ENVIRONMENTAL AND SOCIAL COMPREHENSIVE PROJECT REPORT FOR THE PROPOSED LOTURTUR WATER SUPPLY SCHEME IN LORENGELUP SUBLOCATION OF TURKANA CENTRAL SUB-COUNTY, TURKANA COUNTY

HORN OF AFRICA GROUND WATER FOR RESILIENCE PROJECT (HoAG4RP)-KENYA





Prepared by

CAS CONSULTANTS LTD

Consulting Engineers and Environmentalists

Prepared for

Department of Water Services

The County Government of Turkana

The Horn Of Africa Ground Water For Resilience Project (Hoagwrp) is funded by the World Bank and Implemented by the following Agencies

The County Government of Turkana

Water Sector Trust Fund

Minsitry of Water, Sanitation and Irragation

May 2025

FACT SHEET

Project Name	Proposed Rehabilitation, Equipping, Expansion and Operation of the Loturtur Water Supply Scheme.
Assignment Name	Environmental and Social Impact Assessment (ESIA).
Location	Lorengelup sub-Location, Turkana Central Sub-County, Turkana County
GPS Coordinates	3.0963N, 36.0039E
Project Description	Rehabilitation works shall consist of: a. Installation of a pump and solar panels b. Laying of 13,756 m of pipeline with, 3,501 m rising main and 10,255 m distribution c. Construction of two Elevated Steel Tanks of capacity $50m^3$ d. Construction of seven water kiosks and two Livestock troughs e. Construction of 1# sanitation facility-gender segregated
Estimated Project Cost	Ksh. 36,080,022.80
Project Coordinator	The Ministry of Water, Sanitation and Irrigation (MOWSI), Kenya
Proponent	Water Sector Trust Fund (WSTF) P.O Box, 49699 – 00100 GPO Nairobi. Tel: +254 20 2729017 Email: info@waterfund.go.ke

LEAD EXPERTS:

Name: Kibet Koech **NEMA Registration No.** 1609

(Firm and Lead Expert License attached as Appendix H of the report).

Signature: ..... **Date:** 18/08/25

PROPONENT:

Department of Water Services

The County Government of Turkana

P.O.Box 11-30500,

Lodwar, Kenya

For and on behalf of proponent -

Name: Samuel Ekaran

Designation: Managing Director – Turkana County Rural Water Services Company (TURUWASCO).

Signature: .....

Date: August 15, 2025

(Official stamp)

TURKANA COUNTY RURAL WATER SERVICES PLC
MANAGING DIRECTOR
13 AUG 2025
P.O. Box 62 - 30500 LODWAR

ESIA STUDY TEAM

Name	Position
Kibet Koech	Lead Expert
Sheila Akinyi	Social/SEAH Expert
Winfred Gachohi	Assistant Environmentalist
Maurice Ouma	Geologist

LIST OF ABBREVIATIONS

#	Number
ASALs	Arid and Semi-Arid Lands
CBO	Community-based organization
CGA	County Government Act
CoC	Code of Conduct
CoK	Constitution of Kenya
CSO	Civil society organization
EIA	Environmental Impact Assessment
ESF	Environment and Social Framework
ESIA	Environmental and Social Impact Assessment
ESIRT	Environmental and Social Incident Reporting
ESMF	Environmental and Social Management Framework
ESMoP	Environmental and Social Monitoring Plan
ESMP	Environmental and Social Management Plan
ESS	Environment and Social Standards
FPIC	Free, prior, informed consent
GBV	Gender-based Violence
GC	Grievance Committee
GM	Grievance Mechanism
GoK	Government of Kenya
GRS	Grievance Redress System
HDPE	High density polyethylene
HOA	Horn of Africa
HOAGW4R	Horn of Africa Groundwater for Resilience Project
IDA	International Development Association
IDPs	Internally Displaced Persons
IGAD	Intergovernmental Authority on Development
KNCHR	Kenya National Commission on Human Rights
LMP	Labour Management Procedures
M	Mega
m	Meters
M&E	Monitoring and Evaluation
MAR	Managed Aquifer Recharge
MDAs	Ministries, Departments and Agencies

MoFP	Ministry of Finance Planning
MoWSI	Ministry of Water Sanitation and Irrigation
NEMA	National Environment Management Authority
NGEC	National Gender and Equality Commission
NGO	Non-governmental Organization
NSAs	Non-State Actors
O & M	Operations and Maintenance
OD	Outside Diameter
OHS	Occupation health and safety
OIP	Other Interested Parties
PA	Project Area
PAD	Project Appraisal Document
PAI	Project Area of Influence
PIU	Project Implementation Unit
PMC	Project Management Committee
PMU	Project Management Unit
PN	Pressure Nominal
PWDs	Persons with Disabilities
RPF	Resettlement Planning Framework
SDG	Sustainable Development Goals
SEAH	Sexual Exploitation, Abuse and Sexual Harassment
SEP	Stakeholder Engagement Plan
TOR	Terms of Reference
TURUWASCO	Turkana Rural Water and Sanitation Company
TURWASCO	Turkana Urban Water and Sanitation Company
WASHCORD	Water, Sanitation and Health Coordinator
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

Executive summary

E1: Project background

The Government of the Republic of Kenya (GoK), through the Ministry of Water, Sanitation and Irrigation (MoWSI), is implementing the Horn of Africa Groundwater for Resilience Project (HoAGWRP) with a credit from the International Development Association (IDA). The Project Development Objective is to increase the sustainable access and management of groundwater in the Horn of Africa borderlands. The project intends to benefit 1,500,000 people in the rural areas of the five counties of Turkana, Wajir, Garissa, Marsabit and Mandera through the rehabilitation, construction and sustainable management of boreholes as well as from aquifer restoration, recharge and conservation activities.

The HoAGWRP is set to rehabilitate approximately 400 rural water schemes across five counties in Kenya, including Turkana County. The project emphasizes the restoration of existing water infrastructure to enhance groundwater access and management. This initiative aims to improve water security and resilience against drought for communities in arid and semi-arid regions. The project is coordinated by the Ministry of Water, Sanitation, and Irrigation, with implementation support from the Water Resources Authority and the Water Sector Trust Fund, in collaboration with county water departments, in this case Turkana Rural Water and Sanitation Company (TURWASCO) in Turkana County.

To achieve this, the Water Sector Trust Fund (WSTF), hereinafter referred to as the 'Client' has commissioned CAS Consultants (referred to hereafter as 'the Consultant') to provide consultancy services for engineering designs, tender documentation and supervision of civil works during implementation, in addition to the statutory, environmental and social safeguards. Therefore, the consultancy service included Environmental and Social Impact Assessment Studies for the proposed sub projects.

This report therefore is an Environmental and Social Impact Assessment Project Report for the proposed Rehabilitation of Loturtur Water Supply Scheme situated in Turkana Central Sub-County.

E2: Proposed Project Description

The Loturtur water supply scheme, which is served by Loturtur borehole yielding 40m^3/h caters to the sub-location of Lorengelup. The scheme coverage area includes 12 villages in Loreamatet. The detail of the borehole is as follows: -

Borehole	Reported Yield	BH Depth	Installed Capacity	Power Source	Tanks	Distribution System	Operational Status
Loturtur	24 m^3/h	84 m	6 m^3/h	Solar	2# 10 m^3	None	Non-Operational

Proposed project activities shall consist of:

a. Installation of a pump and solar panels;

b. Laying of 13,756 m of pipeline with, 3,501 m rising main and 10,255 m distribution;

Scheme	Pipe Diameter (mm)	Pressure Nominal (PN)	Length (m)	Total length (m)
Loturtur	40	10	755	13757
	50	10	5,933	
	63	12.5	253	
	75	12.5 & 16	4,521	
	90	16	2,295	

c. Construction of two Elevated Steel Tanks of capacity 50m^3;

d. Construction of seven water kiosks and two Livestock troughs;

e. Construction of the administration and guard house buildings, generator room, and pump house; and

f. Construction of one sanitation facility.

E3: Project location

Loturtur is located in Turkana County, in the north-western part of Kenya. It is situated in the Turkana Central Sub-County, bordering with L. Turkana. The project coordinates are 3.0963N, 36.0039E. This region is characterized by its semi-arid conditions and limited access to safe and reliable water sources, necessitating urgent infrastructural and environmental interventions.

E4: Land take for the water supply infrastructure

The estimated land requirement for the water supply infrastructure, excluding pipelines, is 13,044m^2 (3.21 acres) for the construction of the administration and guard house buildings, generator room, pump house, water storage tank, water kiosks & toilet blocks, solar panels support structure (PV Plant, and access roads. The land on which the infrastructure is proposed is communally owned, and unencumbered. However, a formal land transfer process is required, to transfer the earmarked land from communal ownership to public purpose under the trust of the Turkana County Government. The process has begun with the community having signed the land consent form.

The land acquisition process for access to unregistered community land (as anchored in Community Land Act, 2016):-

i. Due Diligence (Section 8, CLA): Carry out background checks to determine the land's status, including its boundaries, existing use, customary tenure arrangements, and whether the community has initiated registration under the Act.

ii. Government Engagement (Sections 6, 7 & 8, CLA): Engage both the National Land Commission (NLC) and County Government since, under Section 6, county governments hold unregistered community land in trust on behalf of communities. Structured consultations should involve political leadership and relevant administrative officers at the local level.
iii. Community Consultations & FPIC (Sections 8, 15 & 21, CLA): Engage community structures—traditional leaders, elders, women representatives, youth, CBOs, and FBOs—in open and inclusive consultations. The Act emphasizes community participation and free, prior, and informed consent (FPIC) before any transaction or allocation.
iv. Benefit Sharing (Sections 36 & 37, CLA): Define clear, equitable, and transparent benefit-sharing arrangements for any investment or partnership. The CLA requires that benefits derived from community land accrue to the entire community, not just individuals or elites.
v. Community Consent (Section 8(4), CLA): Obtain written consent from the community through a prescribed community resolution/consent form. This aligns with the Act's requirement that decisions relating to community land use and allocation must be by a majority of registered adult members of the community.
vi. Approval & Documentation (Sections 15, 30 & 37, CLA): Any agreement (investment, MoU, or partnership) must be approved in a community assembly or through the community land management committee (once registered). Approval should be by a majority of community members, with decisions recorded in minutes, filed with the county government, and, where relevant, registered with the NLC.

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 Audit) (Amendment) Regulations, 2019. The ESIA has also been done in line with the requirements of the World Bank (WB) Environmental and Social Framework (ESF) and the WB Environmental, Health and Safety Guidelines for Water and Sanitation. Pertinent national and county governments' laws, regulations, standards and guidelines 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 were identified and reviewed.

The Ministry of Water, Sanitation, and Irrigation (MOWSI) prepared an Environmental and Social Management Framework (ESMF) to guide the development of proposed interventions under the HoAGWRP, and to ensure that all project activities systematically consider the key environmental, social, health and safety concerns, including compliance with the applicable national legislation and the World Bank ESF. The ESMF provides a framework for site-specific assessments, stakeholder engagement, and risk mitigation plans, ensuring that HoAGWRP activities in Turkana County address localized environmental and social impacts while adhering to World Bank ESF requirements. This alignment fosters coherence between global safeguards and national frameworks, streamlining regulatory approvals and sustainable project implementation.

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 of the sub-project have been identified.

E6: Objectives of ESIA

1. Describe the proposed project and associated works together with the established E&S requirements in carrying out the proposed project;
2. Consider environmental, social, economic, cultural and legal considerations in regard to the proposed project as described above;
3. Identify and analyze alternatives to the proposed project;
4. To identify, in consultation with the interested and affected parties, all potential significant environmental and social impacts of the proposed project and recommend measures for mitigation;
5. To generate baseline data for monitoring and evaluation of how well the mitigation measures have been implemented by the proponent during the project cycle;
6. Develop an environmental & social management plan with mechanisms for monitoring and evaluating the compliance with the management measures

E7: ESIA Methodology

The Environmental and Social Impact Assessment (ESIA) was based on the proposed project designs, and entailed desktop reviews of the available project information, review of the applicable legislation, field assessment of the baseline conditions, and discussion with stakeholders (including surrounding communities, county and national government officials, among others).

The project team provided the proposed project designs, including associated facilities transposed into the Project Area (PA); to conceptualize the project and its impacts on the PA. Discussions with government officers involved explaining the proposed project and soliciting their views on environmental and social aspects that need to be considered during the design and implementation of the project. The team carried out data collection through structured questionnaires, use of checklists, observations and photography, site visits, consultation with stakeholders and desk studies, and, where necessary, in the manner specified in the Environmental Management and Co-ordination Act (Impact Assessment and Audit) Regulations, 2019.

E8: Stakeholder Engagement & Community Consultation

The main objective of the stakeholder engagement was to inform interested and affected parties about the proposed project and its likely effects, seek their views and concerns, and consider these in project designs and implementation arrangements. Consultations with various identified stakeholders begun in March 24, 2024 during site selection, environmental and social screening and eligibility assessments. From the initial community meeting, the community welcomed the project and expressed their commitment to support its implementation. The community reported that the water quality from the borehole is fit for human consumption. They requested for separate water access points for human and livestock. The community asked for borehole area protection to prevent destruction by flood water, as well as securing of the borehole infrastructure. They asked for extension of pipeline to the villages and institutions. These requests have been considered in the project final designs.

Project land requirement was discussed at this early stage, and the community voluntarily accepted to cede community land for the proposed water supply infrastructure. Land consent was formalized through the signing of a consent form by elected community representatives, and the formal process land transfer from community land to public land has been initiated.

The community prefer the repair and rehabilitation model of the county government. Upon enactment of the Turkana Water Act 2019, the mandate for management of rural water supply schemes shifts to the new created Turkana Rural Water and Sanitation Company (TURUWASCO). Currently, Turkana County Government are in engagement with the communities and their respective WSP over the transitioning of the services.

During ESIA study, Consultations were held with various Ministries and departments of the Turkana County Government with mandate on Health, Labor, Gender, and Education. Consultations were also held with TURWASCO, Water Resources Authority (WRA), National Environment Management Authority (NEMA), and various Community-based organization (CBOs) and Non-governmental Organizations (NGOs).

The project has prepared an Indigenous Peoples, Vulnerable and Marginalised Groups Planning framework which was adopted during the ESIA process, and will guide future project consultations and engagements.

A community baraza was held at Loturtur settlement with community members in December 3, 2024. For the engagement with the community, the various groups including men, women, youths, community leaders, vulnerable groups, and households—were duly notified of the baraza. Meeting notices were posted well in advance, and mobilization efforts included the use of community mobilizers and social media platforms to maximize outreach. The meeting was held at an accessible venue within the target settlement, a location routinely used for public gatherings such as chief's barazas. Attendance was open to all, with no restrictions. Project information was disseminated in the local Turkana dialect, Kiswahili, and English, with translations provided by a community-appointed representative. Questions during the meetings were posed in Kiswahili, the local language, or English. Participants were encouraged to ask questions, offer feedback, provide recommendations, and seek clarifications on all aspects of the project. All inquiries and requests for additional information were comprehensively addressed.

The community played a key role in conceptualizing the water schemes, shaping preliminary designs and ESIA studies. During the ESIA disclosure on June 26, 2025, the revised designs—adjusted after cost appraisal—were presented and well received. The meeting, mobilized through local leaders and institutions, allowed open dialogue in local languages. Clarifications were provided on project cost (undisclosed due to ongoing bidding), land use (community land to be converted for public use), integration of schemes (to serve all settlements), representation (only the CLMC chair in the land committee), and timelines (tendering in progress with construction to follow). Key milestones highlighted included obtaining the WRA permit and ESIA license, land transfer, contract award, construction, and commissioning.

E9: Project Alternatives

Alternatives considered include alternative project location for proposed boreholes, aalternative distribution routes, alternative sources of water, alternatives piping material and the'No Project' Alternative.

E10: Potential impacts and mitigation measures

Risks and Impacts	Descriptions of impacts	Mitigation measures
Water Resource Management	The community boreholes can significantly increase water availability, which is beneficial to local communities. However, improper management may lead to over-extraction, causing a decline in groundwater levels, potentially depleting the water source.	- Implement sustainable water extraction practices based on groundwater recharge rates. - Introduce water management plans and monitoring systems to track water levels and ensure responsible use. - Conduct regular hydrological studies to assess the long-term sustainability of the borehole. - Obtain water abstraction permits from WRA. - Comply with the Water Resources Regulations 2021.
Vegetation Clearance	Exposure to water and wind erosion.	- Limit vegetation clearance to the construction width. - Consult Kenya forest Service (KFS) on the suitable indigenous tree species to plant around the storage tank site, administration building, pump house and sanitation facilities).
General Materials Handling, Use and Storage	Pollution of soil, water and air.	- All materials shall be stored within the Contractor's camp unless otherwise approved by the RE. - Dispose off wastes as per the applicable laws and regulations. - Provide adequate sanitation facilities for both on and off-site teams. - All imported fill, soil and/or sand materials shall be free of weeds, litter and contaminants. Sources of imported materials shall be listed and approved by the RE. - The Contractor shall ensure that delivery drivers are informed of all procedures and restrictions (including 'No go' areas) required.

Risks and Impacts	Descriptions of impacts	Mitigation measures
		- Any electrical or petrol driven pumps shall be equipped and positioned so as not to cause any danger of ignition of the stored product. - Collection containers (e.g. drip trays) shall be placed under all dispensing mechanisms for hydrocarbons or hazardous liquid substances to ensure contamination from any leaks is reduced. - Regular checks shall be conducted by the Contractor on the dispensing mechanisms for all above ground storage tanks to ensure faulty equipment is identified and replaced in timely manner. - Only empty and externally clean tanks may be stored on bare ground. All empty and externally dirty tanks shall be sealed and stored on an area where the ground has been protected.
Water Quality Degradation	During rehabilitation, there may be a risk of contaminating groundwater or surface water with construction materials, waste, or fuel. If not managed properly, this can compromise the quality of water source.	- Implement strict waste management protocols during the construction phase. Ensure all materials used for rehabilitation are non-toxic and do not leach into the groundwater. - Conduct water quality testing before and after rehabilitation to ensure water safety.
Soil Erosion and Sedimentation	The activities involved in the construction phase of the project may have a major negative short-term impact on soil. The rolling terrain where the proposed borehole is located and the erratic rainfall experienced make it particularly vulnerable to soil erosion which could lead to the degradation of the land as	- Excavation work in the hilly areas should be avoided in rainy days - Replant vegetation around the construction site to stabilize soil and reduce erosion. - Soil excavated should be utilized for backfilling and the remaining soil being spread evenly and compacted.

Risks and Impacts	Descriptions of impacts	Mitigation measures
	well as loss of topsoil. This can result in sedimentation of water sources and disruption of the local landscape.	
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.	- Develop and implement a waste management plan. - Providing appropriate waste collection bins at designated points on site for purposes of waste segregation. - Engage licensed waste handlers for final disposal of wastes. - Track collection, holding and disposal of all wastes including hazardous wastes. - Training and awareness creation on Safe Waste Disposal in construction sites and camps for all workers. - Prepare Waste Disposal Plan for every construction site.
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, SO2, and VOCs. This will be potentially high in construction areas especially where there are human settlements and institutions like schools,	- 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. - Machines must not be left idling for unnecessary periods of time; this will save fuel and reduce emissions.

Risks and Impacts	Descriptions of impacts	Mitigation measures
	health centres among others.	
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 in negative impact to the ambient noise and vibration in the project area. However, for temporary periods 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 to 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. - Compliance to Noise and Excessive Vibrations Regulations 0f 2006 - Provide personal protective equipment (PPEs) to the construction workers.
Community Health and Safety	Health and safety risks, hazardous materials, traffic disruptions and security	- Develop and implement the community health and safety management plan - Ensure the safety of residents by providing safety signs at hazardous sites/places in the project area/works. - Hoarding off working sites to protect the public or unauthorized persons.

Risks and Impacts	Descriptions of impacts	Mitigation measures
		- Use of safety signs and warnings on sites with high risks such as the elevated tank sites and deep excavations. - Implement the traffic management plan. - Training and education of communities and project workers on SEAH, Emergency Response Plans (ERP). - Implementation of the stakeholder engagement plan (SEP).
Occupational Health and safety	Use of heavy machinery and various activities for construction work may pose safety hazards to the workers and the community.	- Develop and implement an occupational safety and health management plan. - Ensuring that the drivers and machine operators hired to work on the site are qualified. - Provided all workers with appropriate PPE. - Regular training on health and safety in line with OSHA 2007. - Regular maintenance of machines and equipment's. - Comply with OSHA 2007 Regulations. - Adherence to the programme of works to avoid workers being overworked. - Regular training on drug abuse and mental health issues. - Hoarding hazardous sites.
Labour influx	The influx of migrant workers may increase incidences of communicable diseases, conflict, insecurity, theft, SGBV and increased pressure on social amenities.	- Implement the project labour influx management plan. - Prioritize local labour force. - Regular community and project workers training, awareness and sensitization on HIV/AIDS, Mental Health and Drug Abuse. - Clear and culturally sensitive GM and SEAH/GBV procedures at the project site.

