical and cultural sites	• Training of the construction workers in identifying signs for materials of archaeological and historical value such as bones, shards, metal works, etc. • On suspicion of findings, the contractors to cease work, notify the supervising engineer of the find or disputes relating to archaeological relics or cultural religious sites. • Follow the chance find procedure.	Contractor Proponent Museums of Kenya	Chance find procedure Monitoring reports	No additional cost
Traffic Disturbance	• Erect warning signs of on-going works when pipeline crosses the road. • Adequate care/caution is taken so as not to cause any hindrance to the movement of traffic. • Excavation of trenches should be carried out during lean traffic period in consultation with the concerned authorities. • Expedite construction works so as to reduce the times where roads are blocked. • Alternatives access ways should be communicated to the community.	Contractor	Traffic Management Plan	10,000
Socio-Economic Impacts	• Hiring unskilled construction and skilled (if available) labour from the local population as far as possible.	Proponent Contractor	No. of Complaint	20,000

Potential Impact	Proposed Mitigation Measure	Responsibility	Monitoring and Measurement	Cost, (Ksh)
	• Use of manual labour during excavation and construction works where possible. • Enforcing and maintaining a code of conduct for his employees • A multi-tier Grievance Redress Mechanism shall be developed in line with the existing best practice and local social context.			
Influx of workers	• Hiring unskilled construction and skilled (if available) labour from the local population as far as possible. • Prepare influx of workers plan.	Proponent Contractor	No. of local people employed	20,000
Spread of HIV/AIDS and other STI	• Hiring unskilled construction and skilled (if available) labour from the local population as far as possible. • Sensitizing workers and the surrounding community on awareness, prevention and management of HIV / AIDS.	Proponent Contractor	HIV/AIDS awareness	50,000
Sexual exploitation and abuse of community members by project workers	Develop and implement SEA action plan with an Accountability and Response Framework as part of the C-ESMP. The SEA action plan will follow guidance on the World Bank's Good Practice Note for Addressing Gender-based Violence in Investment Project Financing involving Major Civil Works (Sept 2018). The SEA action plan will include how the project will ensure necessary steps are in place for: • Prevention of SEA: including COCs and ongoing sensitization of staff on responsibilities related to the COC and consequences of non-compliance; project-level IEC materials; • Response to SEA: including survivor-centered coordinated multi-sectoral referral and assistance to complainants according to standard operating procedures; staff reporting mechanisms; written procedures related to case oversight, investigation and	Proponent contractor	No. of Complaints	20,000

Potential Impact	Proposed Mitigation Measure	Responsibility	Monitoring and Measurement	Cost, (Ksh)
	disciplinary procedures at the project level, including confidential data management; • Engagement with the community			
Gender-based violence	The contractor will implement provisions that ensure that gender-based violence at the community level is not triggered by the Project.	Proponent Contractor	No. of Complaint	20,000
	Total cost			**340,000**
Operation phase				
Water system leaks and loss of pressure	• Ensure construction meets applicable standards and industry best practice; • Conduct regular inspection and maintenance; • Implement a leak detection and repair program (including records of past leaks and unaccounted- for water to identify potential problem areas); • Consider replacing mains with a history of leaks or with a greater potential for leaks because of their location, pressure stresses, and other risk factors.	Proponent	Complaints Incident reports	Use internal capacity
Discharge of flushed water that may contain suspended solids and residual chlorine into the environment	• Where possible, flushed water should be carried in bowsers for discharge into a municipal sewerage system; • Discharge the flush water into a separate storm sewer system with storm water management measures such as a detention pond, where solids can settle and residual chlorine consumed before the water is discharged; • Where water is flushed into the environment, erosion should be minimised during flushing by avoiding discharge into areas that are susceptible to erosion and spreading the flow to reduce flow velocities.	Proponent	Complaints Incident reports	Use internal capacity

Potential Impact	Proposed Mitigation Measure	Responsibility	Monitoring and Measurement	Cost, (Ksh)
Exposure of water to pathogens from storage facilities and from external sources	Construct, operate, and manage the water system in accordance with applicable national requirements and internationally accepted standards	Proponent	Carry out analysis of physico- chemical and bacteriological parameters for water quality.	Use internal capacity
Decommissioning Phase				
Solid Waste Management	• Appropriate Segregation of waste for proper disposal and reuse of other materials • Involvement of a NEMA Registered Firm for Hazardous materials	• Decommissioning Contractor	• Approved Decommissioning Plan	Through separate contract
Fugitive Dust Management	• Dust suppression by use of water • Instructing machine operators to maintain low speeds • Monitor Air Quality on a regular basis • Provide decommissioning workers with dust masks			
Exhaust Emissions	• Service vehicle and machinery regularly • Provide workers with nose masks to guard against inhalation of exhaust gases • Carry out regular maintenance of vehicles and machinery			
Excess Noise from Vehicles and Machinery	• Instruct drivers to reduce speed of vehicles and minimize raving of engines • Minimise hooting unnecessarily • Provide workers with ear muffs • Service vehicles and machinery regularly			
Restoration of site	• Site revegetation through planting of indigenous trees		• Restoration Plan	Through separate contract

8.7 Environmental & Social Monitoring

The management of environment and social impacts and consequences of every proposed project is a regular, all purpose and continuous activity, which commences from the beginning of the project and the initial plan of its establishment, and until termination of the project life and thereafter. The performance of this management rests on an appropriate administrative structure, known as the environmental & social management unit, which is a section of the management and operation aggregate of the plan. Outlooks and the principals of environmental conservations must proceed in all the various angles of management.

The objectives of this plan is to render suitable methods and perform effective measures of acceptable costs, in order to reduce the destructive impacts arising from the establishment and operation of the proposed project in regards the regional environment and its accordance with the standard and desirable conditions, in rendering monitoring and control plans, public participation and environmental training. Hence, in this section, in addition to rendering the plan for each monitoring index, by specifying the responsible or relative organizations and estimating the organizational and implementation requirements, conditions for the execution of environmental plan are alleviated.

8.7.1 Internal Monitoring

Though most of the mitigation measures will be implemented by the contractor as per contract condition, the overall responsibility related supervision and monitoring of ESMP implementation and compliance of HSE requirement lies with project proponent. The evaluation of compliance of ESMP implementation and HSE management will be guided by Construction ESMP (CESMP) to be prepared by the contractor based on site specific conditions before start of construction and approved by Project proponent. The CESMP shall comprise of relevant sub-plans such as Erosion control and site restoration, biodiversity protection, Air Quality, Noise & Vibration, Waste Management, Traffic Management apart from Health & Safety Plan and emergency preparedness plan in line with mitigation measures suggested in ESIA.

The objective of internal monitoring and audit will be:

- To identify gaps in implementation of the ESMP by the contractor
- Ensure compliance to legal requirements provided in EMCA 1999
- Guide the contractor's management of HSE requirements from time to time where unforeseen impacts are encountered

The proponent will continue the monitoring process during the operation and decommissioning phases of the projects ensuring that the minimum allowable Environmental parameters are maintained. These parameters include,

1. Workforce Training

The contractor shall provide induction of workers to ensure they are adequately trained on HSE management on top of the specific skills required for their job description. The proponent should

monitor induction training and tool box talks records regularly. The contractor shall also train site specific HSE supervisors to enforce the trainings.

2. Monitoring of Accidents Prevention/ Health Management

The Proponent will procure services of an independent environmental, health and safety (HSE) consultant to undertake frequent audits on the contractor during project implementation. The consultant will undertake regular site inspection visits (frequency shall be agreed upon with Contractor) to monitor how the contractor is managing his work force and activities with regard to accident prevention and health management.

The contractor's safety manager on the other hand shall ensure that appropriate safety signage and personal protective equipment is availed to the construction workers at all times.

Indicators that will be used in evaluation of accident prevention and health risks management includes;

- Provision of adequate personal protective equipment to workers at all phases of the project
- Presence of displayed safety warning signs and markings at active sites
- Adequate human waste disposal and sanitation facilities are present at active sites
- Community awareness on safety risks associated with the project
- Compiled records of actual accidents/ incidences that have been encountered
- Report health cases that are related to the project

3. Soil Erosion and Conservation Monitoring

Construction activities such as excavations and transportation of construction materials within the project areas may lead to loose soil structure thereby resulting in erosion. The contractor will be responsible for ensuring that appropriate soil conservation and erosion prevention measures are practiced throughout the construction phase.

4. Noise Levels Monitoring

Emission of noise is expected during the construction phase. Major sources of noise will be from machinery such as excavators. However, the noise levels may not be an issue as emission is site specific and low Regular monitoring of these noise levels by the Contractor should be conducted to ensure that they recommended limits are not exceeded. Consultation with the neighbouring communities will aid in establishing the extent of this impact

5. Air Quality Protection

Dust and emissions from machinery should be monitored by the contractor and adequate measures employed in ensuring air quality. This will include watering down of active sites/ roads and other areas generating the dust or maintenance of machinery with excessive smoke emissions. In addition, where excessive wind is observed, dust generating activities can be halted for some time.

6. **Solid and Liquid Waste Management Monitoring**

Monitoring of waste generated at both the site and workers campsite during the construction phase shall be done by the contractor's HSE manager. He will ensure that;

- Records of the type and waste amounts generated at the sites is kept
- Adequate and separate waste management facilities are provided at each site. The equipment shall be such that it aids in waste segregation
- All generated waste is bound to the specific sites boundary and littering of the environment is discouraged
- Human waste disposal facilities are provided at each site
- Collected waste is properly disposed away from site at dumping sites approved by the county government

7. Biodiversity monitoring
    - Monitor invasive species as they appear for timely control and physical removal

8.7.2 External Monitoring

The Kenyan government's environment management body NEMA shall issue approval for the implementation of the proposed project. Moreover, it shall ensure that the provided mitigation measures are implemented in implementation of the project. NEMA shall offer oversight of the implementing bodies through review of monitoring reports. The proponent shall therefore provide the agency with annual progress reports on environment, health and safety management.

8.7.3 Environmental Audits (EA)

Environmental audits during all phases of the project implementation are key in ensuring full compliance to ESMP requirements. The goal of EA will be to establish if the proponent is complying with environmental requirements and enforcing the existing legislation. The purpose of EA is to determine the extent to which the activities and programs conform to the approved environmental management plan. The Consultant recommends that an independent consultant will be sourced to oversee environmental management throughout the construction phase and during the operational phase and decommissioning phase. He will provide Environmental audits in line with NEMA's requirement.

8.8 Grievance Management/Redress Mechanism

A Grievance Redress Mechanism GRM has been established to receive and facilitate resolution of complainants (project affected people, local community and workers) concerns and grievances regarding the project's performance during the construction, operation and decommissioning phases of the project. The mechanism should be able to address the concerns and complaints in a timely fashion by using an easy to understand, transparent and effective grievance redress process that is readily accessible to all segments of the project area population including workers and community members.

This GRM has been developed with the intention of providing an effective tool for early identification, evaluation and resolving of grievances during the full cycle of the project. The range of issues that are likely to arise requiring this process include:

- Unfair or biased job allocations;
- Poor management of construction activities;
- Compensation payment for services rendered or damages to property,
- Failure to fulfil commitments;
- Interference with public utilities;
- Accidents due to inappropriate planning of vehicle movement;
- Conflicts between migrant workers and local communities;
- Disturbance due to excessive noise or other nuisance during construction or operation;
- Unfair treatment of workers or unsafe working conditions;
- Issues related to Gender (GBV, SEA and VAC).
- Any other issues related to environment, health and safety issues

Since the range of issues is diverse, the GRM should be comprehensive enough to tackle complaints without any costs and also provide privacy to complainants especially gender issues.

An effective GRM should have the following:

- Identification of personnel (Grievance Officer who will be receiving and recording grievances at the site level);
- Process of evaluating grievances and determining which process to follow;
- Process of making decisions on providing resolutions;
- Notification procedures;
- Timeframes within which issues are to be resolved;
- Procedure for escalation of issues that cannot be resolved at the site level;

Publicizing of the GRM

The developed GRM should be publicized to ensure that all stakeholders (workers, community members, contractor, project management etc) are aware of the existence of the GRM and how it shall be used to resolve grievances.

Grievance Redress Committee (GRC) and Meeting Calendar

The GRC

The developer shall facilitate the formation of a two-tier Grievance Redress Committee (GRC) both at village level and project level. This committee shall comprise of the following representatives:

Level 1

- Affected persons
- Location Chief
- A Representative from the Community (Male and Female)
- Community liaison officer

Level 2

- Project manager/GRC officer
- Community liaison officer
- EHS Officer;
- Contractor EHS representative

GRC Meeting Calendar

The GRC shall roll out its meeting calendar to the stakeholders so that they are aware of when to expect their issues resolved. It should endeavour to meet as often as possible so that grievances do not remain unresolved for a long period. Other than the issues that the GRC Officer will be able to provide immediate solution when the complainants come lodge their complaints, the registered complaints will take between 21-45 days for resolution. It is therefore suggested that the GRC meets monthly or as dictated by any registered urgent grievance. In case complainant/ appellant is not satisfied with the decision of GRC they can approach court of law for resolution.

Special Representatives in the Committee

The proponent to consider having special representatives in the grievance committee (Female Members) who can deliberate and resolve grievances touching on gender issues like sexual harassment, rape etc). This will help in safeguarding privacy of victims of rape and sexual harassment. It will also provide confidence to victims to come forth and register their complaints no matter how personal.

The Committee shall have the following functions:

- To keep a live register of all grievances lodged by complainants;
- To provide support to affected communities on issues arising from environmental or social impacts;
- To record grievances of the affected community by categorizing and prioritizing them, and providing solutions within a stipulated time period;
- To report to the aggrieved parties regularly and in a timely fashion, developments regarding their grievances and decisions of the GRC.
- To escalate any unresolved issues to the management in a timely fashion so that solutions are reached in good time.

Training Workshop

The project proponent shall hold a training workshop for stakeholders (workers and community members) to educate and sensitise them regarding the operations of the GRM. This training shall be carried out before rolling it out so that the team is ready to receive and resolve grievances immediately stakeholders get to know of its existence.

Receiving and Recording of Grievances

The Grievance Officer (Proponent E&S Officer) shall receive anonymously record the grievance in a grievance form and assess the type of grievance.