Risks and Impacts	Descriptions of impacts	Mitigation measures
		- Contractors provide adequate welfare amenities for their staff including accommodation and supplies. - All project workers sign the Code of Ethical Conduct (CoC)
SEAH and GBV	SEAH and GBV risks to the communities and project workers.	- implement the Project's SEAH Prevention and Response Plan. - Induct and regularly train the community and project workers on SEAH and GBV obligations. - Sensitize the communities on GBV/SEAH. - Regular M&E of SEAH and GBV aspects.
Children Rights, Protection of Children and Child labour	Child labour and the risk of violence against children.	- No engagement of minors in the project directly or indirectly. - Compliance to children Act 2022. - Conduct child protection training for workers, contractors, and local leaders. - Display clear signage at the site warning against child labour and abuse - Erect fencing or barriers to prevent children from accessing the project sites and project ancillary sites e.g contractors camps, sub camps, storage area e.t.c. - Include a strict prohibition on child Labor in all contractor agreements and CoCs for each worker - Conduct regular labour inspections to ensure compliance. - Sensitize parents, teachers, and local leaders on the risks of child abuse around construction sites
Security	Water access conflicts poses a risk to the project workers and community members	- Sub projects to adopt the project security management plan.

Risks and Impacts	Descriptions of impacts	Mitigation measures
		- Equitable sharing of project and subproject opportunities across the communities and settlements. - TURUWASCO to develop a community water sharing plan, that will result in a framework for the equitable and sustainable distribution of water resources..Fence off/secure sub project infrastructure.
Exclusion of vulnerable groups from consultations and inclusion in designs	Exclusion of PwD, vulnerable groups meeting the criteria in ESS 7, women, children and elderly from consultations and inclusion of their views in accessible facility design	- Adopt and implement the Indigenous Peoples/Vulnerable and Marginalized Groups (IP/VMG) Plan - Schedule meetings at convenient times and locations to accommodate women, persons with disabilities, and other vulnerable groups. - Ensure that local engagement plans adopted for the site specify need for the E and S focal points to engage directly with vulnerable groups. - Apply universal design in infrastructure to ensure accessibility for persons with disabilities to the water points. This will include dedicated consultations with the PwDs to understand their needs. - Ensure that consultations are culturally appropriate, accessible, including the use of sign language interpreters, braille, and vernacular languages. - Incorporate gender-sensitive and culturally appropriate design considerations
Forced labour in procurement supply chain	Supply chain labour risks	- Bidder requirements to submit a past forced labour performance declaration, and a declaration of ongoing Bidder commitment to prevent, monitor and report on any forced labour; - Include in contracts with Subcontractors/ suppliers/ manufacturers of *materials (pipes, fittings, solar panels and equipment)* obligations to prevent Forced Labor among the staff, employees,

Risks and Impacts	Descriptions of impacts	Mitigation measures
		workers and any other person employed or engaged by the Subcontractor/ supplier/ manufacturer - The Contractor, including its Subcontractors/ suppliers/ manufacturers, shall not employ or engage forced labour. Forced labour consists of any work or service, not voluntarily performed, that is exacted from an individual under threat of force or penalty, and includes any kind of involuntary or compulsory labour, such as indentured labour, bonded labour or similar labour-contracting arrangements.
Land Take (water supply pipelines, water kiosks and livestock troughs)	Physical displacement and loss of livelihood risks	- Alignment of water pipelines along public roads and spaces to avoid any physical and/or economic displacement as much as possible, or infringement on the land rights holders. - Community consultation on siting of livestock troughs and water kiosks. - Where additional land is required for the project, follow procedures to clarify the legal status of land rights holders; Engage with local authorities and traditional institutions to ensure customary rights are documented and recognized in project planning; The project is being implemented among Indigenous People/Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities (SSAHUTLC), ESS7 requires that broad community support through FPIC from both the community and individuals with land claims be sought for; - Engage both community leaders and individual land users and address expectations and grievances proactively; - Develop and formalize access and use agreements between WSTF and the land rights holders (both communal and individual);

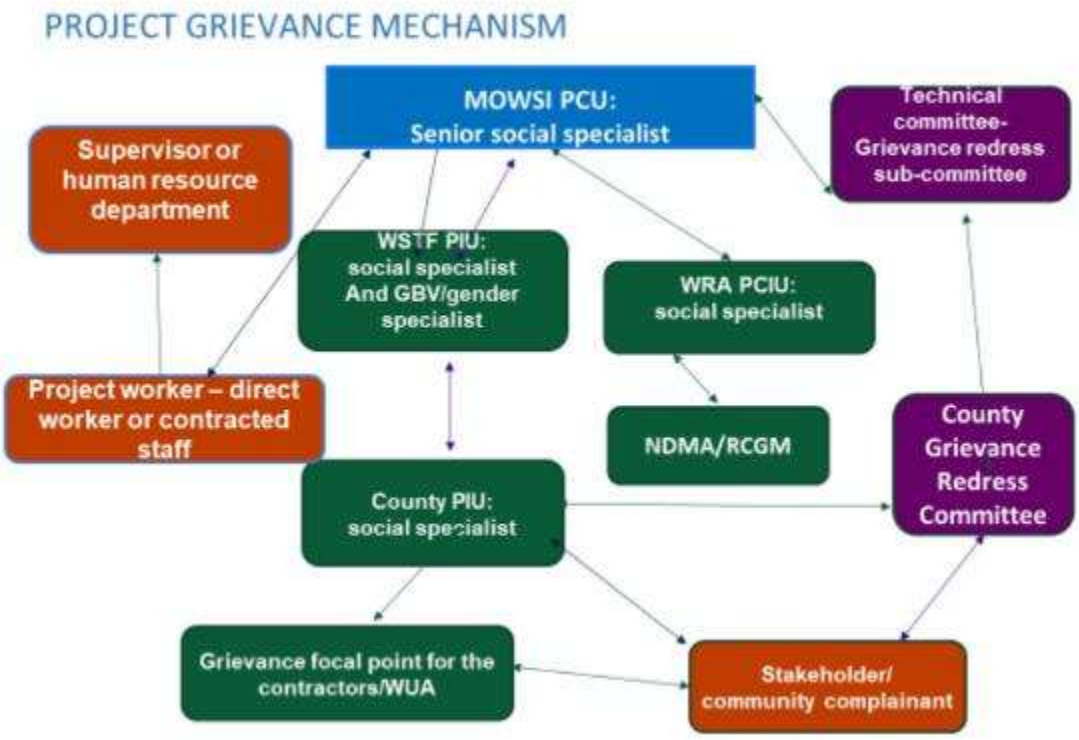
Risks and Impacts	Descriptions of impacts	Mitigation measures
		- Provide community-level benefits for communal compensation, and land-for-land, cash compensation at replacement cost, or livelihood support for those with use rights or structures; establish a GRM that includes customary and formal pathways, with trusted community representatives and accessible procedures

E11: Grievance Mechanism

A grievance committee (GC) has been established at national and county levels chaired by the project manager, and the relevant staff will be included as necessary depending on the complaint (procurement, finance, monitoring and evaluation (M&E), GBV advisor and communication). The social specialists will compile minutes for the meetings and follow up the grievance resolution process. The GRC will meet monthly to review minor complaints, progress on complaints resolution, review the development and effectiveness of the GM, and ensure that all staff and communities are aware of the system and the project.

Immediate meetings will be held in case of significant complaints to be addressed at the MoWSI PCU and County PIU. For serious or severe complaints involving harm to persons, communities or the environment or those which may pose a risk to the project reputation, the County social specialist should immediately inform the social specialist or head of the PCU, who will inform the WB within 48 hours as per the Environmental and Social Incident Reporting requirements.

At the community level, the WWUAs with strong representation of disadvantaged and vulnerable groups will receive complaints directly from the communities, contractors, or schools and forward to the county social specialist to support resolution and follow up. The Ward Water Users Association (WWUAs) will be the key link between the county team and the community, and the members will be useful in the feedback loop. Figure below presents the structure to be adopted by the project in managing grievances.



E12: ESMP Implementation

In order to ensure the sound development and effective implementation of the ESMP, it will be necessary to identify and define the responsibilities and authority of the various persons and organizations that will be involved in the project. The table below summarizes the entities that will be involved in the implementation of this ESMP. It is necessary for all the responsible parties identified to retain the environment and social officers to support the ESMP implementation and oversight:

Table 1: ESMP Institutions and Roles

Institution/Entity	**Specific Officer(s)**	**Role**
Ministry of Water, Sanitation and Irrigation (National Project Coordination Unit) TURWASCO.	Environmental and Social Safeguards Officers	Project-wide Supervision and oversight on ESMP Implementation Quarterly Reporting on ESMP Implementation Incident investigation and reporting
Water sector Trust Fund	Environmental and Social	Component-wide Supervision and oversight on ESMP Implementation

	Safeguards Officers	Quarterly Reporting on ESMP Implementation Incident investigation and reporting
Turkana County Government (S-PIU)	Environmental and Social Safeguards Officers	County-wide Supervision and oversight on ESMP Implementation Quarterly Reporting on ESMP Implementation Incident investigation and reporting
Resident Engineer	Environmental and Social Safeguards Officers	Scheme-level supervision and oversight on C-ESMP Implementation; Quarterly Reporting on C-ESMP Implementation Incident investigation and reporting
Contractor.	Environmental and Social Safeguards Officers	Implementation of the C-ESMP; Regular (at least monthly) reporting on progress of C-ESMP implementation Incident notification, investigation and reporting
National Environmental Management Authority. Directorate of Occupational Safety & Health Services.	Compliance Officers	Periodic/adhoc site inspections for compliance with statutory requirements

E13: Cost of ESMP Implementation

The indicative costs for implementing the ESMP are not provided, as per the applicable FIDIC General Conditions of Contract; the costs of implementing the construction-phase ESMP (C-ESMP) are to be borne by the Contractor and shall therefore be integrated within the Contractor's Bill of Quantities. The ESMP provisions shall be provided to bidders for the works contract, for their accurate estimation of costs. However, a separate cost is provided for HIV/AIDS Awareness training and sensitization, Stakeholder Engagement Plan Implementation, Grievance Redress Mechanism Implementation, and SEAH and GBV training and sensitization

E14. Climate change

Climate change creates several challenges for the water and sanitation sector, because infrastructure systems are highly vulnerable to weather and climate variations. Climate impacts due to the occurrence

of extreme weather events include impacts on infrastructure lifetime and capacity. Although water supply systems and their infrastructure are designed to withstand typical weather patterns, the impacts of current climate change and those arising in the short, medium, and long term can influence the infrastructure itself, the efficiency of the network, operations, and the ability of the infrastructure to withstand extreme events outside the "typical" range. This indicates that infrastructures not only need to be reliable when submitted to standard load, but also be able to minimize the magnitude and duration of failures under exceptional conditions such as increased rainfall intensity, changes in precipitation patterns, and more extreme weather events.

E15. 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 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 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.

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1 Introduction

1.1 Background

The Ministry of Water, Sanitation and Irrigation (MoWSI) is implementing the Horn of Africa Groundwater for Resilience Project (HoAGWRP) with a credit from the International Development Association (IDA). The Project Development Objective is to increase the sustainable access and management of groundwater in the Horn of Africa borderlands. The project intends to benefit 1,500,000 people in the rural areas of the five counties of Turkana, Wajir, Garissa, Marsabit and Mandera through the rehabilitation, construction and sustainable management of boreholes as well as from aquifer restoration, recharge and conservation related activities.

The project also envisions to benefit institutions that work on ground water at the National, County and transboundary levels. These include the Ministry of Water, Sanitation and Irrigation (MOWSI), the Water Resources Authority (WRA), the Water Sector Trust Fund (WSTF), the Regional Center on Ground water, the National Drought Management Authority (NDMA), the Turkana Urban Water and Sewerage Company (TURWASCO) and the Rural Water Service Schemes of participating ASAL counties. These institutions groundwater management will be strengthened by giving more visibility to ground water through policies, strategies, regulations and guidelines.

The HoAGWRP project is structured to be delivered in four components as follows:

i. Component 1 – Delivering inclusive groundwater services to priority Areas

This component will fund groundwater conservation, infrastructure development and service delivery improvement activities in the five borderland counties of Turkana, Marsabit, Mandera, Wajir, and Garissa. The component comprises two interrelated sub-components:

- **Sub-component 1. A:** Development of nature-based solutions for strengthening groundwater conservation, sustainable use, and recharge of seven selected aquifers in the ASALs of Kenya
- **Subcomponent 1. B:** Rehabilitation of an estimated 400 groundwater-based rural water supply schemes, enhancement of the designated drought-response strategic boreholes network, and mainstreaming Operations and Maintenance (O&M) of groundwater infrastructure in the

Under sub component 1B, the HoAGWRP is set to rehabilitate Kaitese water schemes in Kerio Delta Ward, Turkana Central Sub County, Turkana County.

To achieve this, the Water Sector Trust Fund (WSTF), hereinafter referred to as the 'Client' has commissioned CAS Consultants (referred to hereafter as 'the Consultant') to provide consultancy services for engineering designs, tender documentation and supervision of civil works during implementation of the proposed interventions in Turkana County. This also includes preparation of the statutory environmental and social safeguards instruments (ESIA), and supervision of the implementation of the C-ESMP by the contractor.

1.2 The Project Rationale

The HoAGWRP project is set to benefit people living in the rural communities and will focus on groundwater management, development and use. The project will also contribute to climate change adaptation and building the capacity of groundwater institutions which will equip key actors with the requisite know-how to anticipate groundwater impacts and manage groundwater potential and possibilities for the counties and the project's development and rehabilitation of groundwater infrastructure which will augment the availability of freshwater to enhance climate change adaptation.

The Horn of Africa Ground Water Resilience Project (HoAGWRP) in Turkana County addresses critical water scarcity challenges caused by prolonged droughts, erratic rainfall, and climate change impacts. Groundwater is the county's primary water source, yet existing infrastructure is inadequate, with many boreholes non-functional or inefficiently managed. The project focuses on rehabilitating boreholes and strengthening water supply systems to ensure reliable access to clean water for domestic use, livestock, and agriculture. By improving the distribution network, the project will expand water coverage, enabling more rural residents to access water closer to their homes, reducing the burden of long-distance water collection. This enhances climate resilience, supports livelihoods, reduces waterborne diseases, and aligns with Sustainable Development Goals (SDG 6 on clean water and SDG 13 on climate action), fostering sustainable water management and improved public health in vulnerable rural communities.

1.3 The Project Area

Loturutur is located in Turkana County, in the north-western part of Kenya. It is situated in the Turkana Central Sub-County, bordering with L. Turkana and is located at the coordinates 3.0963N, 36.0039E . This region is characterized by its semi-arid conditions and limited access to safe and reliable water sources, necessitating urgent infrastructural and environmental interventions.

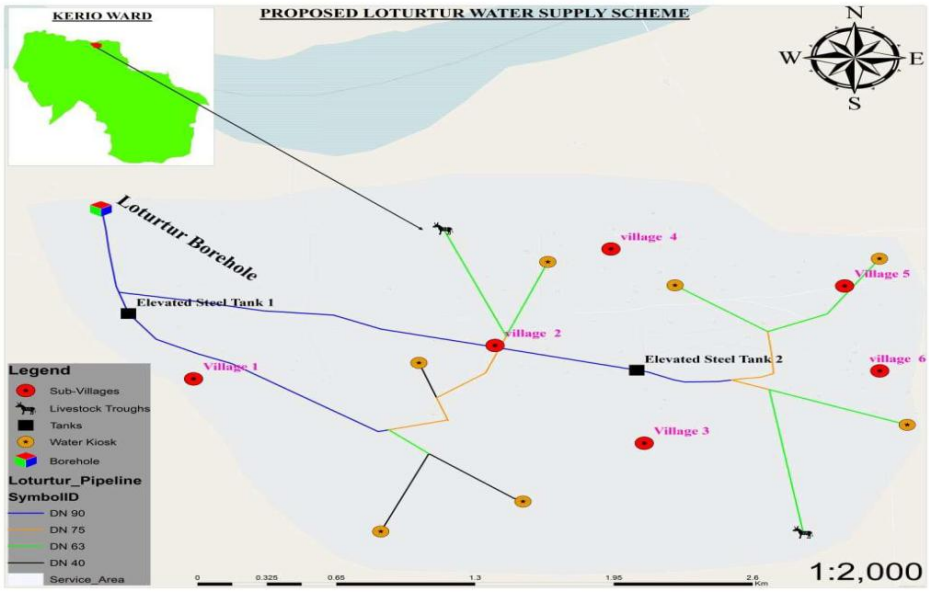


Figure 1. Project Area

1.4 Loturtur water supply project

The Loturtur water supply scheme, which is served by Loturtur borehole, caters to the sub-location of Lorengelup. The scheme coverage area includes 12 villages in Loreamatet and benefits about 1,723 people. The details of the borehole is as follows: -

Borehole	Coordinates	Reported Yield	BH Depth	Installed Capacity	Power Source	Tanks	Distribution System	Operational Status
Loturtur	3.0963N, 36.0039E	24 m^3/h	84 m	6 m^3/h	Solar	2No 10 m^3	None	Non-Operational

1.5 Project Components

The Loturtur water supply scheme comprises of one borehole and a pipeline network associated with certain environmental and social aspects, as well as its specific potential impacts.

Activities in the site shall consist of:

a. Installation of a pump and solar panels
b. Laying of 13,757 m of pipeline with, 3,501 m rising main and 10,255 m distribution as shown:

Scheme	Pipe Diameter (mm)	Pressure Nominal (PN)	Length (m)	Total length (m)
Loturtur	40	10	755	13,757
	50	10	5,933	
	63	12.5	253	
	75	12.5 & 16	4,521	
	90	16	2,295	

c. Construction of 2 # Elevated Steel Tanks of capacity $50m^3$
d. Construction of 4# water kiosks and 4# Livestock troughs and 3# individual connections as shown:

Scheme	Water Kiosks	Cattle Troughs	Shoat Troughs	Individual Connections
Loturtur	4	2	2	3

e. Construction of 1# sanitation facility-gender segregated.

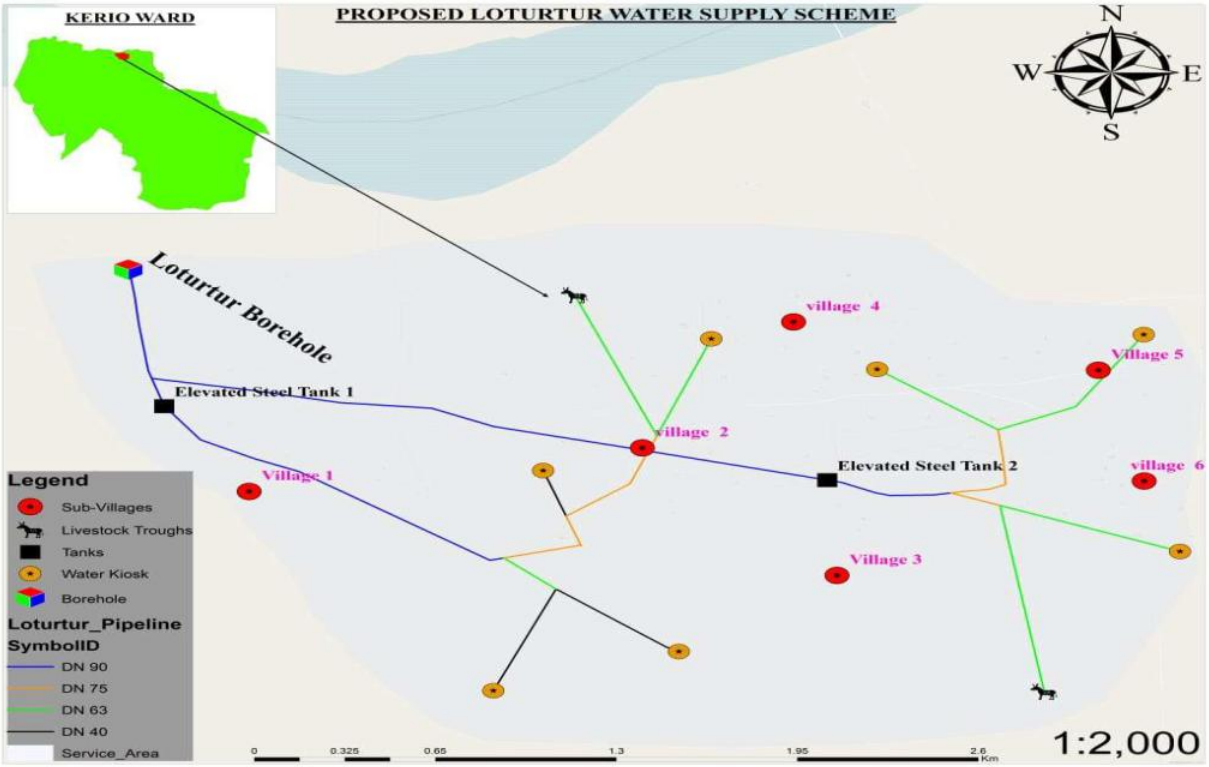


Figure 2. Project Schematic

1.6 Justification for the proposed project

The Horn of Africa Ground Water Resilience Project (HoAGWRP) aims to improve water access and management in rural communities, particularly in Turkana County, where water scarcity is a persistent challenge due to prolonged droughts, erratic rainfall, and climate change.