If it is an issue that can be resolved immediately then a solution shall be provided by the Grievance Officer. If it requires deliberation of the GRC then the Grievance Officer shall indicate the timeframe when the complainant should expect the issues to be resolved.

The Grievance form that shall be used to record grievances shall contain the following information:

- Unique Serial number of the complaint;
- Date of receipt of the complaint;
- Particulars of the complainant (Name, Address, Contact details);
- Nature of Complaint (Subject of the complaint, Brief description of the complaint, where the issue occurred and when, suggestion on what the complainant wants done).

GRC Reports

The GRC shall prepare detailed monthly reports that shall be submitted to the management. The reports shall contain the following among other issues:

- The grievances recorded during the reporting period
- The resolutions provided to the complainants
- The period taken to resolve the issue
- The response received from the complainant after receiving feedback from the GRC
- Escalated Grievances and the timeframe taken to provide solution from the management
- Classification and Analysis of the grievances for lessons learnt and improvement of project operations
- Minutes of all the meetings of the GRC.

8.9 Framework for Implementation of the ESMP

The Contractor will be expected to address all aspects of the construction activities in compliance with all laws and regulations, approvals, licenses and permits which are applicable to the proposed project. The Contractor shall ensure that he is familiar with the ESMP for the project. He shall prepare the work plan and strategy taking into account the relevant provisions of the ESMP. The prepared

Management plans shall be reviewed and approved by Environment and Social Safeguards Officer of the project implementor.

The Contractor will also be expected to evaluate the construction activities/components and prepare appropriate project Construction Environment and Social Management Plan including:

1) Waste Management Plan;
2) Occupational Safety and Health Management Plan (OSHMP)'
3) Workers Code of Conduct;
4) Grievance Redress Mechanism;
5) Prevention and Protection Against GBV and Sexual Exploitation.

8.9.1 Institutional Framework for implementation of ESMP

Project Proponent Obligations & Responsibilities

NARUWASCO has the capacity to supervise the project. The proponent will maintain a monitoring and oversight capability to ensure that the contractor and its subcontractors are fulfilling their E&S obligations. Responsibility for implementing the environmental and social mitigation and monitoring actions included in the ESMP will be passed on to contractor and its constructors.

Contractor upon issue of the 'notice to proceed' (NTP).

Proponent will:

- ensure that contracts with contractor and its sub-contractors are consistent with the components of the ESMP that are within their scope of responsibility and have the capacity to fulfil these requirements;
- review CESMP, including standard environmental and social protection procedures prior to starting construction; and
- maintain oversight of their ESMP performance. A monitoring process to track the contractor's compliance with the approved CESMP will be implemented during construction phase and the results reported.

Contractor Obligation and responsibilities

During the construction phase, responsibility for many of the environmental and social mitigation and monitoring actions will be passed on to the construction contractors. In these situations, Proponent will maintain a monitoring and oversight capability to ensure that contractors are fulfilling their obligations.

Contractor and their sub-contractors will prepare a C-ESMP, which will include:

- Sub plans for environmental management in line with the project ESMP as well as the mitigation measures proposed in the project EIA and any conditions imposed by NEMA to the potable water networks project;
- Site specific plans to apply in the field, including EHS Plan, emergency response and contingency plans, as appropriate; and
- proposed mitigation programme for identified sensitive areas.

8.9.2 Organization Roles and Responsibilities

The Contractor will be expected to engage the following safeguards officers on a full-time basis for the period of the project.

- EHS Expert (Environmentalist);
- CLO (Community Liaison Officer – Community Representative).

Before commencement of construction process, the Contractor will be expected to show familiarity with the methodology on the implementation of Environmental and Social Safeguards.

The above officers will have the responsibility of assisting the Contractor to comply with the safeguard's requirements. Among other duties, the safeguards officers will be responsible for carrying out roles as listed in Table below.

The Safeguards Team will be reporting to the Project Manager/Supervisor on Safeguards achievements, issues and challenges on regular basis.

Table 3: Roles of Safeguards Officers Engaged by the Contractor

Title/Designation	Duties/Roles
EHS Officer	• Assist the Contractor to Develop CESMPs • Supervision of Health and Safety and implementation of Tool Box Talks • Implement Environmental Safeguards in the project to protect people and the environment • Ensure timely approvals and permits, wherever required • Coordinate environmental compliance in the project • Oversight waste management • Ensure environmental information reaches team leaders • Carry out surveillance on safety issues and safety training • Interface between the Contractor and the workers and Community • Support on social safeguards and helps mobilize and organize Community and other stakeholder meetings. • Record incidences taking place during construction work and liaises with the Project Supervisor to address the emerging issues. • Record Grievances • Assist the Grievance/EHS Officers with communicating safeguards issues to the community

	• Attend Grievance Redress Committee (GRC) Meetings • Preparation of Environmental, Health and Safety Reports

8.9.3 Training, Education and Competency

Site Supervisor shall ensure that every employee/worker (direct or contractual) is aware of the EHS risks associated with the work being carried out at the site and is trained and competent in the relevant work practices and maintenance procedures. Training needs shall be identified and executed to ensure all staff are provided with adequate safety training for all levels of employees. The safety training should provide staff with the knowledge and skills necessary for organizing and managing occupational safety and health programmes. The team leaders with leadership skills and knowledge to lead should be supported to implement and apply occupational safety and health activities. Workers with the knowledge, skills and right attitudes should be encouraged/supported to enable them to work safely.

Areas that could be considered for training of various cadres of workers are:

- HSE Policy and how it applies to the workplace;
- Hazards/Risks and Emergency Response Procedures;
- Importance of Safety Induction and Toolbox Talks;
- Appropriate use of Personal Protective Equipment (PPE).

The above inductions and trainings will improve on competency of the workers and lower incidence of injury and improvement on working safely.

8.9.4 Assessment and Improvement

It is noted that often projects collect data on environment, safety and social aspects of the project however this data is never evaluated for improvement on the implementation of the ESMP. Data on injury incidences should periodically analysed considering source of injury, frequency of occurrence and whether any safety measures were overlooked so that improvements can be made on lessons learnt.

8.9.5 Incident Management

All incidences occurring within the project shall be managed through the incident management procedure that has been put in place and conforms with DOSHS. Every team that is carrying out a task must have a person appointed to be in charge. The officer in charge shall be familiar with all incident management protocols All the procedures for different occurrences shall be documented using appropriate forms as guided by DOSHS. Team leaders shall be sensitized on the use of the forms and the required protocols of reporting incidences and timeframe in which all incidences must be reported. The incident reporting forms must always be within reach of the team leader or EHS Officer.

8.9.6 Reporting

It should be ensured that provisions for reporting incidents, accidents and dangerous occurrences during construction are promptly done using prescribed forms obtainable from the local Occupational Health and Safety Office (OHSO). The team leader or Officer in charge of a Task Team shall be inducted on the reporting protocols and requirements. The training or induction shall include:

- Procedure of making a report on incidences;
- The protocol to be followed and reporting hierarchy;
- How the forms should be filled (without errors or omissions);
- Reporting timeframe.