Groundwater serves as the primary water source in Turkana, yet much of the existing infrastructure is inadequate, with many boreholes either non-functional or poorly managed. This project focuses on:

- Rehabilitating boreholes and strengthening water supply systems to ensure reliable access to clean water for households, livestock, and agriculture.
- Enhancing groundwater management, development, and use, equipping institutions with the expertise to anticipate groundwater impacts and optimize its potential.
- Expanding water distribution networks to bring water closer to rural homes, reducing the burden of long-distance collection, particularly for women and children.

Supporting climate change adaptation by increasing freshwater availability, enhancing resilience against droughts, and promoting sustainable water management practices.

The project is expected to extract reasonable volumes of water for domestic and livestock use. Therefore, this water supply Scheme addresses critical water shortages by ensuring adequate supply for domestic use, schools, and livestock. The integration of operational and rehabilitated boreholes will significantly improve water access, benefiting underserved communities. Currently, the Loturtur borehole is non-operational despite having a high yield that can support the project area sufficiently.

1.7 Project Activities

The project activities will include the following:

Construction and Rehabilitation Works will involve extensive earthworks and excavation to create foundations for critical structures such as water tanks and pipeline networks. Materials like reinforced concrete, high-density polyethylene (HDPE) pipes, and precast concrete components will be utilized to ensure durability and compliance with international standards. Rehabilitation will include the cleaning, repairing, and lining of existing water storage tanks, installation of non-corrosive pipes, and implementation of measures to prevent water contamination. The pipelines will be carefully embedded in selected fill materials, ensuring stability and protection from environmental stressors. Concrete thrust blocks will be provided at strategic pipeline bends to mitigate pressure forces, while gabions and riprap will be installed for slope stabilization in erosion-prone areas.

Electro-Mechanical Installations will include the deployment of advanced pumping systems such as centrifugal pumps and solar-powered submersible pumps, catering to the specific needs of rural water supply schemes. Diesel generators will be installed as backup power sources to maintain operations during outages. Solar panels will be designed to resist UV exposure and tropical conditions, ensuring longevity. Electrical works will incorporate the installation of low-voltage distribution boards, control panels, and safety mechanisms. All materials will conform to relevant British and Kenyan standards, ensuring robustness against harsh environmental conditions. These installations will be designed with energy efficiency in mind, reducing operational costs while enhancing the reliability of the water supply system.

Testing and Commissioning of the facilities will involve rigorous procedures to ensure that all components meet operational and safety standards. Water storage tanks will be filled incrementally and tested for watertightness over a seven-day period, during which leakage rates must not exceed 0.3% of the total volume. Pipelines will undergo pressure testing to detect potential weaknesses, while water quality will be analysed to ensure compliance with bacteriological and chemical safety standards. The water storage facilities will be filled to capacity with water and left for three days to confirm they are watertight, while chlorination of the tanks will ensure their cleanliness before final use.

Capacity building and training efforts will be embedded to empower TURWASCO personnel to manage and maintain the rehabilitated systems. Training will cover the operation of pumps, generators, and solar power systems, as well as preventive maintenance of mechanical and electrical installations. Manuals and operational guides will be provided to ensure knowledge retention and promote independent management by the community. These activities will aim to create a skilled workforce capable of addressing potential system challenges, ensuring long-term sustainability.

1.8 Implementing Institutions

1.8.1 Ministry of Water, Sanitation and Irrigation (MoWSI)

The overall implementation and coordination of the project will be led by the Ministry of Water, Sanitation, and Irrigation (MoWSI). The Ministry will work in collaboration with all county water departments and other Implementing Agencies (IAs) to facilitate project execution across Kenya.

A Project Coordination Unit (PCU) has been established at the national level, while Project Implementation Units (PIUs) have been formed at the IA level—specifically at the Water Sector Trust Fund (WSTF). The PCU and PIUs are each headed by a Program Manager or Coordinator and are supported by a small team of technical and administrative experts, including:

(i) Financial Management Specialist
(ii) Procurement Specialist
(iii) Monitoring and Evaluation (M&E) Specialist
(iv) Communication Specialist
(v) Social Specialist
(vi) Environmental Specialist,
(vii) among others as needed.

The Program Manager/Coordinator is responsible for the day-to-day administration and coordination of project activities. The PCU will convene quarterly and annual review meetings with all key stakeholders, including the World Bank and other IAs.

The PIU environment and social safeguards officers will be responsible for Environment and Social Management Plans (ESMPs) effective implementation, monitoring, and evaluation. At the county level, Sub-PIUs will be responsible for executing the Grievance Redress Mechanism (GRM) and the Stakeholder Engagement Plan (SEP) at the project site level, with regular reporting to the PIU. In turn, the PIUs will submit monthly reports to the PCU and quarterly reports to the World Bank.

1.8.2 Water Sector Trust Fund

The Water Sector Trust Fund (WaterFund) is a Kenyan State Corporation under the Ministry of Water, Sanitation and Irrigation and established under the Water Act, 2016, with the mandate to provide conditional and unconditional grants to the Counties and to assist in financing the development of and management of water and sanitation services in the marginalised and underserved areas. In the HoAGWGP is the project proponent and has engaged the Consultant CAS Consultants Limited for this assignment including the ESIA studies.

1.8.3 TURWASCO & TURUWASCO

The Turkana Urban Water Company has formally assumed management of the Lodwar Water and Sanitation Company (LOWASCO) following enactment of the Turkana County Water Act 2019,. The Act also anchored the establishment of Turkana Rural Water and Sanitation Company. The two WSPs

mandate is to serve residents of Turkana County both urban and rural with water supply and sanitation services. TURWASCO is the project implementing agency and TURUWASCO is the project beneficiary.

1.9 Objectives of the ESIA

The specific objective of this assignment was to undertake Environmental and Social Impact Assessment (ESIA) for the project.

- ✓ Describe the proposed project and associated works together with the requirements for carrying out the proposed project;
- ✓ Take into account environmental, social, economic, cultural and legal considerations in regard to the proposed project as described above;
- ✓ Identify and analyze alternatives to the proposed project;
- ✓ To identify all potential significant environmental and social impacts of the proposed project and recommend measures for mitigation;
- ✓ To allow for public participation;
- ✓ To generate baseline data for monitoring and evaluation of how well the mitigation measures implemented by proponent during the project cycle;
- ✓ Develop an environmental & social management plan with mechanisms for monitoring and evaluating the compliance and environmental performance, which shall include the cost of mitigation measures and the time frame of implementing the measures.

1.10 ESIA Methodology

The approach to this exercise was structured such as to cover the requirements under the EMCA 1999 (Amendments 2015), as well as the EIA Regulations (Amendments 2019) and World Bank Environmental and Social Framework (ESF). The assessment involved an understanding of the project background, the interim designs and the implementation plan as well as project commissioning. In addition, the baseline information was obtained through physical investigation of the site and the surrounding areas, interviews with a sample of surrounding community, photography and most important discussions with the client and the design team.

1.10.1 Desk Reviews

A desktop review was conducted prior to site visit. Documents reviewed include:

- ✓ Feasibility study reports and preliminary designs of the proposed project;
- ✓ Project proposals.
- ✓ EMCA 1999 (Amendments 2015) and EIA Regulations (Amendments 2019); and
- ✓ World Bank ESF.
- ✓ Environmental & social screening Checklist.

- ✓ County Integrated Development Plan 2023-2027.

1.10.2 Field Assessment

The physical evaluation of the project area was carried out with specific focus on the environmental and social issues. The environmental issues assessed include, water sources and water quality, drainage and hydrology, air quality, sanitation and hygiene, biodiversity and sources of environmental pollution. The social issues include; settlement patterns, socio economic activities, land use, presence of traditional/cultural sites in the area etc.

1.10.3 Public Participation

Three public participation meetings were conducted in the project area: Loturtur. The key objective being sharing of project information, collect concerns from the public/ community and also to discuss with the relevant stakeholders on the issues raised to the proposed project. In Summary the representation was drawn from Turkana County Government, Local administration, representations from learning & religious institutions, and general public; specifically, beneficiaries. The ESIA Study meeting was held on December 3, 2024. A detailed report on the outcomes of stakeholder consultations is presented in chapter 5 of this report.

1.10.4 Key Informants Interviews

During the study, several key informant interviews/consultations were conducted with various Turkana County Government and National government officials including: -

i. Catholic Diocese of Lodwar;
ii. Water Resources Authority;
iii. Department of Education;
iv. Children's Office;
v. County Coordinator (Turkana County Government);
vi. Public health officers; and
vii. Labour Office.

1.10.5 Socio Economic Survey

The socio-economic survey was conducted within the project area Loturtur, with target respondents being the anticipated project beneficiaries. The information gathered was based on (a) review of secondary data and (b) collection of primary data, both qualitative and quantitative. The quantitative data was gathered through administration of questionnaires and qualitative data through informant interviews, focused group discussions and public consultative meetings organized through the area local administration.

1.10.6 Secondary Socio-economic Data

This information was largely drawn from the Kenya National Bureau of Statistics, The Kenya Population and Housing Census VII on Population and Household Distribution by Socio Economic

Characteristic, August 2019 and findings from household survey undertaken during the ESIA process within the month of December 2024.

1.10.7 Resettlement Action Plan

The project will be implemented within the already existing 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 is community land and no land acquisition is required.

2 Project Description

2.1 Overview

The Loturtur water supply scheme, located in Turkana Central Sub-County, caters to the sub-locations of Lorengelup. The scheme coverage area includes construction of 7 water kiosks within villages in Loreamatet.

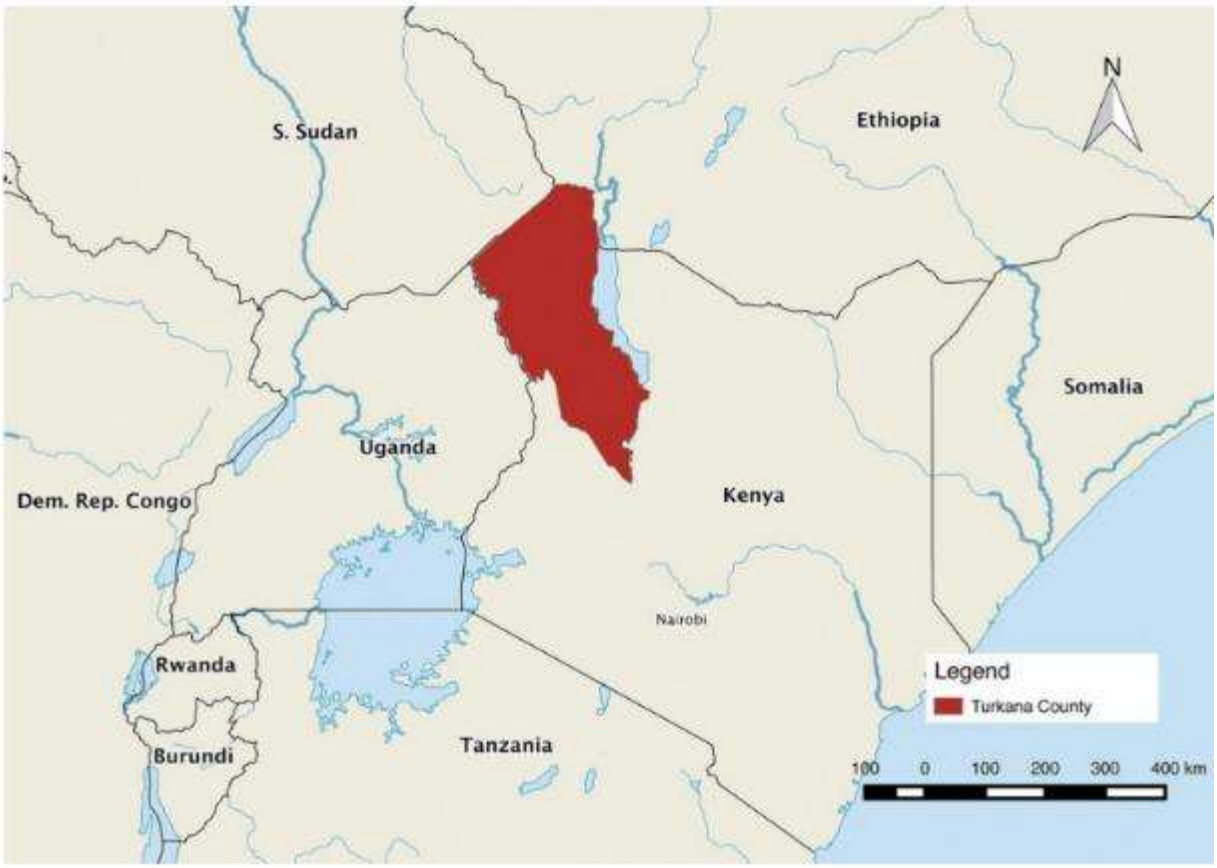


Figure 3:Map of Turkana County

2.2 Location of the Boreholes and pipeline route

Currently, the Loturtur water supply system consists of one non-operational borehole equipped with solar pumps. A summary of the system's details is provided in the table below: -

Borehole	Coordinates	Yield	BH Depth	Installed Capacity	Power Source	Tanks	Distribution System	Operational Status
Loturtur	3.0963N, 36.0039E	40 m^3/h	84 m	6 m^3/h	Solar	2# 10 m^3	None	Non-Operational

2.3 Current Loturtur scheme

Currently, the water supply system is not optimal due to functionality and operational challenges.

2.3.1 Boreholes



Figure 4: Loturtur Borehole



Figure 5: Loturtur – Electrical Faulty Connection



Figure 6: Loturtur Installed Water Meter



Figure 7: Loturtur Inverter Inspection

The non-functional borehole selected for rehabilitation under the project are: -

Loturtur Borehole The borehole was drilled during the 2021/2022 financial year by Koica UNICEF project. However, it became non-functional just three months after it was put into operation potentially due to issues with the electrical connections.

This borehole is connected to two elevated plastic storage tanks, each with a capacity of 10 cubic meters, via a pipeline approximately 100 to 150 meters long. The system operates on solar energy, utilizing 16 solar panels, each rated at 200 watts, connected to a 4-kilowatt converter. It is equipped with a 6 m^3/h pump for water extraction.

The borehole is securely fenced and features a lockable gate and a well-constructed lockable cover. These protective measures ensure the borehole's safety and security.

It could not be established whether an ESIA of the drilling and equipping of the borehole was conducted at the time of borehole drilling. A Hydrogeological Assessment Report on the site was also not available for perusal. Borehole regularization with WRA to ensure that the site is adequately mapped and monitored as per the water resource management regulations has been done and WRA approval is attached as Appendix H. This ESIA Report will be submitted to NEMA for compliance with EMCA.

2.3.2 Loturtur Distribution and Storage

Loturtur borehole is connected to two elevated plastic storage tanks, each with a capacity of 10 cubic meters, via a pipeline approximately 100 to 150 meters long.

2.3.3 Operation and maintenance of Loturtur Scheme

The scheme is currently being operated by the village water committee with the technical support of the Turkana Central Sub-County water officer. The system was observed to lack scheduled maintenance, and breakdowns were not being reported. Once a system stops operating, it is impliedly abandoned. It was clear that the village administration committee needed to be better equipped with the necessary knowledge to maintain the system after a breakdown. With the implementation of the proposed project, TURUWASCO is expected to run the water supply scheme.

2.3.4 Ancillary works

The proposed project also includes construction of Administration buildings, Pump House Control room, guard house and sanitation facilities as detailed in the drawings attached as Appendix F.

2.4 The proposed Loturtur water supply scheme

The Loturtur water supply scheme comprises of one borehole and a pipeline network associated with certain environmental and social aspects, as well as its specific potential impacts.

Activities in the site shall consist of:

a. Installation of a pump and solar panels
b. Laying of 13,757 m of pipeline with, 3,501 m rising main and 10,255 m distribution as shown:

Scheme	Pipe Diameter	Pressure Nominal (PN)	Length	Total length

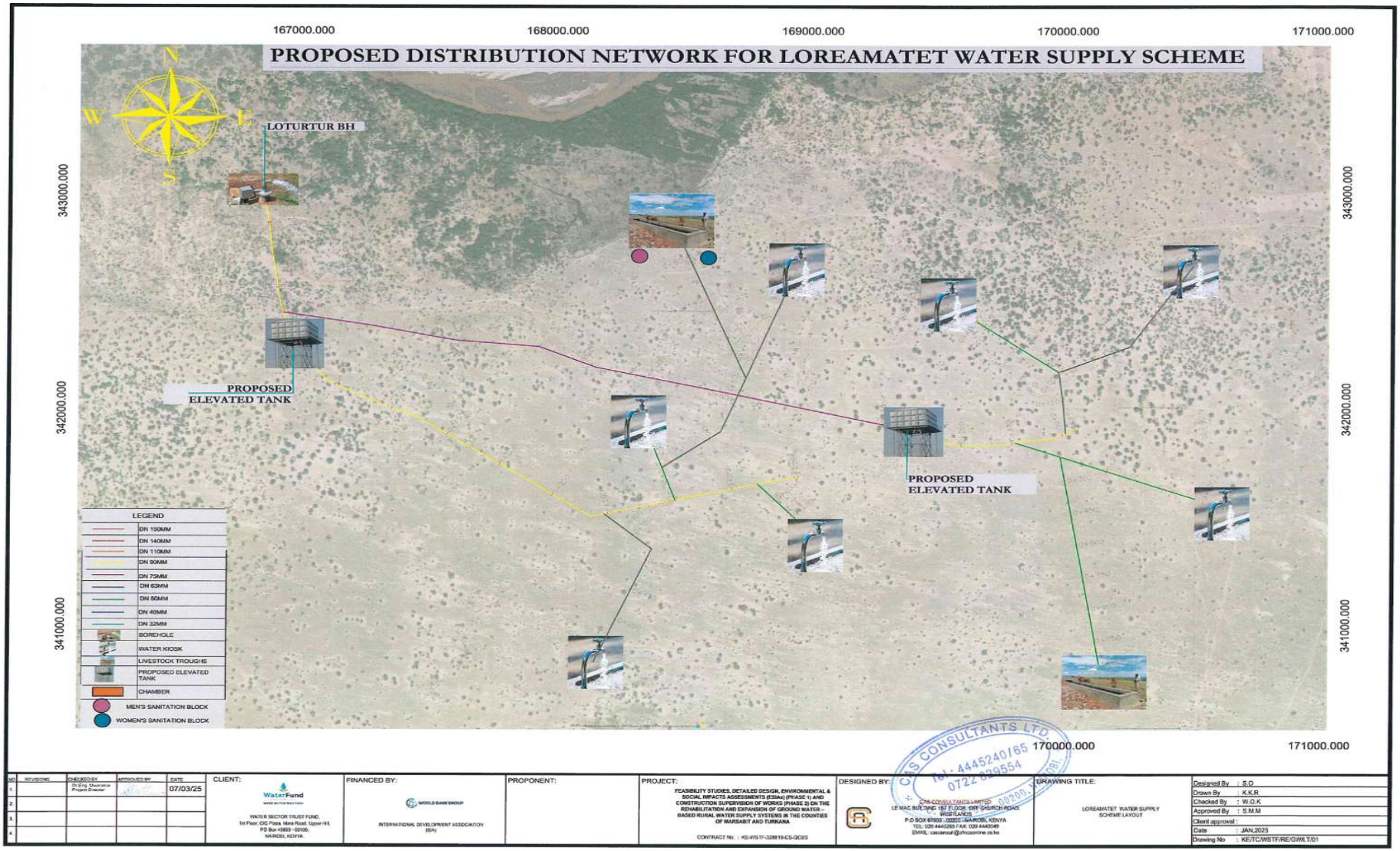
	(mm)		(m)	(m)
Loturtur	40	10	755	13,757
	50	10	5,933	
	63	12.5	253	
	75	12.5 & 16	4,521	
	90	16	2,295	