8.9.7 Management Review

The project Environmental and social Management and Incident reports shall be prepared and submitted on a monthly basis. Review by management shall be done on a quarterly basis and feedback given to the safeguard's teams.

8.9.8 Liaison and Communication to Stakeholders

Regular transparent communication between the project and the community and other stakeholders and vice versa is critical in building a good understanding between the parties involved. This good understanding shall be very important in managing unexpected situations that might arise during project implementation.

9 Conclusions and Recommendations

9.1 Conclusions

The Project's impact on the physical environment will be manageable, mostly short-term construction-related impacts, which will be mitigated. The report has outlined mitigation measures in the ESMP matrix in chapter 8 to be implemented during the various project phases. Given that the Environmental Assessment undertaken under this Project, and considering the Project's strong economic justification, the Project satisfactorily meets environmental protection requirements provided that the mitigation, monitoring, and reporting plans are carried out. The environmental, and social Impact Assessment (ESIA) of the proposed project has been conducted in accordance with national legislative requirement, county by-laws; World Bank Operational Policies; and World Bank Group EHS guidelines. The ESIA study has been carried out based on the site visit, baseline environmental and social condition survey including Ecological Study on biodiversity, stakeholder consultation, analysis of the possible project intervention. The experts identified and evaluated potential environmental impacts associated with all aspects of the proposed project.

The key potential environmental impacts due to the project construction as established by the ESIA study are some losses of vegetation, air and noise pollution, moderate loss of habitat for some mammals, insects and amphibians, solid waste generation and disposal, increase in traffic and occupational health and safety. The economic opportunities in terms of local employment and provision of services during construction and operation phases are assessed as positive impacts. During the operation of the proposed project, the key issues related to the environment has been identified from the ESIA study are ecological, and occupational health and safety.

The Environmental and Social Management Plan (ESMP) has described mitigation measures for impacts specific to the project activities and also discuss implementation mechanism for recommended mitigation measures along with a monitoring plan. Implementation of the ESMP will help the proponent to comply with the national regulatory framework as well as to meet World Bank Operational Policies.

9.2 Recommendations

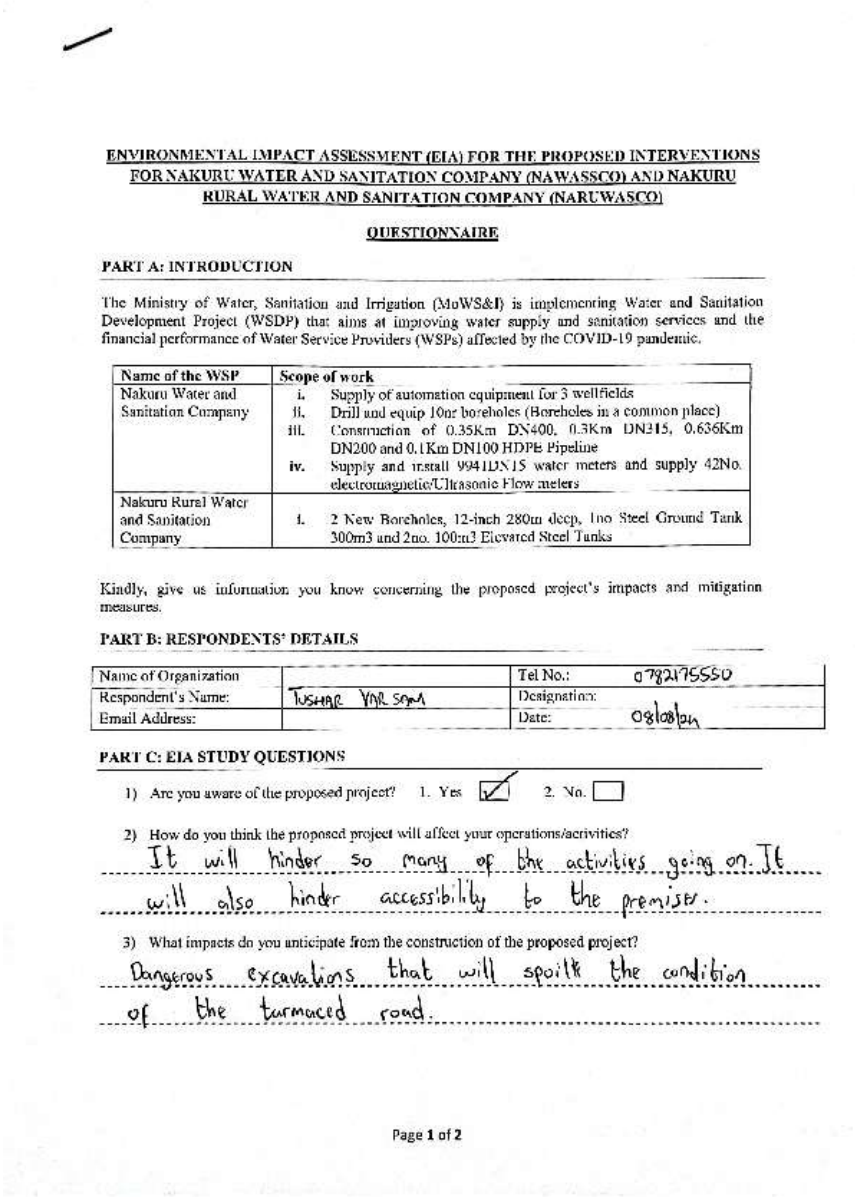
The following are also recommended with respect to the proposed Project.

- That strict adherence to the Environmental Management Plans should be observed;
- That any unforeseen impacts shall be immediately notified to the environmental assessor to ensure that they are immediately addressed and mitigated;
- Project Construction works to commence after approval and issuance of the license;
- The project contractor shall need to hold meetings with local communities before commencement of construction to firm up agreements of engagement.

Appendices

Appendix A: Attendance list for a meeting with NARUWASCO staff

Appendix B: Questionnaires of the key informant interviews



ENVIRONMENTAL IMPACT ASSESSMENT (EIA) FOR THE PROPOSED INTERVENTIONS FOR NAKURU WATER AND SANITATION COMPANY (NAWASSCO) AND NAKURU RURAL WATER AND SANITATION COMPANY (NARUWASCO)

QUESTIONNAIRE

PART A: INTRODUCTION

The Ministry of Water, Sanitation and Irrigation (MoWS&I) is implementing Water and Sanitation Development Project (WSDP) that aims at improving water supply and sanitation services and the financial performance of Water Service Providers (WSPs) affected by the COVID-19 pandemic.

Name of the WSP	Scope of work
Nakuru Water and Sanitation Company	i. Supply of automation equipment for 3 wellfields ii. Drill and equip 10nr boreholes (Boreholes in a common place) iii. Construction of 0.35Km DN400, 0.3Km DN315, 0.636Km DN200 and 0.1Km DN100 HDPE Pipeline iv. Supply and install 9941DN15 water meters and supply 42No. electromagnetic/Ultrasonic Flow meters
Nakuru Rural Water and Sanitation Company	i. 2 New Boreholes, 12-inch 280m deep, 1no Steel Ground Tank 300m3 and 2no. 100m3 Elevated Steel Tanks

Kindly, give us information you know concerning the proposed project's impacts and mitigation measures.

PART B: RESPONDENTS' DETAILS

Name of Organization		Tel No.:	0782175550
Respondent's Name:	TUSHAR YAR SAM	Designation:	
Email Address:		Date:	08/08/20

PART C: EIA STUDY QUESTIONS

1) Are you aware of the proposed project? 1. Yes ☑ 2. No. ☐

2) How do you think the proposed project will affect your operations/activities?

It will hinder so many of the activities going on. It will also hinder accessibility to the premises.

3) What impacts do you anticipate from the construction of the proposed project?

Dangerous excavations that will spoilt the condition of the turmaced road.

Page 1 of 2

(Note: double click on the image to access the all questionnaires (6No.)

Appendix C: Minutes of the meeting

MINUTES OF PUBLIC CONSULTATION MEETING FOR ESIA STUDY FOR THE DRILLING OF 2NO. BOREHOLES AND CONSTRUCTION OF 3NO. STORAGE TANKS HELD ON 6TH AUGUST 2024 AT CHIEFS OFFICE NGATA LOCATION FROM 11:30AM TO 1:35PM.

Participants; v. The community	The 82 people (Males =65, Females = 17)
vi. Consultant	Vitalis Too
vii. Technical team (NARUWASCO)	Caroline Rotich
viii. Assistant consultant	Walter Rotich
Leaders present	• Alex Langat - Area MCA • Augustine Rotich- Area Chief • Lucia Akai-SNR. Asst Chief • Richard Rotich-ASN. Asst Chief • Koech Charlse-Asst Chief • Timothy Tirop Manyibei-Asst Chief

1. Agenda of the meeting
The agenda was as follows:

a. Opening remarks
b. Introduction of participants
c. Overview of the agenda of the meeting
d. Project Description
e. Question and answer session
f. Closing and adjourning of the meeting

2. Commencement of the meeting
The meeting started by a word of prayer by the Area Chief, Augustine Rotich. He stated that it was in order for the meeting to start and further proceeded to introduce the area leadership before inviting NARUWASCO representative, consultant and one of his team to take over the meeting.

3. Project description
After the introduction Mrs. Rotich explained the project nature and its objectives, she stated that the boreholes will be situated at Kerma and Ndarugu area. The Ngata overhaul works project was proposed for funding purposes and Ngata was selected as part of the initiative due to the significant challenges faced by NARUWASCO. These challenges include insufficient supply of water to the consumers due to few number of boreholes in the area, inaccessibility of water to the people living around.
Project objective
Reliability: To ensure a more reliable water supply to the community.
Affordability: To make the improved water system affordable for all members of the affected community.
Quality: To enhance the quality of water provided.

4. ESIA process (EIA consultant)
The EIA consultant explained that the requirement for an ESIA is enshrined in the Environmental Management and Coordination Act (EMCA), 1999, (amended in 2015) which is the framework law on environmental management in Kenya. The Act provides for environmental protection through processes such as Environmental Impact Assessment, Environmental Audit and Monitoring. It also identifies development of the proposed interventions as requiring EIA studies.

By way of consideration of the nature of anticipated environmental and social impacts in terms of severity, ease of reversibility, longevity and the geographical scope which may be impacted by the project, it has been determined the project to be subjected to a Full ESIA Study to enable an in-depth identification and analysis of potential impacts, and subsequent devising of appropriate mitigation and enhancement measures.
The ESIA process entails screening a project to determine whether an EIA is required or not, and if needed, the level of scrutiny (environmental assessment) that the project should be subjected to screening is following by a baseline and scoping study to determine the nature and magnitude of anticipated environmental and social impacts.
It is crucial that stakeholders in any given development are identified and engaged at various levels with an aim of obtaining their views, concerns, suggestions and recommendations to be incorporated in the project.
The consultant explained that it is for this reason that stakeholder engagement is being carried out.
He stated that the impacts will be very good as the project will lead to sufficient amount of water to the people living around, employment to the youth living around.
The consultant explained that once the ESIA Report is submitted to NEMA. NEMA will then review the report and decide as to whether to issue an EIA license with conditions or not issue the EIA license within a period of 21 days.

5. Questions raised and the answers

The meeting then progressed to an interactive session moderated by Vitalis Too whereby the participants were given the opportunity to ask questions, make comments, seek clarification, air their views, concerns and recommendations for incorporation into the project development.

Issues raised and the response given

Participants name	ID No.	Issues raised	Responses
Renison Waweru	0097624	There is insufficient amount of water within the area particularly Kerma area, how will they benefit from the new proposed project.	NARUWASCO staff (Caroline Rotich) responded that water infrastructure within the area is not well developed, community is facing challenges of continuous water Supply due to poor network system. She assured the community that first thing they will do is to do the hydrological survey there after construct tanks after which customers will get the supply of water near their homesteads. The new project will improve water reliability and quality.
		When will the proposed project start?	The Consultant responded that the project will commence immediately after getting the license from NEMA which will take a period of 21 days after getting the report there after if licensed by NEMA the contractor will be assigned to start the project.
Eric .N. Mbugua	6386868	How will the people from Mambwe village in Kirobon area get access to the new proposed project?	The consultant responded that it is not necessarily you are near a borehole that you can only get access to water rather the new tanks will be placed at high points for example at Tulwet area where the water will then be supplied to the people at the lower regions by gravity and Kirobon area being one of them will benefit.
Bernard Kombo	9928508	Which routes will the pipelines pass through?	The consultant responded that the road reserves will be used for the pipelines and if the line passes through someone's land he or she will be notified in advance on the same to avoid disputes and

Participants name	ID No.	Issues raised	Responses
			other factors that may lead to the interference of the proposed project.
		Which are the exact places where the bore holes will be placed?	M/s. Rotich responded that the bore holes will be situated at Kerma and Ndarugu area.
Patric Sagimi	9148227	How will the people living far from the project area benefit?	The consultant responded that since there will be installation of two 100m^3 and one 300m^3 tanks there will be enough amount of water to be distributed to the people living around the area, M/s. Rotich further explained how they can be connected to their homes under a procedure that is required and which the community is aware.
Caroline Ngeno	22901968	How will the people from the lower regions receive water?	The consultant responded and explained that the water from the bore holes will be pumped to higher regions for example at Tulwet area where now the water will be supplied to the people living in the lower regions through gravity.
Samuel Koech	26702877	Which role does the county government play in the proposed project?	The consultant explained comprehensively that the project is funded by the world bank and through the county government (NARUWASCO) has the role to ensure the project is implemented.
Francis Gatahi Njenga	3535137	Who is concern with the risks of the proposed project?	The consultant responded that there will be very low levels of risks because most of the pipelines will be passing through the road reserves.
Sang Douchords	12839498	What is the capacity of the tanks that will be put in place?	Caroline explained that 1no steel ground tank 300m^3 and 2no .100m^3 elevated steel tanks.
		What is the type of the tank that will be constructed?	Mrs. Rotich responded that the material that will be used is the one that is made of steel.
Petronila Lodechi	21987386	Which safety measures will be taken during and after the project is being done?	The ESIA consultant provided comprehensive safety mitigation measures that will be taken during and after the project to ensure community well-being and improve water reliability and quality: 1. Construction sites will be secured with appropriate barriers and signage to prevent unauthorized access. 2. Regular updates will be provided to the community regarding project progress, potential disruptions, and safety guidelines. A dedicated contact point will be established for residents to report concerns or incidents.
Emily Cherop	23271886	How will NARUWASCO ensure that all people gets water?	Mrs. Rotich responded that the everybody will get water starting with few number of people as the time goes by and eventually everybody will get access to water and she urged the community members to follow due process in pipeline connections to their homes in there office and everybody will be served well.