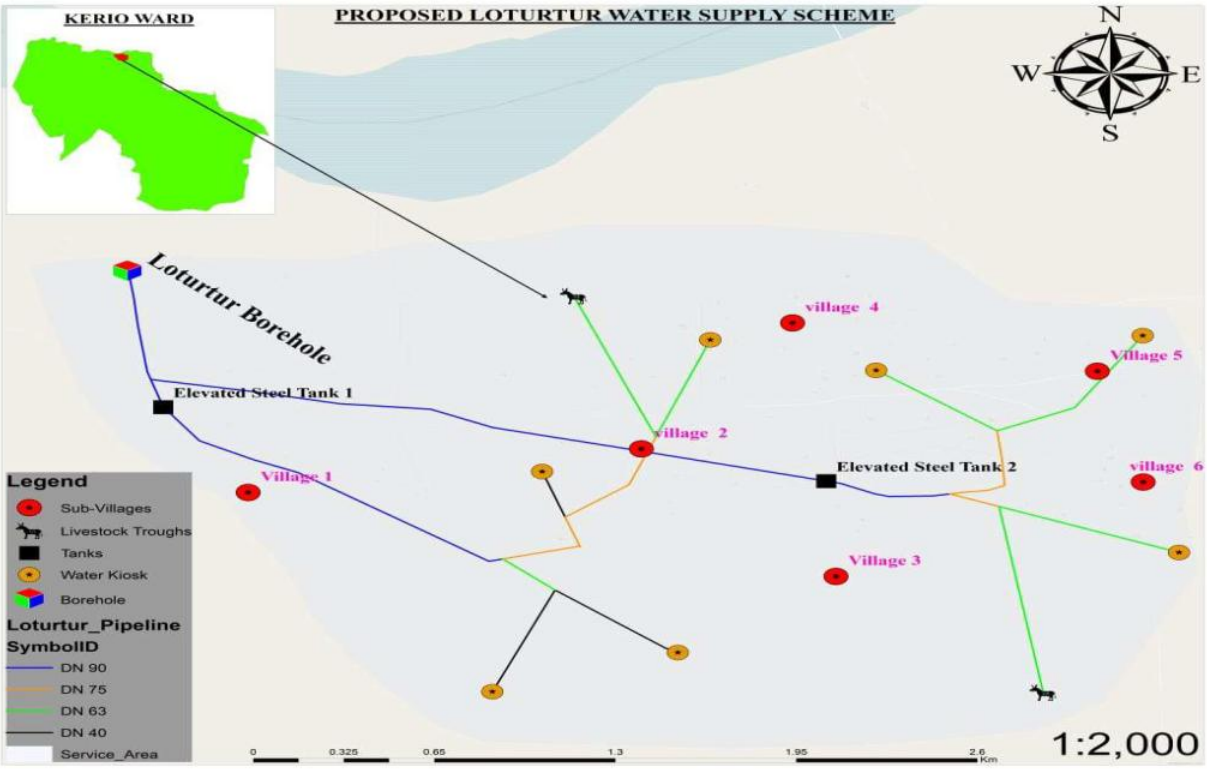
c. Construction of 2 # Elevated Steel Tanks of capacity 50m3
d. Construction of 4# water kiosks and 4# Livestock troughs and 3 individual connections as shown:

Scheme	Water Kiosks	Cattle Troughs	Shoat Troughs	Individual Connections
Loturtur	4	2	2	3

e. Construction of 1# sanitation facility.

Figure 8: The proposed Loreamatet distribution network





2.5 Project Land requirement

Loturtur borehole is located on communal land. To facilitate the implementation of the project, land consent forms have been signed by the Loreamatet community, granting permission to the project to utilize the designated land for borehole infrastructure development and its appurtenance. The construction of water kiosks, elevated storage tank, and other project components will be undertaken within the agreed communal land boundaries. For the pipeline network, the project will utilize the existing road reserve, ensuring minimal land disturbance and avoiding conflicts over land ownership. This alignment will also facilitate easier access for maintenance and repairs while ensuring the sustainable and efficient distribution of water to the targeted beneficiaries. Turkana County Government is in the process of transferring land from communal land to public land through issuance/registration of a title deed. Signed land consent form is attached as Appendix C-3.

The estimated land requirement for the water supply infrastructure, excluding pipelines, is 13,044m2 (3.21 acres) for the construction of the administration and guard house buildings, generator room, pump house, water storage tank, water kiosks & toilet blocks, solar panels support structure (PV Plant, and access roads.

2.6 Water quality tests

The water quality from the proposed boreholes meet the portable water quality standards provided by the Water Quality Regulations, Water Regulations 2019 and WHO. Water quality test results are attached as Appendix G.

2.7 Real-time remote monitoring, data-logging and remote-control

Installation of electromagnetic meters, control valves and actuators, level sensors and SCADA system to enable a Web-based monitoring interface is proposed. This will ensure continuous remote real-time monitoring of current operational status and some performance parameters; capture and store historical trends data-logging of key performance parameters and operational status as well as allow for an Optional remote control of the pumping system.

2.8 Fencing off the facilities

It is proposed that the borehole site and the associated solar and electoral mechanical works and where possible the elevated steel tank as proposed above be fenced with chain-link on concrete posts.

2.9 Project Materials, Equipment and Machinery

Materials for Use

The materials to be used shall include but not limited to; screen, gravel pack, sanitary seal, water, cement, sand, chlorine, solar panels, building stones, hardcore, fencing post, GI pipes and fittings, wire mesh, submersible pump, concrete fencing posts, chain link, barbed wire, bracing posts, plastic tanks, enamel paint, emulsion paints, red oxides, steel casement door, steel casement windows, reinforcement bars, formworks and damp proof membrane among other materials.

Equipment and Machinery

The anticipated works will require use of the following machineries and equipment on site; backhoe excavator, water bowser, tipper truck, double cab pick-up, poker vibrator, concrete mixer, dewatering pump, pressure testing kit, and plate compactor among others.

Labor force

The project is estimated to engage 20 skilled and semi-skilled persons and 50 non-skilled laborers. However, the exact number of personnel to be involved in the project may change. The contractor will be required to give priority to youths from the local community when hiring construction workers. The workforce will be employed for the duration of all construction works and reduced to 1 operator, clerk and plumber during operations and maintenance.

2.10 Anticipated Waste Material and By-products

The anticipated waste materials shall include waste water from test pumping, demolition debris, wood waste, electrical waste, soil cutting, waste metals, plumbing waste, plastics, organic waste, waste oil and fuel among others.

2.11 Project Stages and Activities

2.11.1 Pre-construction Phase

The ESIA is a crucial part of this process, identifying areas of environmental and social concern and recommending appropriate mitigation measures to be implemented during the construction, commissioning, operation, and decommissioning phases. The proponent prepared a detailed proposal to justify the need for the project and to evaluate its suitability in meeting the water demand of PA.

The project design involved extensive groundwork activities, including a reconnaissance survey, topographical survey, analysis of the hydrology of the water offtake source, identification of water demand, development of the design layout, and preparation of associated Bills of Quantities (BOQ) and tender documents. Additionally, interaction with local communities to gather first-hand information regarding physical features and desired design considerations is conducted at this stage. Implementation schedules are also prepared during this phase. Further, the ESIA study uses the design outputs to determine the quantifiable impacts and recommend an appropriate management plan to eliminate or mitigate them.

2.11.2 Construction Phase

Borehole rehabilitation – Borehole cleaning, replacing parts, replacing pumps and installation of solar panels.

Construction of water storage tanks and associated infrastructure – construction of offices, water kiosks, livestock water troughs, and steel tank.

Site Clearing and Trenching - Given that the proposed pipeline will pass through the project site within the established road reserves, minimal vegetation may need to be cleared to facilitate the establishment of temporary campsites and the laying of the pipeline. The pipeline construction width is estimated to be 3m and a depth of 900mm.

Public Amenities – the project pipelines are long access and feeder roads in the PA. These features may be disrupted during construction and therefore need to implement the project traffic management plan and stakeholder engagements to mitigate on community disruptions.

Pipe Laying - This stage will involve the transportation of the pipeline, placing the pipes in the trenches, pipe joining works, and backfilling.

Reinstatement of construction areas including backfilling, levelling and compaction of lose soils.

2.11.3 Operation Phase

Currently, the borehole is managed as a community-operated scheme. However, with the enactment of the Turkana County Government Water Act 2019, the responsibility for water supply services was transferred to the Turkana County Government. As a result, the Ministry of Water Services (TCG) is engaging with the community and the water committee to facilitate the transition of the water supply scheme from community management to TURUWASCO (Turkana Rural Water and Sanitation Company).

The water supply system will be monitored to ensure it conveys the designed flows and adheres to allowable volumes from the abstraction sources. This monitoring process will be continuous, with regular checks along the pipeline to detect and address any leakages or illegal connections that may occur over time.

2.11.4 Decommissioning Phase

Should the pipeline be decommissioned, process will include the safe removal of equipment and infrastructure, restoration of affected areas to their original condition, and the implementation of monitoring measures to verify the effectiveness of restoration efforts. All activities will be conducted in accordance with approved decommissioning plans and regulatory requirements to mitigate any potential long-term impacts on the environment and local communities.

3 Legislative, Policy and Institutional Framework

3.1 Introduction

It is a requirement under the Environmental Management and Coordination Act No. 8 of 1999 (Amendments, 2015)/Cap 387 and Environmental (Impact Assessment and Audit) Regulations 2003; (Amendments, 2018) to carry out Environmental Impact Assessments (EIA) as per Section 58 of the EMCA for all projects in the second schedule. Section 18 of the regulations sets out the information to be captured in the ESIA report. The institution charged with overseeing the implementation of Cap 387 is the National Environment Management Authority (NEMA).

This Project ESIA complies with the Kenyan legislative, regulatory and policy requirements. Throughout this ESIA report, reference is made to relevant international standards as part of Good International Industry Practice (GIIP) (i.e. IFC Performance Standards on Environmental and Social Sustainability (2012). This subsection of the ESIA provides an overview of the relevant policy, legal and institutional framework governing the Project ESIA process.

This chapter presents a review of the current policy, legal and regulatory framework applicable to environmental management of the proposed project.

3.2 Policy framework

The following key policies are relevant to the project:

Table 3.1: Policy framework

Policy	Description
The National Environmental Policy, 2013	The goal of the National Environment Policy is to provide a better quality of life for present and future generations through the sustainable management and use of the environment and natural resources. The National Environment Policy has the following objectives: • Provide a framework for an integrated approach to planning and sustainable management of the environment and natural resources; • Strengthen the legal and institutional framework for effective coordination and management of the environment and natural resources; • Promote sustainable management of the environment and natural resources; and • Promote collaboration and cooperation in the protection, conservation and sustainable management of the environment.
National Policy on Water Resources Management and Development	The policy paper seeks to enhance the systematic development of water facilities in all sectors for the country's socio-economic progress, and therefore calls for the development of appropriate sanitation systems to protect people's health and water resources from pollution. It also sets guidelines for the utilization of water resources to prevent overexploitation and depletion of the resource. Development projects, therefore, should be accompanied by corresponding waste management systems to handle the wastewater and other waste emanating there-from. The policy also requires that such projects should

Policy	Description
(Sessional Paper No.1 of 1999)	undergo comprehensive Environmental and Social Impact Assessments that will provide suitable measures to be undertaken to ensure environmental resources and people's health in the immediate neighbourhoods and further downstream are not adversely affected by any emissions or discharges.
Kenya's Vision 2030	Kenya Vision 2030 is a national long-term development blueprint to create a globally competitive and prosperous nation with a high quality of life by 2030. The vision is anchored on three key pillars; economic, social and political governance. It aims to transform Kenya into a newly industrialising, middle high-income country and to provide a high quality of life to all its citizens by 2030 in a clean and secure environment.
National Land Policy (2012)	The National Land Policy aims to guide the country towards efficient, sustainable and equitable use of land for prosperity and provides a legal, administrative, institutional and technological framework for optimal utilisation and productivity of land-related resources in a sustainable and desirable manner at national, County and community levels. It addresses critical issues of land administration, access to land, land use planning, restitution of historical injustices, environmental degradation, conflicts, the unplanned proliferation of informal urban settlements outdated legal framework, institutional framework and information management. This policy addresses the following topics: • Constitutional issues, such as compulsory acquisition and development control as well as tenure. It recognises the need for security of tenure for all Kenyans (all socioeconomic groups, women, pastoral communities, informal settlement residents and other marginalised groups); • This policy recognises and protects private land rights and provides for derivative rights from all categories of land rights-holding; • Through the Policy the government will ensure that all land is put into productive use on a sustainable basis by facilitating the implementation of key principles on land use, productivity targets and guidelines as well as conservation; and • The Policy promotes Environmental Management and Audit as land management tools and encourages public participation in the process.
National Land Use Policy (2017)	The overall goal of the national land use policy is to provide legal, administrative, institutional and technological framework for optimal utilization and productivity of land related resources in a sustainable and desirable manner at national, county and community levels. The Policy is premised on the philosophy of economic productivity, social responsibility, environmental sustainability and cultural conservation. Key principles informing it include efficiency, access to land use information, equity, elimination of discrimination and public benefit sharing. The Policy is cognizant of numerous factors that affect land use in Kenya which include geographic and ecological features, population distribution, social, historical, cultural and economic factors.
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	Kenya's policy paper on the Environment and Development was formulated in 1999. The policy defined approaches that will be pursued by the Government in mainstreaming the environment into development. The policy harmonised environmental and developmental

Policy	Description
Policy, Sessional Paper No. 6 of 1999	objectives with the broad goal of achieving sustainable development. It covers the following environment and development issues: biological diversity; land and land-based resources; water resources; fisheries and marine resources; energy resources; atmospheric resources; waste management; management of toxic and dangerous chemicals; radiation management; environmental health and occupational safety; human settlements; disaster management; implementation strategies; priorities for action; human resources development; environmental planning; environmental laws; environment and land use practices; environment, industry and economic development; environment, research and technology coordination; and participation; regional and international cooperation; and NEMA. This policy points out that the survival and socio-economic well-being of Kenyans are ultimately intertwined with the environment. Therefore, under this paper, broad categories of development issues among them the infrastructural development, have been covered that requires a sustainable approach. The policy recommends the need for enhanced reuse/recycling of residues including wastewater, use of low non-waste technologies, increased public awareness and appreciation of a clean environment. It also encourages the participation of stakeholders in the management of wastes within their localities. Regarding the human settlement, the paper encourages better planning in both rural and urban areas and the provision of basic needs such as water, drainage and waste disposal facilities among others.
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.
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.
The National Energy Policy (2018)	The Policy provides for a sustainable, adequate, affordable, competitive, secure and reliable supply of energy at the least cost geared to meet national and county needs while protecting and conserving the environment.

3.3 Relevant Sustainable Development Goals

The project aligns with several Sustainable Development Goals (SDGs) due to its focus on water, climate resilience, institutional strengthening, and community empowerment.

SDG	Relevant Targets	Contribution of the Project
SDG 6: Clean Water and Sanitation	**Target 6.1:** Achieve universal and equitable access to safe and affordable drinking water for all.	The project improves access to groundwater for underserved communities in Kenya's ASAL regions.
	Target 6.4: Substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity.	Focus on sustainable groundwater management, including borehole rehabilitation and aquifer recharge, enhancing water-use efficiency.
SDG 13: Climate Action	**Target 13.1:** Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries.	Enhances community resilience to drought and climate change by improving groundwater infrastructure and management.
	Target 13.2: Integrate climate change measures into national policies, strategies, and planning.	Groundwater development and disaster risk management are integrated into national strategies, addressing climate impacts.
SDG 5: Gender Equality	**Target 5.4:** Recognize and value unpaid care and domestic work.	Reduces the burden on women and children who are primarily responsible for water collection, thus promoting gender equality.
	Target 5.5: Ensure women's full participation in decision-making.	Involves women in community-based management of water resources, promoting their role in decision-making processes.
SDG 2: Zero Hunger	**Target 2.4:** Ensure sustainable food production systems and implement resilient agricultural practices.	Enhances water access for irrigation and livestock, supporting sustainable agriculture and food security.
SDG 1: No Poverty	**Target 1.5:** Build the resilience of the poor and those in vulnerable situations to climate-related hazards.	Increases resilience to droughts, thereby reducing economic vulnerability and poverty in the ASAL regions.
SDG 16: Peace, Justice, and Strong Institutions	**Target 16.6:** Develop effective, accountable, and transparent institutions at all levels.	Strengthens institutions responsible for groundwater management, improving policies and governance.

SDG 17: Partnerships for the Goals	**Target 17.16:** Enhance the global partnership for sustainable development.	Collaboration between the Kenyan government, regional institutions, and the World Bank, strengthening international partnerships for development.

3.4 Legislative Framework

3.4.1 The Constitution of Kenya

The Constitution of Kenya, 2010 provides that every person has the right to a clean and healthy environment (Article 42). The state is obliged to ensure that the environment and natural resources are conserved and genetic resources and biological diversity are protected. In that regard, it must eliminate any processes or activities that would be likely to endanger the environment. Everyone is expected to cooperate with the State organs and other people to protect and conserve the environment and ensure that the use and development of the natural resources are ecologically sustainable (Article 69). These environmental rights are enforceable in a court of law (Article 70). Article 174 of the Constitution sets out the objects of devolution of government, which include, among others, giving powers of self-governance to the people and enhancing their participation. The Constitution has elevated water resources into a human rights issue; Sec. 43 (1) (d) every person has a right to clean and safe water in adequate quantities. The Constitution has placed water resources regulation and management functions in the National Government to deliver human rights. On behalf of the Government of Kenya, the Water Resources Authority (WRA) is the Authority charged with the responsibility of regulating the use of water resources in the country. The Constitution has further devolved the water services function to the respective county governments.

Relevance

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

3.4.2 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 Turkana.

3.4.3 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.

These Regulations outline the water quality standards that should be met for different uses including effluent discharge.

The following schedules in the Water Quality Regulation set out the relevant standards and monitoring requirements:

First Schedule: Quality Standards for Sources of Domestic Water;

Second Schedule: Quality Monitoring for Sources of Domestic Water;

Third Schedule: Standards for Effluent Discharge into the Environment;

Fourth Schedule: Monitoring Guide for Discharge into the Environment;

Fifth Schedule: Standards for Effluent Discharge into Public Sewers; and

This regulation gives quality standards for water supply for domestic.

Relevance

The project will deliver quality water to its beneficiaries according to the regulations.

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 minimization 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 0-1: 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.

	PART II – GENERAL PROVISIONS
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; 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	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,

	PART II – GENERAL PROVISIONS
transporter	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.
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 disturbed areas, 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.

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 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.

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.

viii. Environmental Management and Co-ordination (Extended Producer Responsibility) Regulations, 2020.

Every producer shall bear extended producer responsibility obligation to reduce pollution and environmental impacts of the product that they introduce in the market.

Relevance

The proponent and the contractor shall adhere to this regulation, ensuring that all materials purchased or by suppliers, if they have the potential to become waste in the environment and fall under Schedule 1, comply with the requirements of this regulation.

3.4.4 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.

3.4.5 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.
- Section 72: Empowers WASREB to regulate water tariffs.
- Section 85: Requires county governments and WSPs to ensure water services are provided affordably and sustainably.

The Kenya Water Act, 2016 establishes a structured approach to setting water tariffs and regulating water quality. WASREB plays a key role in ensuring fair and sustainable tariffs, while WRA enforces water quality standards to protect public health and the environment.

Relevance

The proponent shall be expected to ensure collaboration with the County government, WASREB and WRA and their specific mandates as defined in the act such as having a water abstraction permit for sinking of the boreholes.

3.4.6 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.

3.4.7 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 occupied by the boreholes belongs to the community. Efforts are to be made to ensure that the land is transferred to the WSPs to avoid future land contentions.

3.4.8 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.

3.4.9 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.

3.4.10 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

3.4.11 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.

3.4.12 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.

3.4.13 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.

3.4.14 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.

3.4.15 Physical and Land use Planning Act, 2019

The Physical and Land Use Planning Act, 2019 replaced the older Physical Planning Act (Cap 286) and provides a comprehensive framework for spatial planning, land use, and development control in Kenya.

Relevance

The Proponent and Contractors of the proposed project will need to comply with the requirements of this Act by ensuring proper site selection, sustainable land use, and compliance with regulatory approvals.

3.4.16 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.