6. Closing and adjourning of the meeting

The consultant thanked the participants for creating time to attend the meeting he further gave an opportunity to the community members present, the members proposed the project to continue.

A few moments to the end of the meeting the area MCA arrived and he was welcomed by the area chief together with the sub-chiefs from the neighboring locations. He was then given an opportunity by the area chief to talk to the people where he promised he will ensure that his people will benefit from the project that will take place, he further assured the community that under his leadership everything will be alright because he will work together with the county government and asked people to be patient as the project will bring a lot of benefits to the community.

The Area Chief made his closing remarks by thanking the public for availing themselves for the meeting despite their busy schedules and for the contributions they had made on behalf of Ngata community the meeting ended with a word of prayer from pastor Luwere.

Confirmation of the minutes
Minutes prepared by: -------**Vitalis Too**---------- Date ----------06/08/2024----------   Minutes confirmed by: ---Augustine Rotich---------- Date ---06/08/2024-   Position: ----------Area Chief--

PHOTOS OF THE PUBLIC BARAZA MEETING



The area chief addressing the meeting.



One of the community member asking questions to the consultant.



The consultant addressing the meeting.



NARUWASCO representative addressing the meeting.



Area MCA addressing the meeting.

Appendix D: Attendance list

(Note: double click on the image to access all the attendance list (10No. pages)

Appendix E: Hydrogeological survey reports

REPUBLIC OF KENYA
COUNTY GOVERNMENT OF NAKURU
DEPARTMENT OF WATER, ENVIRONMENT, ENERGY AND NATURALRESOURCES
Telephone/ Nakuru
Email: coenrew@gmail.com

When replying please quote,

Chief Officer
Water Environment Energy andNatural Resources
P.O. BOX 2870-20100
NAKURU

HYDROGEOLOGICAL SURVEY REPORT

CARRIED OUT

IN

LR,NO.

NJORO AREA,
NAKURU COUNTY.

FOR

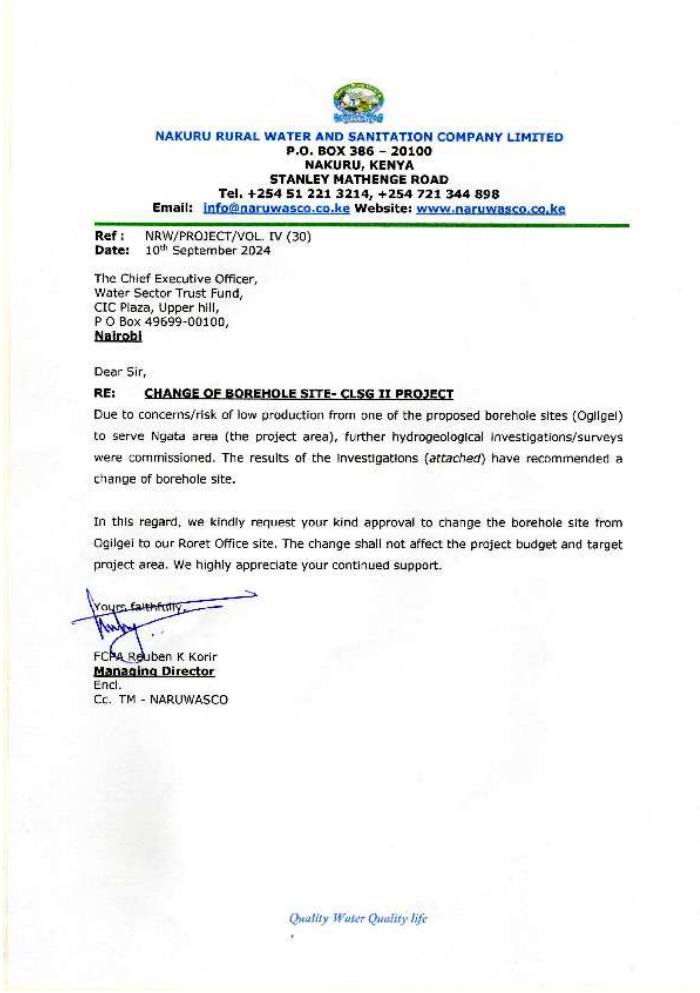
NARUWASCO KERMA TANK ,
P.O. BOX 386-20100,
NAKURU.

Report Compiled by:

(S.R. Kamau- Registered Hydrogeologist)

Licence No. WD/WRP/261

MAY 2023



NAKURU RURAL WATER AND SANITATION COMPANY LIMITED
P.O. BOX 386 – 20100
NAKURU, KENYA
STANLEY MATHENGE ROAD
Tel. +254 51 221 3214, +254 721 344 898
Email: info@naruwasco.co.ke Website: www.naruwasco.co.ke

Ref : NRW/PROJECT/VOL. IV (30)
Date: 10th September 2024

The Chief Executive Officer,
Water Sector Trust Fund,
CIC Plaza, Upper hill,
P O Box 49699-00100,
Nairobi

Dear Sir,

RE: CHANGE OF BOREHOLE SITE- CLSG II PROJECT

Due to concerns/risk of low production from one of the proposed borehole sites (Ogilgei) to serve Ngata area (the project area), further hydrogeological investigations/surveys were commissioned. The results of the investigations (*attached*) have recommended a change of borehole site.

In this regard, we kindly request your kind approval to change the borehole site from Ogilgei to our Roret Office site. The change shall not affect the project budget and target project area. We highly appreciate your continued support.

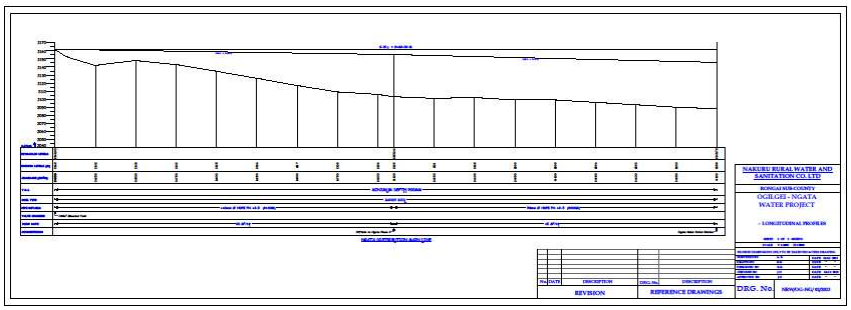
Yours faithfully,

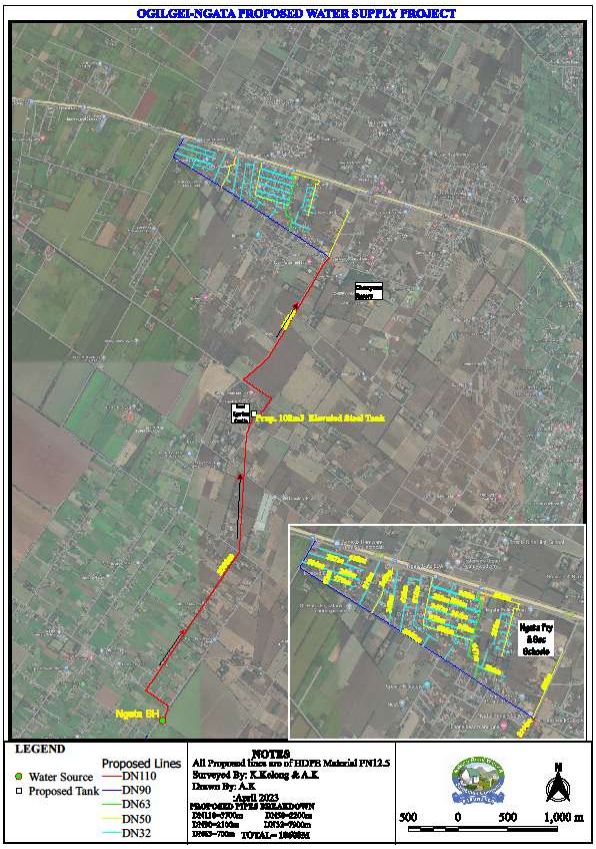
FCPA Reuben K Korir
Managing Director
Encl.
Cc. TM - NARUWASCO

Quality Water Quality life

(Note: double click on the image to access full report

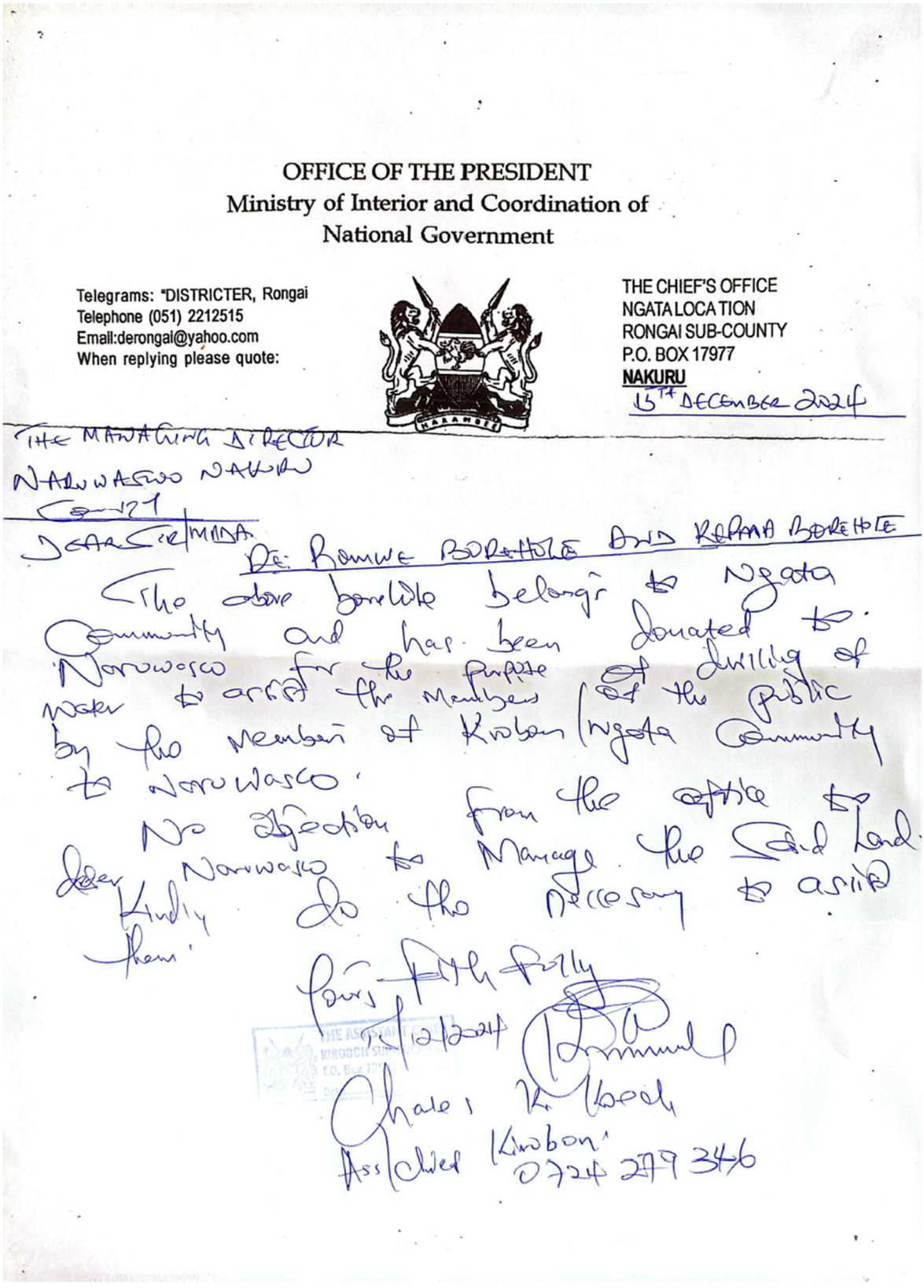
Appendix F: Design layouts





(Note: double click on the image to view clearly)

Appendix G: Proof of land ownership



OFFICE OF THE PRESIDENT
Ministry of Interior and Coordination of
National Government

Telegrams: "DISTRICTER, Rongai
Telephone (051) 2212515
Email:derongai@yahoo.com
When replying please quote:

THE CHIEF'S OFFICE
NGATA LOCATION
RONGAI SUB-COUNTY
P.O. BOX 17977
NAKURU
15TH DECEMBER 2024

THE MANAGING DIRECTOR
NARUWASCO NAKURU
Copy
JAMES KIMANI

Re: ROMWE BOREHOLE AND KAMA BOREHOLE

The above borehole belongs to Ngata Community and has been donated to Naruwasco for the purpose of drilling of water to assist the members of the public by the members of Kiwbon Ngata Community to Naruwasco.