3.4.17 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.

3.4.18 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.

3.4.19 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.

3.4.20 The Persons with Disabilities Act, 2003

The Persons with Disabilities Act, 2003 emphasizes the inclusion of persons with disabilities (PWDs) in decision-making processes to ensure their rights, dignity, and interests are protected. The Act mandates that PWDs are adequately represented in public and private institutions, committees, and boards to ensure their views are considered in policy formulation and implementation. PWDs and their representative organizations must be consulted in the development of laws, policies, and programs that directly affect them. The Act promotes their active participation in political, social, and economic decision-making processes at all levels.The Act also requires public institutions and organizations to create mechanisms that promote the inclusion of PWDs in their decision-making structures.

Relevance

The client and contractors should adhere to this Act. The Act calls for active involment of PLWD as a means of empowerment and ensuring their voices are heard and their needs are integrated into the design and implementation of the project.

3.5 World Banks Environmental and Social Framework (ESSF)

The World Bank Environmental and Social Framework sets out the World Bank's commitment to sustainable development, through a Bank Policy and a set of Environmental and Social Standards that are designed to support Borrowers' projects, with the aim of ending extreme poverty and promoting shared prosperity.

The Environmental and Social Standards are designed to help the proponent to manage the risks and impacts of a project, and improve their environmental and social performance, through a risk and outcomes based approach.

The table below provides the overview of the relevant Environmental and Social Standards for the project.

World Bank's Environmental & Social Standards

	E & S Standards	**Comments**
ESS1	Assessment and Management of Environmental and Social Risks and Impacts	The project will involve multiple activities, among them capacity building and strengthening of institutions that have a social impact. Conservation efforts will be carried out that will include gazettement of particular land areas that will likely involve restriction of use or acquisition that will likely have both an environmental and social impact. Rehabilitation of existing boreholes will also have both environmental and social impacts. Given the activities and imminent environmental and social impacts that will arise from these activities, it is necessary to identify the risks the subprojects present, determine their severity and put in place appropriate mitigation measures to manage these risks to acceptable levels in accordance to instruments applicable or prescribed by local or national legislations.
ESS2	Labor and Working Conditions	The project will entail some works activities and the ESS2 is relevant in ensuring that no child or forced labour is involved and that working conditions in the works activities will comply with both national laws and this ESS.
ESS3	Resource Efficiency and Pollution Prevention and Management	The project will involve construction of water infrastructures which will make use of different materials both hazardous and non-hazardous and generate wastes that will require disposal. Sinking of boreholes requires proper management to avoid contamination of the groundwater. Use of this water once it comes to the surface by multiple users also presents the risk of contamination and generation of wastewater by multiple users. Under ESS3 and what is prescribed under the local laws such as the Water Act and Environmental Management and Coordination Act (EMCA) these objectives will be achieved by putting in place proper management

		measures for potentially hazardous substances and generated waste also covered by ESS1.
ESS4	Community Health and Safety	The water infrastructure may pose hazards to human beings and livestock while water provision infrastructure is associated with hazards such as insecurity and communicable diseases from labour influx, leakage, flooding, contamination, and water-borne diseases which may pose a danger to users and non-users alike. Appropriate provisions within the ESMP and instruments such as Labor Influx Management Plan and community emergence and response plans have been prepared to appropriately mitigate these issues.
ESS7	Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities	The project will aim to enhance opportunities for the local people by offering employment and ensuring that the activities of the proposed project do not threaten their unique cultural identities and well-being.
ESS8	Cultural Heritage	Sets out measures designed to protect cultural heritage throughout the project life-cycle.
ESS10	Stakeholder Engagement and Information Disclosure	This Standard applies to all projects supported by the Bank through Investment Project Financing. The report incorporates a Stakeholder Engagement Plan (SEP) proportionate to the nature and scale of the project and its potential risks and impacts.

Relevance

*The project proponent and contractor should adhere to this framework. The ESSF ensures that World Bank-funded projects balance economic growth with environmental protection and social inclusion, minimizing risks while maximizing benefits for communities and ecosystems***.**

3.6 Institutional Framework

The table below presents a list of administrative agencies and government institutions that regulate the water sector, or have a key role in the Project ESIA authorization process, as well as those that are directly affected by the proposed implementation of the water supply scheme project.

Institution	***Description***	***Role in the Project***
National Environment Management Authority (NEMA)	NEMA was established under the EMCA 1999 (CAP387, Laws of Kenya). NEMA is the main institution of the Government responsible for the coordination and supervision of the various environmental	Main institution responsible for granting ESIA approvals in Kenya and monitoring and assessing project activities according to relevant environmental

Institution	*Description*	*Role in the Project*
	management activities in Kenya and implementation of policies relating to the environment in country development projects. As part of its mandate in the regulation and management of the environmental sector, NEMA is responsible for granting ESIAs, Environmental Audit reports, licensing under different Environmental Management and Coordination regulations.	regulations and laws in the country. This Project ESIA document will be submitted to NEMA for approval and permitting.
National Environment Council (NEC)	The National Environment Council was established under the EMCA 1999 (Section 4(1), Act no 8). Its key function is to formulate and set national policy and direction for the protection of the environment as prescribed in the EMCA.	Stakeholder responsible for formulation of environmental policies.
Water Resources Authority (WRA)	The Water Resource Authority (WRA) is a state corporation established under the Water Act 2016 (Section 11) (formerly called Water Resource Management Authority - WRMA, established under Water Act 2002). The WRA is the lead agency in water resources management and use of water sources. It is responsible for granting permits for water use.	National Authority responsible for granting water permits for water abstraction from surface and ground sources.
National Land Commission (NLC)	The National Land Commission (NLC) is the main government institution responsible for managing public land on behalf of the National and County governments. It is responsible for advising the national government on a comprehensive program for the registration of title in and throughout Kenya and recommends National Land Policy to the National government. The NLC also initiates investigations into present or historical land injustices and have oversight responsibilities over land use planning throughout the country.	Responsible for land acquisition processes and compensation to persons affected by the Project.
County Environmental Committees (CEC)	The County Environmental Committees (CEC) are responsible for the proper management of the environment within the County for which it is appointed. The Committees also develop the County Strategic Environmental Action Plan every five years.	Key stakeholder at County level that monitors project activities.

Institution	*Description*	*Role in the Project*
Turkana County Government	The Turkana County Government consists of both the County Assembly and the County Executive made up of several County Ministries. The Turkana County Government functions include agriculture, health and sanitation, control of air and noise pollution, cultural activities, County transport, planning and development, implementation of national government policies on natural resources and environmental conservation, land, energy and housing, trade, gender and youth affairs, etc. Further, planning for development of all nationally significant projects in the County require participation in each of the affected counties.	Key stakeholder for the Project.
Lodwar Water and Sewerage Company (LOWASCO)	LOWASCO is a Water Service Provider within Turkana County majorly Lodwar Town. Under section 91 of the Water Act, LOWASCO is responsible for the effective and economical provision of water service to fulfil the right to water.	The Turkana Urban Water Company has formally assumed management of the Lodwar Water and Sanitation Company (LOWASCO) following enactment of the Turkana County Water Act 2019.
TURUWASCO	The water utility company is the main water service provider in Turkana County.	The existing Lowarengak water supply schemes is reported to be under the management of community WRUAs. Once the proposed project is completed, it will be operated and managed by TURUWASCO through an MoU with the community. The project shall therefore be operated by TURUWASCO for service provision or as shall be agreed with the community. TURUWASCO will be responsible for overall implementation of the ESMP recommendations during operation phase of the project.
The Commission on Administrative Justice (CAJ) - Office of the Ombudsman	The Commission on Administrative Justice (CAJ), also known as the Office of the Ombudsman in Kenya, plays a critical role in ensuring fairness, accountability, and transparency in public administration, including matters of project design and implementation. Its roles include ensuring Compliance with Fair Administrative Action, addressing Complaints regarding	The CAJ's involvement ensures that projects are designed and implemented in a way that is equitable, inclusive, and aligned with Kenya's constitutional values and statutory provisions. It also plays the role of mediation and resolving of disputes arising between project proponents and affected communities to ensure

Institution	*Description*	*Role in the Project*
	maladministration, exclusion, or unfair treatment, monitors compliance with Legal Standards, and advocating for and monitors the inclusion of public views, especially from marginalized groups, persons with disabilities, and other vulnerable communities, in the project cycle.	projects are implemented smoothly and without violation of rights.
Ministry of Environment and Forestry	The Ministry of Environment and Forestry mission statement and the key objective is to facilitate good governance in the protection, restoration, conservation, development and management of the environment and forestry resources for equitable and sustainable development.	Key stakeholder to the Project mandated to undertake national environment policy and management, forestry development policy and management, development of re-afforestation and agroforestry, among others.
Ministry of labor and social protection	The Ministry of Labour and Social Protection plays a key role in ensuring that project design and implementation align with labor standards, social inclusion, and protection of vulnerable groups. This is achieved through enforcing labor Laws, promoting Social Inclusion, monitoring employment practices, stakeholder engagement and participation, safeguarding social welfare, capacity building and training	By integrating labor and social protection considerations, the ministry ensures projects are not only economically viable but also socially responsible and inclusive.
National council of people living with disability (NCPLWD)	The National Council for People Living with Disabilities (NCPLWD) plays a crucial role in ensuring that the rights and needs of persons with disabilities (PWDs) are considered in project design and implementation. Its responsibilities include advocating for inclusion, representing the interests of PWDs during stakeholder engagements to ensure their voices are heard and integrated into project planning, offer guidance on disability related legal compliance Policy and Standards Guidance to ensure projects meet accessibility and inclusivity requirements.	Through their roles, the NCPLWD ensures that projects are designed and executed in a manner that upholds the dignity, rights, and opportunities for persons with disabilities.
National Gender and Equality Commission	The Commission works with, partners, communities and other stakeholders to promote mainstreaming of issues of minorities and marginalized communities and groups in all spheres of development. Its focus areas include: undertaking public	Key stakeholder for the project

Institution	*Description*	*Role in the Project*
	education and information to sensitize minorities and marginalized and stakeholders on integration of the principles of equality and freedom from discrimination.	

3.7 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
6.		

3.8 Applicable International Conventions and Agreements

Applicable International Conventions and Agreements

Conventions & Agreements	Description
Vienna Convention on the Protection of the Ozone Layer	Aims to protect the ozone layer by regulating the production and use of substances that deplete it. Relevant for projects affecting atmospheric conditions or chemical usage.
United Nations Convention on Biological Diversity (UNCBD)	Focuses on the conservation of biological diversity, sustainable use of its components, and fair sharing of benefits arising from genetic resources. Key for projects impacting ecosystems.
The 1992 United Nations Framework Convention on Climate Change (UNFCCC)	A treaty aimed at mitigating climate change by reducing greenhouse gas emissions and promoting global cooperation on climate action. Relevant for projects contributing to emissions or climate policy.
Rio Declaration on Environment and Development	Sets out principles for sustainable development, balancing environmental protection with economic growth. Provides a framework for making environmentally and socially responsible decisions in development.
African Convention on the Conservation of Nature and Natural Resources	Aims to protect Africa's natural resources, promote biodiversity, and prevent degradation. Essential for projects involving land use or natural resource exploitation in Africa.
Earth Summit on Sustainable Development Agenda 21	A global action plan for sustainable development across social, economic, and environmental sectors. Guides projects toward sustainable practices.

Convention on International Trade in Endangered Species (CITES)	Protects endangered species from over-exploitation through international trade regulations. Relevant for projects that may involve trade or use of endangered species.
International Labour Organization (ILO)	Promotes fair labor practices, social protection, and rights at work. Ensures that projects align with international labor standards.
The Paris Agreement	A legally binding international treaty on climate change, aiming to limit global temperature rise and enhance climate action. Relevant for projects that may impact climate change or require emission reductions.
The World Commission on Environment and Development (The Brundtland Commission of 1987)	Introduced the concept of sustainable development, focusing on meeting present needs without compromising future generations. Informs development policies and projects with a focus on sustainability.
United Nations Convention to Combat Desertification (UNCCD)	Focuses on preventing land degradation, particularly in dryland areas, and restoring desertified land. Relevant for projects that impact land use or ecosystems in arid regions.
The Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW)	Addresses gender equality and the empowerment of women, ensuring women's rights in all areas of life. Guides projects to promote gender equity.
The African Charter on Human and Peoples' Rights (Banjul Charter)	Protects human rights and freedoms in Africa, ensuring respect for individual and collective rights. Projects must adhere to principles of human dignity, equality, and justice.
Protocol to the African Charter on Human and Peoples' Rights on the Rights of Women in Africa (Maputo Protocol)	Focuses on the protection and promotion of women's rights in Africa. Ensures projects are gender-sensitive and promote equality.
The ILO Convention No. 169 on Indigenous and Tribal Peoples	Recognizes the rights of indigenous and tribal peoples, particularly concerning land, resources, and culture. Projects must respect the rights of these communities, especially in land and resource management.

4 Baseline Information

Overview

Turkana County is the second largest of 47 counties in the Republic of Kenya. It covers an area of 68,680 km^2, accounting for 13.5% of the total land area in Kenya (Turkana County Investment Plan, 2016-2020). It lies between Longitudes 34° 30'E and 36° 40'E and between Latitudes 10° 30'N and 50° 30'N. Turkana is located in the northwest of Kenya and borders Uganda to the west, South Sudan and Ethiopia to the north and northeast respectively. Internally, it borders West Pokot and Baringo Counties to the south, Samburu County to the southeast, and Marsabit County to the east.

The total population of Turkana County is 926, 976 (478,087 males; 448,868 females; 21 intersex) with a population density of 14 persons/km^2 and 164,519 households. The populace is predominantly pastoralist (70%) and only 20% engage in crop farming.

Administratively, the County is subdivided into 7 sub counties: Kibish, Turkana North, Turkana West, Turkana Central, Loima, Turkana South and Turkana East. Turkana Central is the Focal sub county for this project.

Table 4.1: Turkana County 2019 Kenya Population and Housing Census

Sub-County	Male	Female	Intersex	Total
Kibish	18651	18117	1	36769
Loima	54531	53453	1	107795
Turkana Central	93145	92160	-	183305
Turkana East	76871	61643	12	138526
Turkana North	32810	32408	-	65218
Turkana South	78402	75329	5	153736
Turkana West	123867	115758	2	239627

Source: 2019 Kenya Population and Housing Census

The gender distribution is as shown below: -

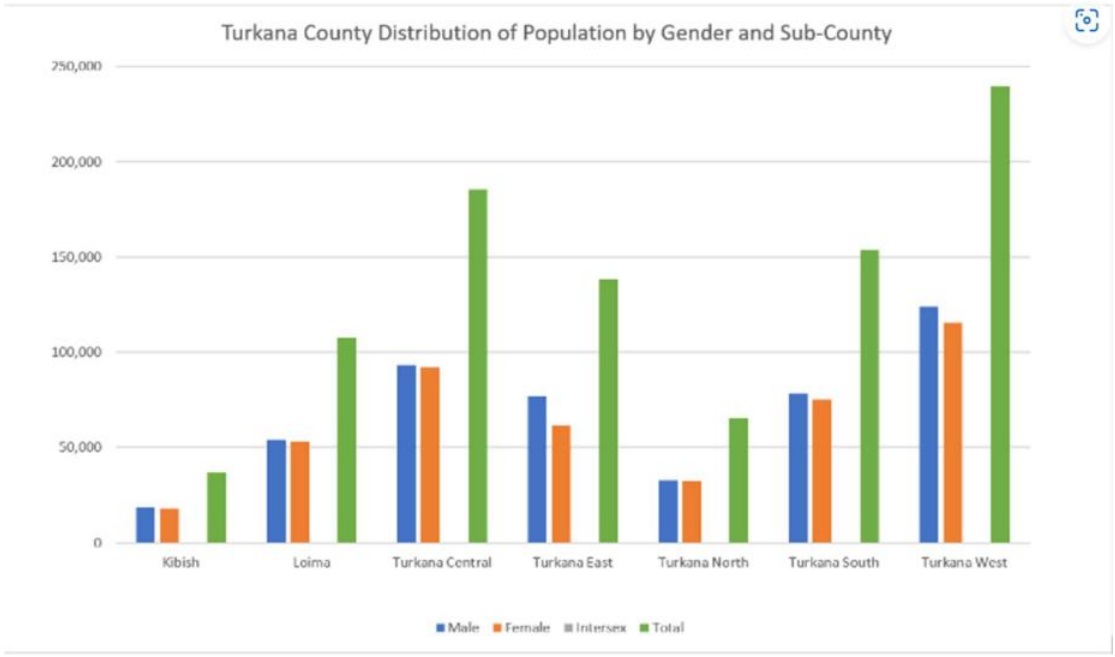


Figure 9: Distribution of Population by Gender in Sub County

Loturtur water supply scheme is located in Turkana Central Sub County, Turkana County. Turkana Central sub county has 5 wards namely Kerio Delta, Kang'atotha, Kalokol, Lodwar Township and Kanamkemer. The sub county headquarters is Lodwar town which is also the county headquarters. The proposed project site is situated in Kerio Delta ward. (figure 8).

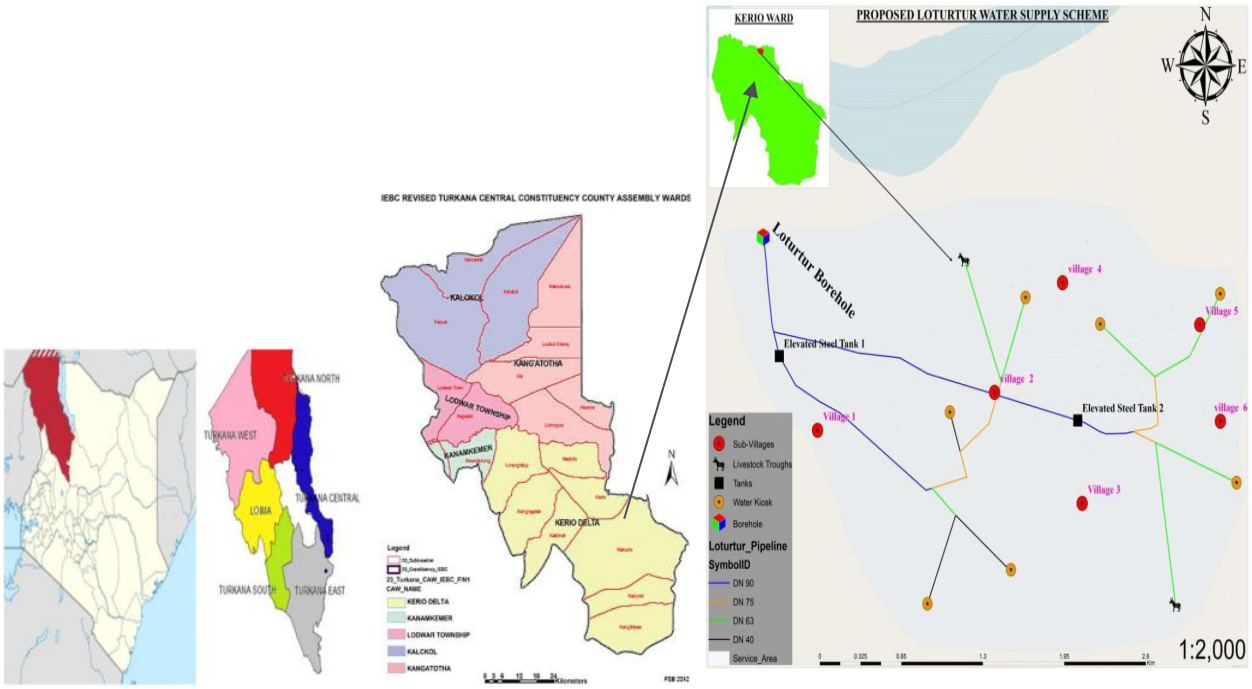


Figure 10: Project location at the County and Sub County

4.1 Physical environmental condition

4.1.1 Overview

Turkana County is the second largest of 47 counties in the Republic of Kenya. It covers an area of 68,680 km^2, accounting for 13.5% of the total land area in Kenya (Turkana County Investment Plan, 2016-2020). It lies between Longitudes 34° 30'E and 36° 40'E and between Latitudes 10° 30'N and 50° 30'N. Turkana is located in the northwest of Kenya and borders Uganda to the west, South Sudan and Ethiopia to the north and northeast respectively. Internally, it borders West Pokot and Baringo Counties to the south, Samburu County to the southeast, and Marsabit County to the east as shown in Figure 7 below.