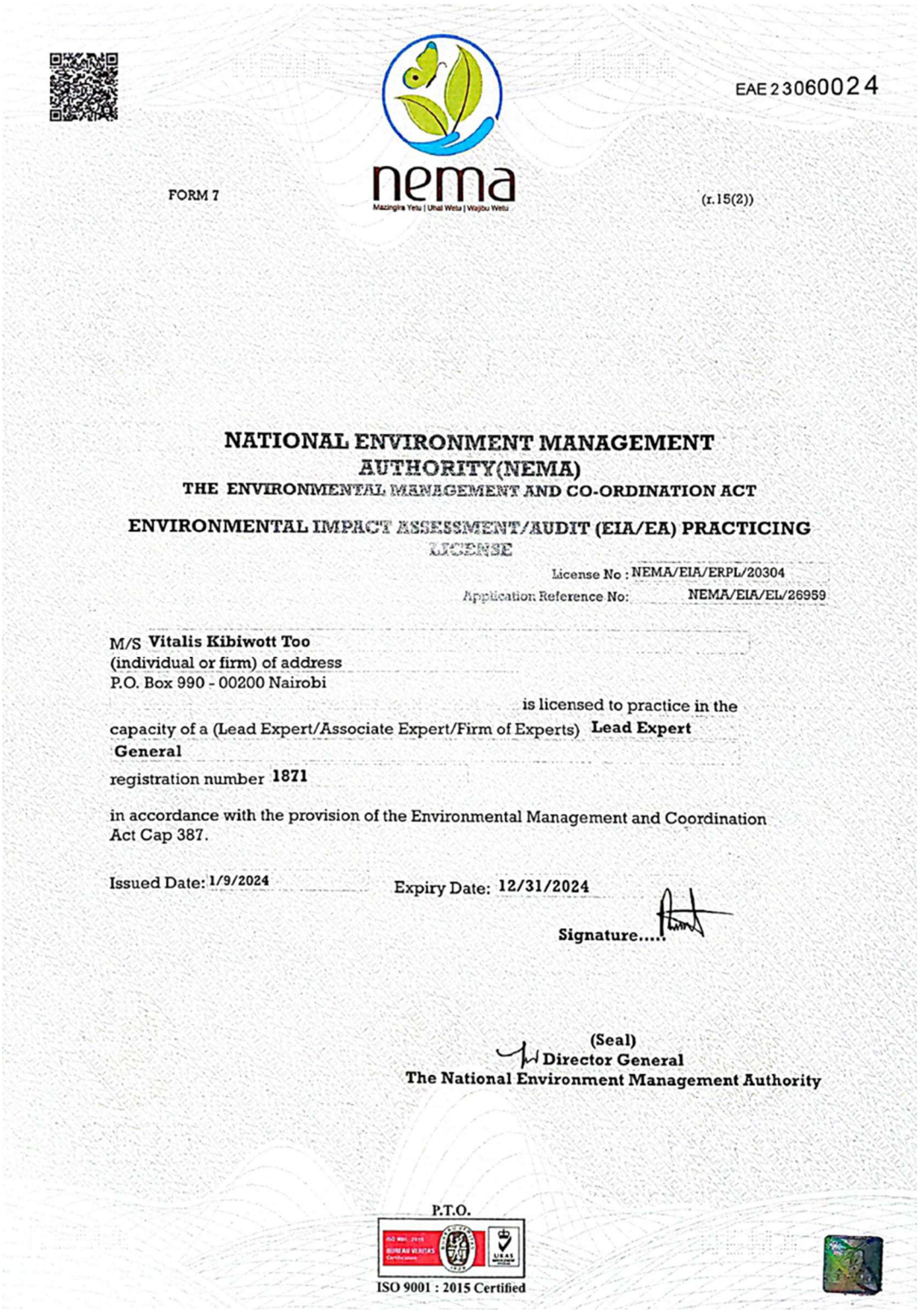
No objection from the office to Naruwasco to Manage the said land. Kindly do the necessary to assist them.

Yours Faithfully
12/12/2024
Chairman
Kiwbon
0724 279 346

Appendix H: Bill of quantities

BOQ FOR DEVELOPMENT OF 2 NEW BOREHOLES TO BUILD UP ON WATER AVAILABILITY, AND CONSTRUCTION OF STEEL TANKS					
New water sources developed (Boreholes at Kerma and Roret)					
S/No.	**SCOPE OF WORKS**	**UOM**	**QTY**	**UNIT COST (KES)**	**TOTAL COST (KES)**
1	Geophysical/hydrogeological study/survey and reports	Ls	2	90,000.00	180,000.00
2	Water resource authority authorization (WRA)	Ls	2	15,000.00	30,000.00
3	Environmental and social impact assessment reports on compliance (ESIA)	Ls	2	35,000.00	70,000.00
4	Water Resource Users Association (WRUA) permits	Ls	2	10,000.00	20,000.00
5	Mobilization and demobilization of drilling equipments, materails, personnel and other supplies	Ls	2	100,000.00	200,000.00
6	Drilling of a borehole 12" diameter upto 100 metres depth	M	200	4,800.00	960,000.00
7	Drilling of a borehole 12" diameter from 100 metres to 180 metres	M	160	5,200.00	832,000.00
8	Drilling of a borehole 12" diameter from 180 metres to 250 metres	M	140	6,000.00	840,000.00
9	Supply and installation of 302 MM steel casing plain casing	M	400	4,500.00	1,800,000.00
10	Supply and insta;lation of 302 MM steel screen casing	M	100	5,200.00	520,000.00
11	Installation of gravel pack (2-4 mm) to at least 3m above the top screen	Ton	40	6,000.00	240,000.00
12	Borehole deveopment, flushing by airlifting before testpumping	Hrs	6	5,000.00	30,000.00
13	Test pumping for 24 hours, draw down yield, yield recoverly and data analysis	Ls	2	120,000.00	240,000.00
14	Supply and installation of surface casing with retrieval	M	10	4,500.00	45,000.00
15	Design and construction of well head slab with concrete class 25/25	M^3	6	5,000.00	30,000.00
16	Chemical analysis for the water sample	Ls	2	15,000.00	30,000.00
17	Borehole completion and test pumping reports	Ls	2	10,000.00	20,000.00
18	Water for use during drilling of the borehole	Ls	2	20,000.00	40,000.00
19	Distribution network of Ngata Area	Ls			10,700,680.31
20	Design, supply install testing and commissioning of a 6" - 8" size multistage vertical submersible pump with a soft start control panel capable of doing approximately $20m^3$/hr against 250 metres Total dynamic head and construction of 4 km 110mm HDPE transmission pipeline to the elevated 100m3 steel pressed tanks	Ls	2	5,250,000.00	10,500,000.00
21	Construction of 1No.: tank 300 M3 pressed steel tank with dwarf Columns resting on strip foundation, carry out the Pipe connections, Stelirise with Chlorine. The pressed steel tank specification are as follows • Hot rolled sections to BS 4360 Grade 43A or equivalent. • Cold formed sections to BS 5950 Part 5: 1997 or equivalent. • Bolt and nuts to BS 3692 and BS 4190 or equivalent. • Welding specifications to BS 5135 or equivalent. • Welding electrodes to BS 635 or equivalent. • Wind load to CP3 chapter V part 2 **Plate thickness** For 500m3 (10.98m x 9.76m x 4.88m) tank is 6mm for bottom and 1st layer panels;	No	1	6,500,000.00	6,500,000.00
22	Ditto but 100m3 tank elevated steel tank 10 meter high	No	2	3,500,000	7,000,000.00
					40,827,680.31
	Add 16% VAT				**6,532,428.85**
	GRAND TOTAL				**47,360,109.16**

Appendix I: NEMA practising license for the lead expert



EAE 23060024

FORM 7 (r.15(2))

nema
Mazingira Yetu | Uhai Wetu | Wajibu Wetu

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY(NEMA)

THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT

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

License No : NEMA/EIA/ERPL/20304

Application Reference No: NEMA/EIA/EL/26959

M/S **Vitalis Kibiwott Too**
(individual or firm) of address
P.O. Box 990 - 00200 Nairobi

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

registration number **1871**

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

Issued Date: 1/9/2024 Expiry Date: 12/31/2024

Signature.....

(Seal)
Director General
The National Environment Management Authority

P.T.O.

ISO 9001 : 2015 Certified