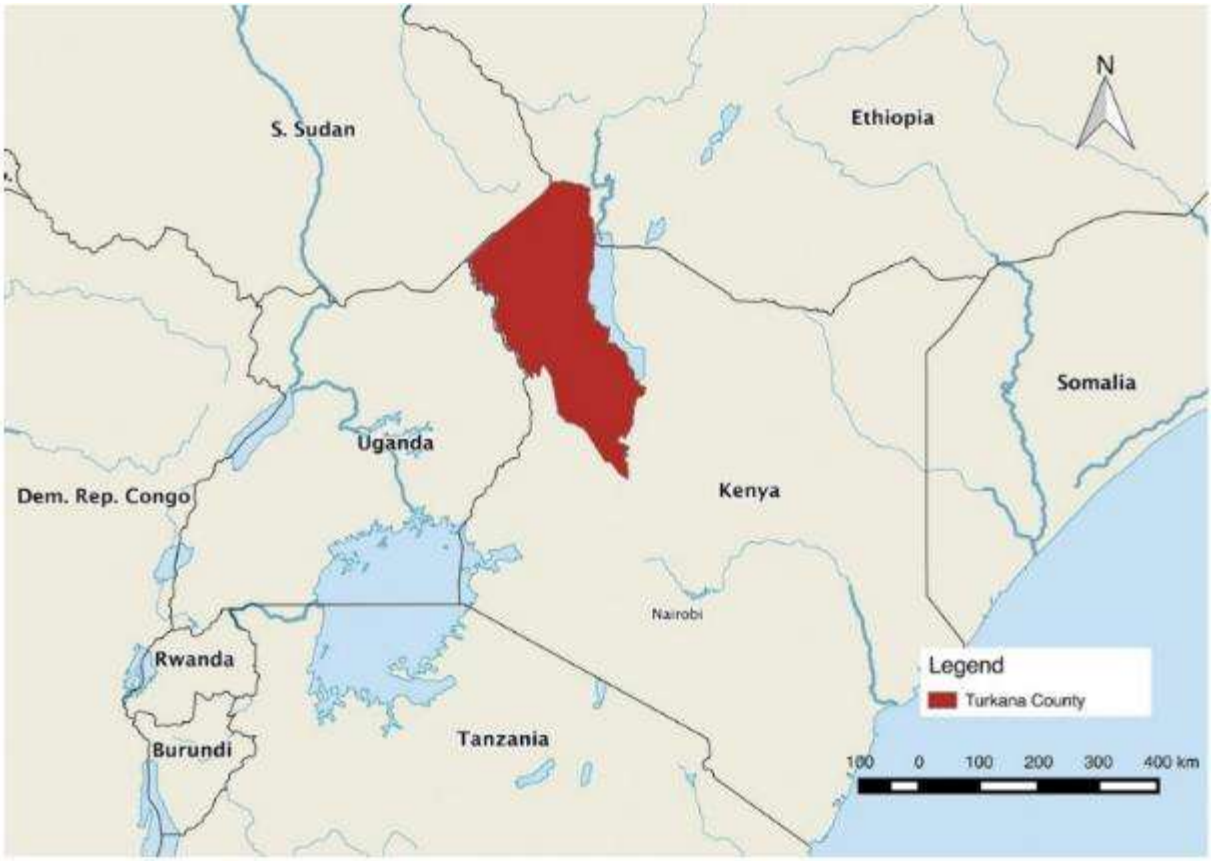


Figure 11 Map of Turkana County

4.1.2 Climate

Turkana County is essentially arid and semi-Arid and characterized by warm and hot climatic conditions. The daily temperature ranges between 24^o C and 38^o C with a mean of 30.5^{o}C. The rainfall pattern and distribution is erratic and unreliable both with time and space. There are two rainfall seasons. The long rains usually occur between April and July and the short rains between October and November. The rainfall ranges between 120mm and 500mm. The driest periods are January, February and September. The rainfall is distributed on the East-West gradient with more rainfall in the Western

parts and other areas of higher elevation. The rain falls in brief violent storms resulting in flash floods. The surface runoff and potential evaporation rates are extremely high.

The effects of climate change in Turkana County are experienced through unpredictable rainfall, extreme rainfall, frequent and prolonged dry spells, and increased daytime temperatures. Climate hazards that have been observed in the county include drought, floods, and intense rainfall.

4.1.3 Ecological Conditions

Due to the low rainfall and high temperatures, there is a lot of evaporation resulting into the deposition of salt in the soil and copping on the surface. As a result, only about 30 percent of Turkana County's soil can be rated as moderately suitable for agricultural production. These moderately fertile soils are found at the Central plains of Lorengippi, the upper Loima, the Lowlands drainage rivers, along the Lakeshore at Todonyang plains, the Lower Kolokol and the Lower Turkwel and Kerio Rivers and a portion of the Loriu Plateau.

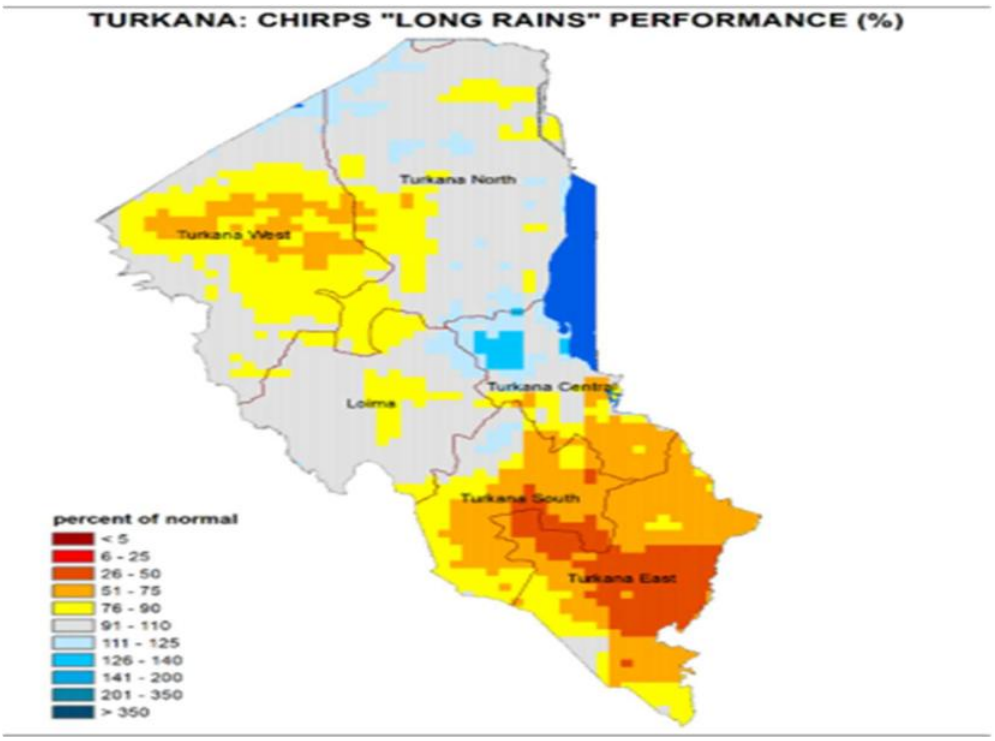


Figure 12: Turkana Long Rains Performance

4.1.4 Topography

Lodwar town, located within Turkana Central is located at the point where Kawalathe River pours into the Tukwel River. The geography of Turkana Central is characterized by flat plains interspersed with isolated hills and ridges. The elevation ranges between 400 and 700 meters above sea level, with the sub-county benefiting from its proximity to the Turkwel River, a critical seasonal water source that supports the livelihoods of many residents. The sub-county directly borders Lake Turkana thereby is influenced by its proximity to the lake, particularly through the trading activities centered in Lodwar, the administrative capital.

The figure below shows the image of the proposed project scheme site.

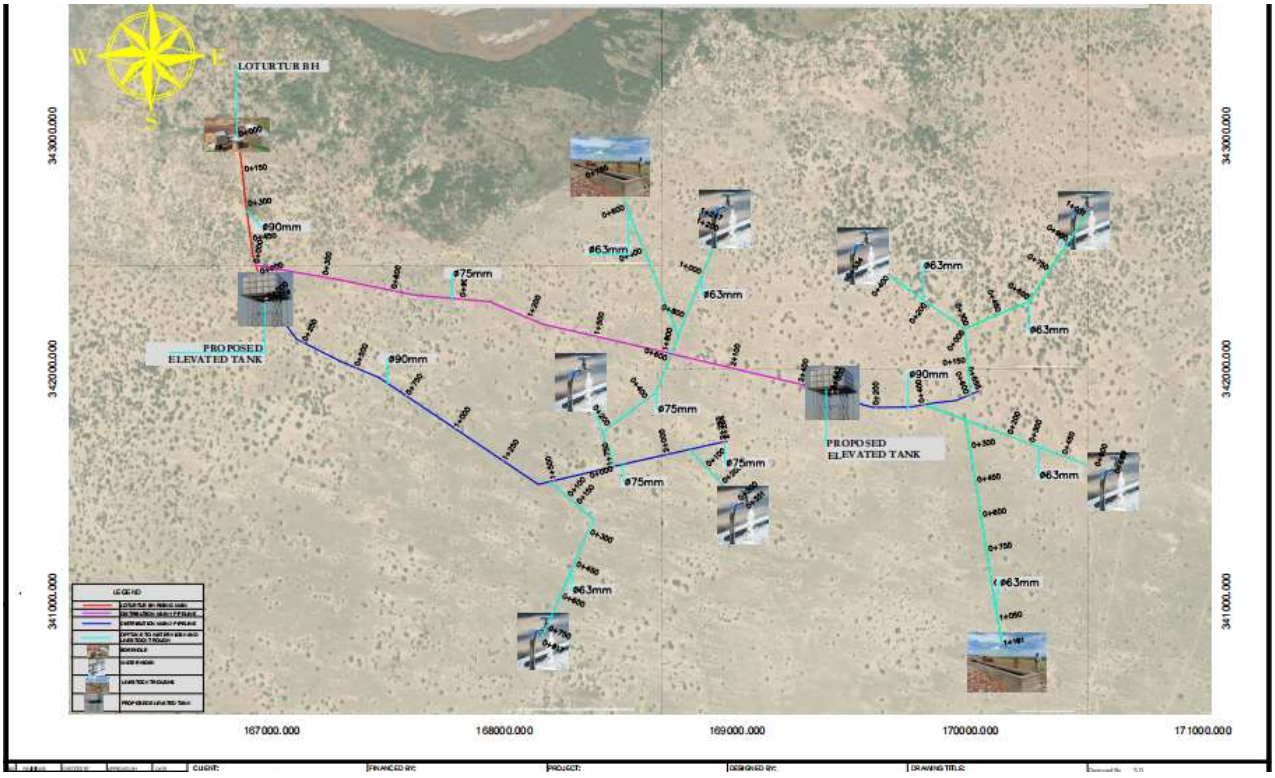


Figure 13: Loturtur water supply scheme

4.1.5 Hydrology

Turkana County is an arid and semi-arid region where water scarcity is a significant challenge. However, the discovery of two major aquifers Lotikipi and Napuu offers potential for improved water security.

Lotikipi Aquifer

The acquifer is located near the border of Kenya and South Sudan, covering a vast underground water storage area. It is estimated to be approximately 200 billion cubic meters of water, making it the largest aquifer in Kenya with the potential to supply water for up to 70 years at a high extraction rate. However, it has high levels of salinity in some areas that would require desalination before human consumption.

Napuu Aquifer

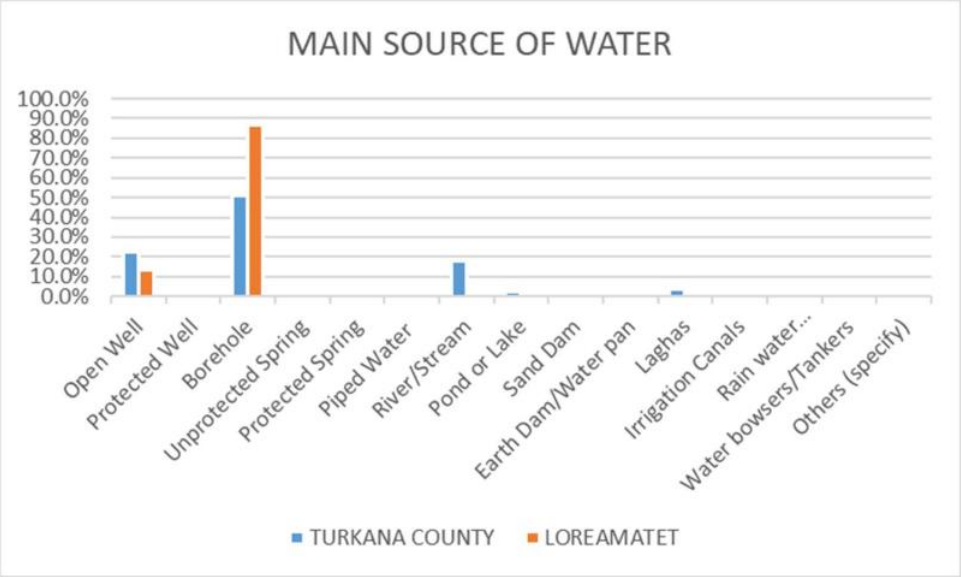
The acquifer is located near Lodwar, the capital of Turkana County and is estimated to hold approximately 3.5 billion cubic meters of water. It is more accessible than Lotikipi and already being used for local water supply. It has better water quality with lower salinity levels, making it more suitable for direct human consumption. However, it requires sustainable management to prevent over-extraction.

Turkana Central is home to the famous Turkwel river. River Turkwel is a permanent river originating from the Cherengani Hills to the South and the slopes of Mt. Elgon to the far South West of the town including the Karapokot Hills and the Ruch Prasir Plateau.

Water resources in Turkana Central are severely constrained. The Turkwel River is the most important source of water, flowing seasonally and supporting both human and livestock needs. Boreholes and shallow wells provide additional water, although the groundwater is often saline or brackish. With high evaporation rates and limited surface runoff, water scarcity remains a persistent challenge for residents.

The people of Loreamatet, as is with Turkana County, are majorly dependent on boreholes as their main source of water as illustrated. With the stalling of the Loturtur borehole, the residents are forced to seek alternative sources of water whose quality is unknown.

Figure 14: Main source of water



Source: Survey, 2024

4.2 Biological Environment

4.2.1 Flora

Turkana central has a wide range of vegetation cover from grouped trees especially along R. Turkwel and extending towards L. Turkana. Vegetation in the sub-county is sparse, dominated by drought-resistant species such as acacia trees, thorny bushes, and scrubland. After rains, seasonal grasses briefly emerge, providing critical pasture for livestock. Riparian vegetation is limited to areas near the Turkwel River, which serves as a lifeline for the sub-county's ecosystems.

The vegetation cover at the proposed sites comprises of scattered thickets with grass patches. There are a number of indigenous trees species comprising of *Acacia tortilis* and *Dobera glabra, Salvandora Persia, Balanites aegyptieca and Zisiphus mauritanica. Prosopis juliflora* is invading the area most likely having been dispersed through goats' droppings in grazing in the area.



Wildlife is limited, with sparse populations of gazelles, ostriches, and smaller mammals, while domesticated livestock, such as camels, goats, and sheep, dominate the landscape. Overgrazing and deforestation have led to significant habitat degradation, reducing the region's biodiversity.

4.2.1 Fauna

Small wild animals are found around the project area these include; foxes, lizards, squirrels, birds and hares and other rodents, while domesticated livestock, such as camels, goats, and sheep, dominate the landscape. Overgrazing and deforestation have led to significant habitat degradation, reducing the region's biodiversity. There will be minimal interference with their terrestrial habitats. The project area does not have fauna that are threatened.

4.3 Land use and Tenure

Land is communally owned. The people are free to graze and settle in any area of their choice. The community elders make crucial decision when it comes to land use issues.

A big section of the proposed project area land is mainly used for pastoralism with small pockets of land under crop production especially practicing rain fed agriculture and small scale irrigation.

4.3 Soils

The soils in Turkana Central are predominantly sandy and rocky, with low fertility and poor water retention capacity. These soils are prone to erosion, making agricultural activities highly challenging. However, along the seasonal rivers and floodplains, some alluvial soils provide marginal opportunities for small-scale farming, especially when combined with irrigation.

4.4 Socio-economic Environment

Socio-economically, the project area relies heavily on pastoralism, with camels, goats, and sheep forming the backbone of the local economy. Small-scale farming within the sub county is practiced near the Turkwel River, where irrigation schemes have been implemented to supplement traditional livelihoods. Lodwar, the largest urban center, serves as a commercial hub, linking the pastoralists to markets and providing opportunities for trade and commerce. There are local market centres such as Nadoto, Lorengelup and Kerio where small scale trading is practiced.

Environmental challenges in Turkana Central include chronic water scarcity, desertification due to overgrazing and deforestation, and the impacts of climate change, which have intensified temperatures and made rainfall patterns increasingly unpredictable. Resource-based conflicts over water and grazing lands are also common, further complicating efforts to sustain livelihoods in the region.

Despite these challenges, the project area has significant developmental potential. Its abundant solar energy resources could be harnessed to generate renewable energy, as is the proposed project, while investments in irrigation along the Turkwel River could support agricultural expansion. Enhancing water infrastructure, such as boreholes, water pans, and desalination systems, could alleviate water scarcity and improve resilience to environmental stressors.

4.4.6 Infrastructure

The proposed project site is about 78km from the Lodwar town and is connected with an earth road. The road is a major infrastructure as it is often used by fish mongers to transport fish from L. Turkana to Lodwar town for sale. The roads have sections with poor drainage and are not maintained regularly forcing the drivers to create alternative round routes. In addition, there are lots of stones and potholes on the road.

Figure 15: Lodwar Loreamatet route



There are three mobile telephone operators in the county: Safaricom, which has the largest network coverage, Airtel and Orange. While network coverage is growing, the project area is served by sporadic Safaricom mobile signal that is highly unreliable with some areas devoid of network completely which is hampering communication and development.

There are no railway lines or airstrips near the project site.

4.4.7 Markets

Turkana Central Sub County has five major markets namely Lodwar, Kanamkemer, Kangatotha, Kerio Delta and Kalokol. The nearest market is Kerio Delta, however there are small scale trading at centers such as Loreamatet, Lorengelup and Nandoto. Livestock sale yard is at Kerio where traders buy goat

and load on trucks and then transport them to Lodwar town**.** However, there are local livestock markets in centres such as Loreamtet where locals trade.

4.4.8 Security, Law and Order

The project area does not face major insecurity challenges such as raids from neighbouring communities. However, incidents of theft and vandalism of community properties have been reported. However, there have been efforts by the National Government to ensure security and peace in the area. The nearest police station from the project area is at Kerio Delta town. Assistant County Commissioner and Deputy County Commissioner are all stationed at Lodwar town. Sub County Administrator and Ward Administrator are also stationed at Kerio town while village administrators are located in their respective centres such as Loreamatet and Nadoto.

The household survey revealed that the area is moderately secured mainly because of the few theft and vandalism cases that are reported in the area.

4.4.9 Human Settlement, Access to Services and Living conditions

Settlement Distribution

The population patterns in the project area is sparse with settlements concentrated more along the river banks/laghas for better accessibility to water from seasonal streams and wells. In dry seasons, some households migrate with cattle in search of water and pasture.

Access to Health Services

According to CIDP 2023, access to quality health care in the County has greatly improved. However, it is important to note that there has been a recorded increase in HIV new infections and Malaria cases as illustrated below: -

Aspect	**From**	**To**	**Implication**
No. of facilities	207 in Fy 2018/19	266 in FY 2020/21	Improved access to health facilities for all
Under 5 mortality rate	117/1000	65/1000	Decreased under 5 mortality rate
Infant mortality rate	66/1000	39/1000	Decreased infant mortality rate
Maternal mortality rate	1594/100,000 FY 2014/15	381/100,000 FY 2020/21	Decreased maternal mortality rate
HIV prevalence	4% in 2015	3.2% in 2017	Decreased HIV prevalence rate

HIV new infections	528 in 2015	555 in 2017	Increased risk of new infections
TB Treatment	83% in Fy 2018/19	84% in Fy 2020/21	Reduced TB transmissions.
Malaria confirmed cases	110/1000in Fy 2018/19	358/1000 in Fy 2020/21	Increaase of Malaria cases

Source: CIDP, 2023

The project area has Malaria and HIV/AIDS as the most common diseases in the area. The project area is served by health facilities that include Loreamatet, Olengéruk, Kerio and Nandoto health centres. All referrals are done to the Lodwar level five hospital located in Lodwar town.

4.4.12 Access to Education

The levels of access to Education in Turkana County is low compared to national averages. According to the Basic Educational Statistical Booklet, 2019, the pre-primary gender parity index is 0.96 for Turkana County. Secondary school gross enrollment rate is 21.18 for the county against a national average of 71.19 while the pupil teacher ratio is 160.9 against a national average of 29.1.

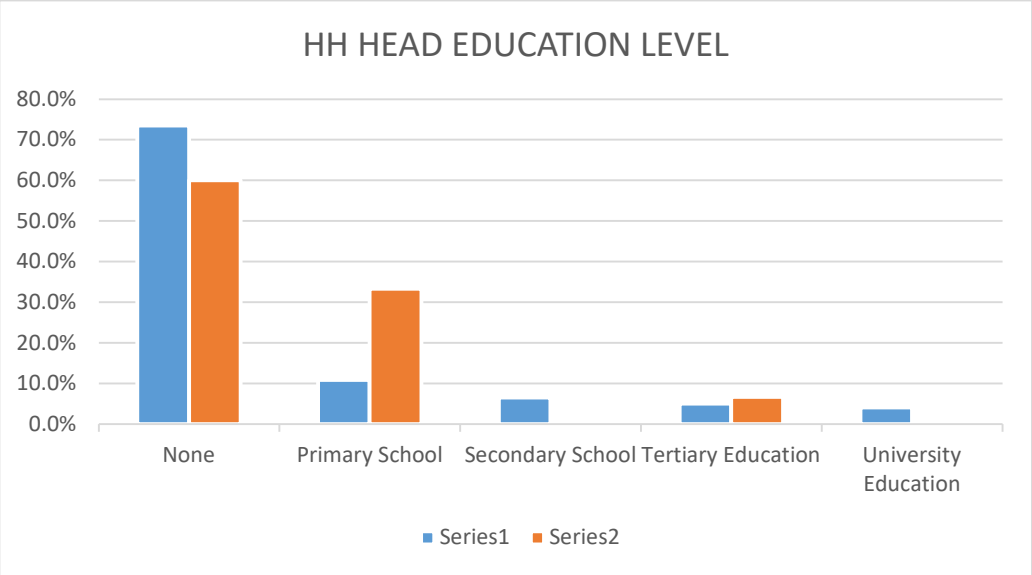
The 2019 KNBS population census estimates that only 1.9% of the population have completed basic education with about 77% never having attended school at all. Only 16% of the population was in school and another 1.8% had attended but not completed school.

The dismally low levels of Education are partly attributed to the nomadic nature of the population as a coping mechanism to impacts of drought. Construction of more reliable sources of water such as the proposed water supply scheme would help break these nomadic patterns and improve quality of life including access to education.

Access to Education is disproportionately skewed against women and girls. About 18% of male are in school compared to 15% female (KNBS, 2019). In addition, three times more women than men were reported as to having dropped out of school by 2019. In a similar fashion, 80% of the female population against 75% of male reported to not ever having been to school at all.

In Loreamatet, 60% of the household heads have no education background whereas only 33.3% have attained primary school level of education. This is similar to the situation reflected within the entire Turkana County (Survey, 2024) as illustrated below: -

Figure 16: Highest level of education attained by the HH head



Source: Survey, 2024

Schools within the project area include Loreamatet primary school that has a population of 387 pupils and 2 TSC permanently employed teachers.

4.4.13 Energy Sources

The main sources of cooking fuel in the project area is firewood while wood and torch are main sources of lighting.

4.4.14 Water, Sanitation and Human Waste Disposal

The main sources of water in Turkana North Sub-County are unprotected dug wells, streams and boreholes. More than half (61%) of rural households use unimproved water sources with majority relying on unprotected wells and streams. Water resources potential for the county is unknown. Access to water greatly affects food security i.e., livestock production, crop production, sanitation, health and nutrition-thus consequently human productivity (Natural Resource Mapping 2015)

Table 4.9: Distribution of Conventional Households by Main Source of Drinking Water in Turkana North Sub-County (KNBS 2019)

Turkana Central	**Pond**	**Dam**	**Stream**	**Well/ Borehole**	**Piped**	**Rain**	**Water Vendor**
% of HHs	0.2	6.7	20.3	7.5	17.2	0.2	6.6

About 20.3% of households in Turkana Central sub-county depend on streams for their drinking water with another 7.5% using boreholes and wells. Harvesting rain accounts for only 0.2% of households' main source of drinking water. (KNBS, 2019).

Loreamatet has one borehole that is not operational despite having a high yield capable of supporting the area. The household survey showed that 86.7% of the residents of Loreamatet are dependent on boreholes as their main source of drinking water whereas an additional 13.3% depend on open wells.

About 55% of the population in Turkana Central practice open defecation. Only 27.5% have pit latrines and other modes of human waste disposal such as sewers, septic tanks and bio-septic cumulatively account for less than 1% of households. These numbers are way higher than the overall national, rural and urban averages, probably due to the area been predominantly rural.

Table 4.10: Distribution Conventional Households by Main Mode of Human Waste Disposal in Turkana North Sub-County (KNBS 2019)

Turkana Central	Main Sewer	Septic tank	Cess pool	Latrine	Bucket	Open	Bio-Septic	Not Stated
% of HHs	0.7	3.0	0.2	27.5	0.3	55	0.0	0.0

4.4.15 Financial Services

There are three banks in the county namely; Kenya Commercial Bank with two branches at Lodwar and Kakuma, Equity Bank, Cooperative Bank, National and Post Bank both in Lodwar. There are also three major Savings and Credit Cooperative Societies (SACCOs): Turkana Teachers SACCO, Elimu SACCO and Kapenguria Teachers SACCO. The Micro Finance Institutions within the County include Kenya Women Finance Trust and Kenya Agency for Development of Enterprise and Technology (KADET).

There are few lending institutions due to unfavorable business environment which has limited access to financial services and lack of properly organized marketing. The available financial institutions are concentrated within one central place – Lodwar. This leads to low savings rate, low borrowing and slow uptake of investment opportunities within the county. The compounding effect of this is slow economic growth of individuals and the county at large.

Where financial services are available outside and within Lodwar, the cost of credit has been unfavourable resulting in the lack of capital to finance enterprise development. Pastoralism is the main economic activity hence livestock and livestock products are the main enterprises. Limited access to financial services has greatly affected trade, livestock and agriculture sub-sectors.

4.7 Cross-cutting issues

4.7.1 HIV/AIDS

HIV/AIDS is a major development crisis that affects all sectors. The water construction sector is not spared. It continues to be among the leading global public health issues, having claimed almost 33 million lives so far (WHO, 2020). However, with increasing access to effective HIV prevention, diagnosis, treatment and care, including for opportunistic infections, HIV infection has become a manageable chronic health condition, enabling people living with HIV to lead long and healthy lives. There were an estimated 38.0 million people globally living with HIV at the end of 2019 (WHO, 2020).

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).

According to the Kenya HIV/AIDS estimates report of 2018, Kenya had a national prevalence rate of 4.9%. Turkana County, where this water project exists, had estimated overall HIV prevalence of 3.2% (Kenya HIV Estimates Report, 2018). Loreamatet rating for HIV/AIDS is between moderate (40%) and very low (60%). However, the survey shows that 93.3% of the age group mostly affected are the youths. This has been attributed to early sexual activities (66.7%) and lack of sensitization (33.3%) amongst teenagers and youth. This disease has weakened the economically productive population.

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.

4.7.2 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.

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.

5.2 Purpose and objective of public consultation

5.2.1 Purpose

The purpose for public consultation during this ESIA study was to:

- Inform all the stakeholders about the proposed make-up water supply scheme project and its likely impacts;
- Canvas stakeholders' inputs, views and concerns about the proposed project; and
- Take into consideration all the information and views of the public in ESIA and decision making.

5.2.2 Objectives

Key objectives for undertaking this public participation were to:

- Obtain local and traditional knowledge that may be useful for decision making in so far as the proposed water supply scheme and its associated activities are concerned;
- Provide stakeholders with timely and adequate information on project activities and the related implications.
- Facilitate consideration of project alternatives, mitigation measures and trade-offs;
- Ensure that important impacts are not overlooked while maximising the benefits;
- Reduce conflicts through early identification of contentious issues;
- Provide an opportunity for the members of the public to influence project design thereby creating a sense of ownership;
- Improve transparency and accountability in decision making; and
- Increase public confidence in the EIA process

5.3 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 in the ESIA process

Principle	**How observed**
Adaptive, communicative, meaningful and pro-active consultation	• Project information was shared in local dialect (Turkana), Kiswahili and English languages. 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 project, administrative footprint, potential positive and negative impacts and health & safety aspects. • Effort was put towards simplification of technical processes and concepts.
Accessibility	• The location for consultation were convenient to the stakeholders – in their offices or places where they live in the community. • Meeting venue was accessible to all those who wanted to attend; the meeting was held within the target settlement; the venue is regularly used for community meetings e.g. chief's barazas. • 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 and social media groups 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.

Principle	How observed
	• All the questions, requests for clarifications, or additional information were responded to. • Time was dedicated to a question-response session in all the engagements.

Stakeholder engagement/participation was achieved through a variety of information and consultation methods. These were contextualized to the type of stakeholder and/or complexity of the information to be shared or collected. The consultation methods used were: community meetings, administration of a household questionnaire, key informant interviews, observation and secondary data.

Table 5-2 : Consultation Methods

Stakeholder Type	Details of Stakeholders	Consultation Method
Community members in the project area individuals / groups institutions that may or not be direct beneficiaries but who consider or perceive their interests in the project and the process of its implementation in some way.	All community members: men, women, youth, vulnerable, PWDs, community leaders, business people, religious leaders, traditional council of elders, village managers. • National Government officials e.g. Chiefs, Assistant Chiefs, Village etc • County Government Officers including Village Administrators, and sub county water officers.	• Environmental Impact Assessment questionnaire. • Community meetings. Barraza - notices of meetings were delivered to respective chiefs, Assistant Chiefs, village elders, Nyumba kumi elders, places of worship, markets, institutions. Announcements were made in public gatherings including places of worship, chiefs baraza, funerals, water collection points. • Face to face meetings. • One- on- One/ face to face meetings • Key Informant Interviews
Government Agencies	• NEMA • Education Department • CECM Water Services • Children Office	• Key informant interviews • Face to face discussions • Questionnaire

	• Water Resources Authority • WASHCORD	

5.4 Procedure for meetings

As required by EMCA cap 387 and EIA/EA Regulations 2003, all the meetings were arranged in advance with the target audience. This was aimed at giving them adequate time to prepare for the meetings. As is best practice requirement, all the public meetings commenced with the ESIA team making a disclosure of the proposed project and all its associated activities. This was followed by comments, concerns and views from the local community members. To enhance proper communication and understanding of the proposed project, the ESIA team recruited local translators/interpreters through the office of the Chief to help with the translation to local languages (Turkana).

5.5 Outcome of the Public Consultation Process

5.5.1 Key informant Interviews

Key informant interviews were conducted with government agencies in Turkana between 10th and 11th December 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 sample filled questionnaires).

Table 5-3: Key Stakeholders Consulted

Name	Designation	Organization	Interests, Concerns, Suggestions	Issue Redress in the Project Planning
Joseph Nga'ng'a	WASH Coordinator	Catholic Diocese of Lodwar.	The respondent is aware of the proposed project, supports it and appreciates the consultation and engagement process. He envisions a project which will support in reduction of costs in relation to maintenance, an issue he considers has been challenging. He attributes this positive impact to the use of solar powered components which are durable as opposed to the current equipment such as hand pumps, most of which require regular maintenance. 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.	The project as designed is solarized to reduce O & costs. Development of SEP, IP and VMG framework will also ensure smooth stakeholder management.
Samson Rotich	Sub Basin Area Coordinator	Water Resource Authority	The respondent is acquainted with details of the proposed project and greatly supports it. Anticipates numerous positive impacts to the livelihoods of beneficiary communities, these include but are not limited to reduced impact of climate change through improving	Borehole test pumping water quality tests and ESIA report has been undertaken towards borehole regularization.

Name	Designation	Organization	Interests, Concerns, Suggestions	Issue Redress in the Project Planning
			recharge by constructing spread basins which improve the quality and quantity of water. He recommends continuous cooperation with the project so that issues such as regularization in terms of licences and data collection yield quality data and sustainability.	
Ezekiel Ichor	Director-ECDE	County Government of Turkana	The respondent affirms to have heard about the project. Anticipates numerous positive impacts in the education sector, ranging from increased enrolment in schools and reduction in cases of absenteeism to improved skill development which greatly impact performance. He suggests that moving forward water sources for schools should be separated from communities' since allowing communities to access water from schools sometimes led to conflicts and at times vandalism of school water projects.	The project has connected water supply service to Kainyang'aruk primary school alongside providing separate community access points (water kiosks) within the settlements.

Name	Designation	Organization	Interests, Concerns, Suggestions	Issue Redress in the Project Planning
James Obewa	Children's Officer	County Government of Turkana	The respondent is aware of the proposed project. He reports to greatly support it and expects to witness an increase in child safeguarding since they will no longer have to travel long distances to collect water thereby exposing themselves to the risk of being abused or miss attending school, giving them a chance of improved livelihoods and a sense of wellbeing. He recommends the project adheres to stipulated policies and laws on child protection to ensure smooth implementation of the project till completion.	The project has adopted both national and WB guidelines on issues relating to children safeguarding.
Eliud Ebenyo	County Coordinator	County Government of Turkana	The respondent is aware of the proposed project. He envisions a significant decrease in cases of early marriages, which he associates with the practice of young girls being lured into marriage while on their way to collect water. He further expects the project to minimize challenges faced by girls and women who are often tasked with the responsibility of walking long distance to collect water.	As designed, the project will have the domestic water access points within the settlements. The water kiosks and toilet blocks are PWDs friendly.

Name	Designation	Organization	Interests, Concerns, Suggestions	Issue Redress in the Project Planning
			He recommends inclusivity in the designs to ensure the water points are user friendly to PWDs and other vulnerable groups in the community.	
Alfred Emanman	Director Preventive and Promotive Health	County Government of Turkana	Respondent is aware of the proposed project and supports it. He anticipates a general improvement in the health and wellbeing of community members, especially children below 5 years of age who are at the risk of acquiring rampant water borne disease prevalent in underserved areas. Recommends continuous engagement to help monitor project impact on health.	The project will maintain regular water quality monitoring to ensure that communities access safe water.
Amos Abong	Labour Officer	County Government of Turkana	Respondent has information about the project. Supports its implementation since it is bound to create employment. Recommends collaboration between the project and labour office to streamline labour management. In addition, the officer recommends adherence to labour laws for smooth operations in the project.	The project will be implemented in line with the national and World Bank requirements on labour and working conditions.

5.5.2 Initial community meeting

During the project screening phase, a community meeting was held on March 24, 2024. The meeting had community members and regular water users. In this meeting, the community actively participated in conceptualizing the project design and expressed their full support for the project, including the voluntary ceding of community land for its development.

Further, the community requested for upgrading of the existing hand pump to a solar pumping system to reduce congestion. We have 12 villages which we need piping to each village. Also, we need water kiosks and cattle troughs. The villages are Loturtur, Lopiding Kirion, Nachomin, Lothiarengan, Loreamatet, Kalobua, Lokirim, Namadang, Lopur Kipi, Emuthalaba, Lopungila and Ngapwangora.

The community, through their duly selected representatives, signed a land consent form. Consequently, the process of transferring the land from the community to the project—through the issuance of a title deed—is currently underway. Minutes of meeting, the land consent form and attendance lists is provided in Appendix C-3.

5.5.3 Public *baraza* discussions 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 mobilization was done through the chiefs' office which included issuing public notices Also, the chief used other means such as calls and word of mouth at random. Details of Minutes of Meetings and attendance list is placed at **Appendix- C-1 & C-2**. The meeting was held on 3rd December 2024.

Table 5.2: Issues raised in the baraza

Issues/comments raised	Responses	Incorporation into design
Thanked the experts for the informative session		
The current water yield for each borehole was not sufficient and the project was	Standard pipes will be used. Where water pressure is an issue, pressure release values will be installed.	The project design has take such into consideration to ensure achievement of sustainable water supply.

Issues/comments raised	Responses	Incorporation into design
welcomed as it would help fix their shortage issue.		
What measures would be put in place to ensure the project does not fail as witnessed in the previous projects.	Due processes were being followed to ensure the project is sustainable.	The project is well funded and will be implemented according to WB guidelines.
Will there be job opportunities for the local people?	Local people will be prioritized for the available unskilled opportunities.	Project implementation will adhere to the WB and National provisions on the management of labour conditions
When will the proposed project start?	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.	-
Will the contractor import the resources needed or will utilize what is readily available in the area?	The contractor will be adviced to source locally all available resources such as sand as a way of improving the locals' livelihoods.	The project has adopted a competitive tendering process; this shall be replicated at all project phases.
Contractors are known to introduce vices within the community such as alcoholism. What will be done to ensure the moral fabric of the community is protected?	The contractor has to have a labour management plan that includes the code of conduct for all its employees. This will be enforced to protect the community.	Project implementation will adhere to the WB and National provisions on the management of labour conditions.
Job opportunities available, consideration for women and the youth to be prioritized. Equal chances for all members of the community.	The recommendations will include prioritizing employment opportunities for local residents including women.	Project implementation will adhere to the WB and National provisions on the management of labour conditions.
Does the new water supply network over areas where the residents have migrated	The water supply network adequately covers all listed villages and is sufficient for all residing within them.	The design has sited the water kiosks suitably (central and periphery), long and adequate livestock troughs, storage

Issues/comments raised	Responses	Incorporation into design
in search of water and pasture?		tanks and hybrid energy systems to enable adequate production of water.
Is it possible for the community to apply or request the contractor to do a water pan for farming?	The scheme has adequate yield that can be used for small scale farming subject to approval by the WSP.	The design has sited the water kiosks suitably (central and periphery), long and adequate livestock troughs, storage tanks and hybrid energy systems to enable adequate provision of water.
Are all the health facilities in the area connected to the supply scheme as it is a priority to the community?	Yes. facilities such as schools and health centres have been considered.	
What measures will be put in place to ensure the opportunities available and renumerations are done fairly?	The contractor will be required to abide with the relevant regulations such as the employment Act as well as having a labour management plan that clearly outlines the procedures for hiring their workers.	Project implementation will adhere to the WB and National provisions on the management of labour conditions.
What type of trees will be offered for revegetation?	Revegetation will be prioritized with seedling provided for replanting and increasing the tree cover. Priority will be given to indigenous types and trees that do well in the area climatic conditions such as the Neem tree. The community will also be consulted on their preference of type.	Most appropriate trees for revegetation discussed during ESIA public meetings.
What measures are place to curb the previous vandalism that resulted in the failure of the borehole projects?	The consultant highlighted a few safety mitigation measures such as securing of construction sites and having regular updates regarding safety guidelines communicated to the people.	-
Will the project provide employment of locals including sub contracts?	During works, local community members will be prioritized for all job categories as well as local sub-contractors.	Project implementation will adhere to the WB and National provisions on the management of labour conditions.

Issues/comments raised	Responses	Incorporation into design
A community member requested involvement of leaders as project goes on	A stakeholder engagement plan will be developed before works begin for implementation during works.	There is a SEP developed in line with the WB requirements.
Do you accept the ownership of the project?	The community unanimously accepts the ownership of the project.	-

5.5.4 Group discussions with the community

This summarizes key findings of the focus group discussion held on 3rd December 16, 2024 at Loturtur borehole point. The GD comprised of 9 members of the community that were selected using the following criteria: -

Table 5.3: Group discussion Representative

Group Represented	No.
Male	1
Female	2
Youth	1
PLWD	1
Religious	1
PBO	0
Administration	2
Minority ethnic group	0
Education	1
Total	**9**

Methodology

The Focus Group Discussion (FGD) began with all 9 participants gathered in the same forum to address questions designed to assess the status of water supply in the area. A list of participants is attached as Appendix D.



Figure 17: Joint FGD forum with Loreamatet residents

Key findings

The main findings from data generated by the focus group discussions are summarized below. The consultation brought about valuable information also in terms of current water supply situation in the area.

- ✓ The quality of water supplied is good but the quantity is not sufficient
- ✓ There is no WSP in the area, the water is managed by a committee. The committee is well represented including women, youth, ethnic minority and PLWD;
- ✓ Major use of water is for domestic and livestock watering;
- ✓ They are dependent on livestock for livelihood;
- ✓ It's hard to compute monthly income because all monies gotten from sale of livestock goes into purchasing food for the family;
- ✓ It is the responsibility of women and girls to decide where to source and collect water;

- ✓ The households majorly do not treat the water before drinking;
- ✓ Major waterborne diseases in the area include Malaria, skin diseases and a few cases of dysentery, all resulting from drinking contaminated water.
- ✓ Guaranteed with supply of quality water, households are willing to pay about Ksh. 100 per month. This is due to their low-income capacity;
- ✓ The area has no sanitation services and the locals use the *laggas* as a mode of excreta disposal. This further contaminates the water being used for domestic use.
- ✓ Major expectation for the project is supply of quality water close to the households.

Aspect	Men	women
Spend their day	Take the livestock to pasture Rest Take stock to ensure all are accounted for	Fetch water Take care of the family - cook, wash/ cleaning, prepare children for school. Burning charcoal Fetch firewood for sale. Offer casual labour to fishmongers (clean fish, filleting, drying). Take stock of the younger livestock e.g. goat kids left under their care as the rest are out grazing. Source and prepare lambs,kids, calves feeds.
Manage monetary resources	Women	Women
Key challenges	Lack of water for livestock - construct animal troughs;	Lack of water for both domestic and watering livestock - water kiosks close to home; No source of income hence poor living standards - project will offer job opportunities, women to be considered;
Construction and operation phase impacts	Job opportunities; quality water;	Opportunities for business growth; short distances to access water; less time taken to fetch water; Possible harassment from contractor - governing policies
Handling GBV cases	Elders are called to settle the disagreements. Family issues are left to be handled at family level. Where serious injuries occurred,the accused is surcharged in terms of livestock and is instructed to pay for treatment.	Women being beaten is taken as a normal thing. In case of injuries, the man takes her to the hospital. This mechanism is not adequate and is not fair to the women and girls who are the greatest recipient of GBV cases. Forums to educate men on GBV issues would help curb the vice.

Handling cases	SEAH	The cases are treated the same as GBV cases. There's underreporting of the cases. In cases where sexual relations or pregnancy occurs, the responsible party is required to pay dowry and take them in as wives regardless of their age; Awareness training on SEA/SH issues in this region should be prioritized.

5.5.5 Consultation with vulnerable and IPs

This was undertaken using both quantitative and qualitative methods. The qualitative methods used were Focused Group Discussions (FGD), Key Informant Interviews, (KIIs), and Community consultative meetings. The consultant used local facilitators to undertake this engagement. This approach enabled the project team to build trust and confidence while undertaking the engagement directly and openly with the Turkana community in their natural location. In order to meet the requirements of Environmental and Social Standard 7 (ESS7), the consultant (with prior consent from the traditional structures) undertook the following activities:

- Used local facilitators / community liaisons who are trusted and speak the local language/dialect.
- Conducted a social and cultural assessment to understand community norms, values, decision-making processes, and sensitivities. The traditional governance systems and customary protocols were respected (e.g., prior permission from elders and their representatives before meeting community members).
- Ensured gender-sensitive approaches by including women-only consultations. Held FGDs with community in gender disaggregated and intergenerational groups in order to understand their pre-project situation, current situation and aspirations for the future.
- One (1) Community consultative meetings were planned at village Level. The planned meeting was with community's representatives: representatives of traditional council of elders for Turkana, elected leaders at county level, teachers, professionals from Turkana community, Chiefs, Assistant Chiefs, leaders of local CSOs, women leaders, youth leaders. They were given a detailed brief of the project after which they agreed to mobilize for community meetings. They suggested and agreed on representation, facilitation for those from far to attend the meetings, dates, venues, time and other logistics. They agreed that the chief of the location of the meeting would be the host of the meeting.

Community Consultation Meetings: The community consultation meeting was held in an open space. There were no restrictions on attendance and local language was used with local analogies when explaining about the project and its impacts. The consultant ensured the participation of vulnerable sub-groups, including women, youth, the elderly, and people with disabilities. The meetings commenced with a word of prayer said in local language by the eldest member of the traditional council of elders in attendance. The host chief invited all the participants to the meeting, made introductions of all the stakeholders present, the consultant was last to be introduced. The host chief made some remarks and invited the community representative to make remarks. The host chief then requested the consultant to inform the community members about the project.

It worth to note that, an Early Engagement and Relationship Building had been done by the WSP and Turkana county government during the project pre-feasibility stages. The consultant was accompanied by the representatives of the county government and WSP during ESIA study so as to ride on existing relationship through their early engagement.

Photos of the public *baraza* meeting



Figure 18: A resident participating during the public forum



Figure 19: The water officer addressing the residents

5.5.5 ESIA Disclosure

The community was involved in conceptualizing the water schemes during initial consultations, which informed the preliminary designs and ESIA studies. The ESIA disclosure presented findings, addressed concerns from earlier consultations, shared the final (revised) designs after cost appraisal, outlined land requirements, and explained the O&M plan in line with legal, regulatory, and World Bank standards. The revised scope was disclosed on June 26, 2025, with the community appreciating the adjustments. Stakeholders were mobilized through chiefs, ward administrators, schools, mosques, and churches to ensure broad participation. At the centrally located meeting, community members—encouraged to speak in their language. During the ESIA disclosure, participants sought clarifications on project cost, land issues, scheme integration, representation, and timelines. The project cost could not be disclosed as bidding was still in progress. Land conflicts were ruled out since the project will use community land converted for public use. Regarding land committees, only the CLMC chair is represented in the project's land committee. On timelines, the community was informed that tendering is ongoing, with a pre-site visit scheduled the following week. Key milestones identified included obtaining the WRA permit and ESIA license, land transfer, contract award, construction, and commissioning, with detailed minutes attached in Appendix J.

Below is a summary of the disclosure outcome: -

HORN OF AFRICA GROUND WATER FOR RESILIENCE PROJECT (HoAGWRP)-KENYA
Stakeholder Engagement Log & Issues and Response Report

#	Name of Participant	Question/Comment	Response	Reference to the CPR
1.	Musa Ekeno (Village Adm)	Thanked the community members for accepting to give out land for the project structures. Appreciated that the project will bring water close to the people so that they will not have to travel long distances to fetch water. He is eagerly waiting for the contractor to begin the construction.	Appreciated	Section 2.5 - Project Land requirement
2.	Rebecca Ekal	How long will the contractor stay on site?	The construction period is anticipated to take 1 year.	-
3.	Charles Kaapus	Will the project compensate us for the land surrendered?	The land to be surrendered is community land and not private land, therefore no compensation will be done.	Section 2.5 - Project Land requirement
4.	James Epur	How much will the contractor pay for local labor?	The payment is for the contractor to discus with potential employees and agree on during the construction phase.	Section 7.4.1 - Improved Livelihoods
5.	Bonface Lomuria	Requested to be considered for employment opportunity available during the construction of the project as well as during construction.	The contractor will give consideration to the locals for employment opportunities that will be available.	Section 7.4.1 - Improved Livelihoods Section 7.5.10 - Labor Conflicts and Forced labor
6.	James Losikiria	Confirmed that the community is receptive of the project and are willing to surrender the needed land for the project. He anticipated potential for growth of their livestock due to availability and access to water.	Noted. The project aims to improve water access for both domestic and livestock use, enhancing local livelihoods.	Section 2.5 - Project Land requirement



Figure 20: Public forum during the ESIA disclosure

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 Project location

The borehole is located in Loreamatet location, Loturtur settlement and it is currently nonfunctional. Water quality assessment and test pumping analysis have been undertaken confirming the borehole yields and whose water is fit for human and animal consumption.

6.2 Alternative pipeline routes

The proposed pipelines routes for conveyance and distribution will be a long road reserves and existing community paths within the Loturtur settlement which are to earth conditions. 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.

6.3 Alternative sources of water

Alternative water source is from the rainwater harvesting which is not reliable due to inadequate rainfall in the area. Residents have no storage facilities, and most houses are manyattas. Turkwel River water is not fit for domestic use and far away from the settlements. These options are not viable.

6.4 Alternatives piping 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.

6.5 '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 Loreamatet area, Turkana Central sub-County. 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 saline; and in some cases, the quality of the source is unknown.
- Stagnating growth of Loreamatet area and Turkana 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.

7 Potential Environmental & Social Impacts and Mitigation Measures

7.1 Introduction

This chapter presents the anticipated impacts resulting from the construction and operation of the proposed Loturtur water supply scheme project. The chapter also presents proposed mitigation measures to help reduce the anticipated negative impacts. Detailed mitigation measures have been captured in the ESMP of Chapter 8 of this report.

The environmental baseline information collected and project description discussed form the basis for impact identification and evaluation. The impacts that are expected to arise from the project could either be termed as positive or negative, direct, or indirect, major, or minor, temporary or permanent depending on their nature, area of coverage and their duration in the environment and have been identified in all the phases of the proposed sub-project cycle.

7.2 Methodology for Impact Assessment

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

- Prediction of potential impacts; and
- 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:

i. Magnitude of the impact;

ii. Duration: period of time that impact lasts;

iii. Mitigation measures; its availability whether integrated in the project design or implemented as management measures; and

iv. 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.

7.3 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:

i. Impact Prediction and evaluation;

ii. Mitigation and Enhancement; and

iii. Residual Impact Evaluation.

7.4 Categorization of impact

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 project impacts to the physical environment and the communities.

Table 2: 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*
			*I**ndirect –** 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 measures are applied*
			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*

No	Impact	Criteria	Classification
			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	Impact Significance	The significance will be rated by combining the consequence of the impact and the	***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*

No	Impact	Criteria	Classification
		probability of occurrence	***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*

7.5 Construction Phase

7.5.1 Anticipated Positive Impacts

7.5.1.1 Creation of job opportunities

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.

Impact	**Creation of job opportunities**
Impact Nature	Positive
Impact Type	Direct/indirect
Impact Severity	High
Impact Duration	Long Term
Impact Extent	Local
Likelihood of Occurrence	High
Impact Significance	High

7.5.1.2 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.

Impact	**Injection of money into local economy**
Impact Nature	Positive
Impact Type	Direct

Impact Severity	High
Impact Duration	Long Term
Impact Extent	Local
Likelihood of Occurrence	High
Impact Significance	High

7.5.1.3 Improvement of livelihood for locals

The Project will require materials, some of which will be sourced locally. These include sand, cement, ballast, hard core, lining materials, steel bars/ rods. This will provide a ready market for suppliers in and outside the project area.

Impact	**Improved livelihood for locals**
Impact Nature	Positive
Impact Type	Direct
Impact Severity	High
Impact Duration	Long Term
Impact Extent	Local
Likelihood of Occurrence	High
Impact Significance	High

7.5.1.4 Skill and technology Transfer

The employment of the skilled personnel will have both from the economic and social point of view. The community members will learn new skills in handling water structures and this will enhance the community skills.

Impact	**Skill and technology transfer**
Impact Nature	Positive

Impact Type	Direct
Impact Severity	High
Impact Duration	Long Term
Impact Extent	Local
Likelihood of Occurrence	High
Impact Significance	High

7.5.1.5 Other secondary positive impacts

The reduction in the burden of water collection allows community to invest time to improve their livelihood through animal husbandry and other economically viable activities. In addition, to the application of various permits from various government agencies e.g., for construction works, increased business for suppliers and direct deductions from the contractor means increased revenue through taxation.

Implementation of the proposed road project will enhance interaction between people from different communities in Kenya e.g. interaction between the local community and non-local construction workers thus promoting national integration and cohesion.

7.6 Negative Impacts during construction

7.6.1 Land Take

Physical and economic displacement, if unmitigated, may give rise to:-

- ✓ severe economic, social, and environmental risks.
- ✓ Impoverishment through loss of livelihoods.
- ✓ Loss of cultural identity, traditional authority.

The estimated land requirement for the water supply infrastructure, excluding pipelines, is 13,044 m2 (3.21 acres) for the construction of the administration and guard house buildings, generator room, pump house, water storage tank, sanitation facilities, solar panels support structure (PV Plant, and access roads. The land on which the infrastructure is proposed is communally owned, and unencumbered. However, a formal land transfer process is required, to transfer the earmarked land to public purpose under the trust of the Turkana County Government.

Impact	**Land take**
Impact Nature	Negative

Impact Type	Direct
Impact Severity	Low
Impact Duration	Short Term
Impact Extent	Project Site
Likelihood of Occurrence	Low
Impact Significance	Low

The land acquisition process for access to unregistered community land (as anchored in Community Land Act, 2016):-

i. Due Diligence (Section 8, CLA): Carry out background checks to determine the land's status, including its boundaries, existing use, customary tenure arrangements, and whether the community has initiated registration under the Act.
ii. Government Engagement (Sections 6, 7 & 8, CLA): Engage both the National Land Commission (NLC) and County Government since, under Section 6, county governments hold unregistered community land in trust on behalf of communities. Structured consultations should involve political leadership and relevant administrative officers at the local level.
iii. Community Consultations & FPIC (Sections 8, 15 & 21, CLA): Engage community structures—traditional leaders, elders, women representatives, youth, CBOs, and FBOs—in open and inclusive consultations. The Act emphasizes community participation and free, prior, and informed consent (FPIC) before any transaction or allocation.
iv. Benefit Sharing (Sections 36 & 37, CLA): Define clear, equitable, and transparent benefit-sharing arrangements for any investment or partnership. The CLA requires that benefits derived from community land accrue to the entire community, not just individuals or elites.
v. Community Consent (Section 8(4), CLA): Obtain written consent from the community through a prescribed community resolution/consent form. This aligns with the Act's requirement that decisions relating to community land use and allocation must be by a majority of registered adult members of the community.
vi. Approval & Documentation (Sections 15, 30 & 37, CLA): Any agreement (investment, MoU, or partnership) must be approved in a community assembly or through the community land management committee (once registered). Approval should be by a majority of community members, with decisions recorded in minutes, filed with the county government, and, where relevant, registered with the NLC.

Mitigation Measures

The following are the proposed measures to ensure risks of land take are adequately mitigated:

- ✓ The Project will align water pipelines along public roads and spaces to avoid any physical and/or economic displacement as much as possible, or infringement on the land rights holders
- ✓ Community consultations will be held on siting of the proposed livestock troughs and water kiosks.
- ✓ Where additional land for the project is required, the following processes and activities will be undertaken:
- ✓ Clarify the legal status of land rights holders;
- ✓ Engage with local authorities and traditional institutions to ensure customary rights are documented and recognized in project planning;
- ✓ Adopt FPIC from both the community and individuals with land claims;
- ✓ Engage both community leaders and individual land users and address expectations and grievances proactively;
- ✓ Develop and formalize access and use agreements between WSTF and the land rights holders (both communal and individual);
- ✓ Provide community-level benefits for communal compensation, and land-for-land, cash compensation at replacement cost, or livelihood support for those with use rights or structures;
- ✓ Establish a GRM that includes customary and formal pathways, with trusted community representatives and accessible procedures

7.6.2 Soil Erosion and compaction

Soil erosion is a significant concern during construction due to the movement of heavy machinery, excavation for infrastructure, and vegetation clearance. Soil compaction caused by construction vehicles and machinery increases surface runoff, especially during rainfall, leading to erosion and a decline in soil fertility. Excavation will result in piles of excavated earth, and after using this material for backfilling, any excess soil should be properly managed to reduce its impact on the surrounding environment.

Impact	**Soil erosion and compaction**
Impact Nature	Negative
Impact Type	Direct
Impact Severity	Medium
Impact Duration	Short Term
Impact Extent	Project Site

Likelihood of Occurrence	Low
Impact Significance	Medium Low

Mitigation Measures:

- Excavation in sloped areas should be avoided on rainy days.
- Soil excavated for the pipeline should be used for backfilling, with any excess soil spread evenly and compacted.
- Topsoil disturbed during site development should be used to restore the platform surface.
- Vegetation should only be removed from areas directly within the project footprint.
- Minimize vehicle movement over bare soil to reduce the risk of soil compaction.
- At construction stage, the contractor will prepare Specific Construction Environment and Social Management Plan (C-ESMP) which included among other: Soil and Sedimentation Control Plan, Spoil Management Control Plan and Waste Management Plan.

7.6.3 Waste generation and disposal

During the construction process, various types of waste will be generated. Construction activities such as site preparation, clearance, excavation, machinery and vehicle servicing and repair, tank construction, and borehole equipping will generate both solid and liquid waste. Additionally, waste from excavation activities, such as soil and debris, will accumulate at the site.

These wastes will vary from general to hazardous categories. While the impact is short-term, the disposal methods used for the waste may have long-term consequences. Solid waste, such as packaging materials, pipes, cables, sand, aggregate, and steel, generated during construction, will be carefully managed and periodically removed from the site to prevent contamination. The waste management system will also help minimize the risk of accidents from contamination, spills, and fires.

The waste generated includes:

- **Domestic waste**: Food waste, food wrappers, cans, bottles, and other spoiled containers, as well as sanitation wastewater.
- **Construction waste**: Packaging waste, scrap metals, construction debris, and discarded parts.

Improper handling of domestic solid waste, such as paper and food wrappers, could result in littering around the site, which may be blown into neighboring areas. Other domestic waste may also accumulate on the site, creating an unhealthy environment for workers. If construction waste is not properly managed, it could pose health and safety risks to workers and visitors.

It is crucial that the sanitation facilities on-site are properly maintained to prevent sanitation waste from overflowing, which could pose health risks to workers and visitors.

Impact	**Waste generation and Disposal**

Impact Nature	Negative
Impact Type	Direct
Impact Severity	Low
Impact Duration	Short Term
Impact Extent	Project Site
Likelihood of Occurrence	Medium
Impact Significance	Medium Low

Mitigation measures

- At construction stage, the contractor will prepare Specific Construction Environment and Social Management Plan (C-ESMP) which included among other; Soil and Sedimentation Control Plan, Spoil Management Control Plan and Waste Management Plan.
- Contractor to sensitize workers on waste management and the C-ESMP.
- Adhere to the EMCA Waste Management Regulations, 2006 (Legal Notice 121), and develop a detailed Waste Management Plan for implementation.
- The contractor to exercise waste segregation and to ensure waste not reusable or recyclable is cleared from the project site and disposed off as per NEMA and County Government regulations
- Solid waste will be collected at a central location on site, sorted and will be stored temporarily until removal to an appropriately permitted disposal site.
- Contractor to provide waste skips/ bins to contain wastes on-site e.g., for paper, used cement bags, used face masks etc.
- Where potentially hazardous substances (oils and greases) are being disposed of, a chain of custody document should be kept with the environmental register as proof of final disposal.
- Engage registered waste handlers to regularly collect and dispose the wastes or as necessary.
- Avoid waste or vegetation burning.
- Prioritizing reduce, reuse and recycling strategies whenever possible.
- Minimize material waste by accurately estimating the required size and quantity.
- Promote the recycling and reuse of construction materials and opt for durable, long-lasting materials to reduce the frequency of replacement and associated waste over time.

7.6.4 Air pollution

a) Motor vehicle Emissions

Emissions associated with combustion of fuel from the equipment and vehicles. These emissions may be in the form of oxides of nitrogen as well as volatile organic carbons. Emissions from the construction vehicles should comply with national or international standards.

Mitigation measures

- All vehicles and machinery should be regularly maintained to ensure they meet emission standards and minimize air pollution.
- 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, 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 boreholes site at Loreamatet project area is accessed through earth roads, the pipeline route will be along the road reserve which is expected to generate dust.

Impact	**Air pollution Impacts**
Impact Nature	Negative
Impact Type	Direct
Impact Severity	Medium
Impact Duration	Short Term
Impact Extent	Local
Likelihood of Occurrence	Medium
Impact Significance	Medium

Mitigation measures

- Implement as part of C-ESMP, a Dust Management Plan (DMP) and Undertake inspections to ensure compliance with the Dust Management Plan;
- Use of dust control methods, such as covers, water suppression, or increased moisture content for open materials storage piles, or controls;
- 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;
- Liaise with local communities to forewarn of potentially dusty activities;
- Minimize drop heights when loading stockpiles or transferring materials

- Avoid waste or vegetation burning;
- Record all dust and air quality complaints, identify cause(s) and take appropriate action to remedy;
- Erect solid screens if feasible around stockpiles.

7.6.5 Disturbance of 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, there will be removal or disturbance of the vegetation. While the area to be cleared may be small, the removal of vegetation can still disrupt local ecosystems, reduce biodiversity, and affect the soil structure.

Impact	**Disturbance of vegetation**
Impact Nature	Negative
Impact Type	Direct
Impact Severity	Low
Impact Duration	Long Term
Impact Extent	Project site
Likelihood of Occurrence	Low
Impact Significance	Low

Mitigation Measures

- The project should limit vegetation clearing to only the areas necessary for construction activities.
- The community should be encouraged to establish a local indigenous tree nursery to propagate native tree species. These trees can be replanted after the project, which will help restore ecosystems and provide local benefits like shade and timber.
- Construction workers should be trained on the importance of maintaining the local ecosystem and be encouraged to avoid unnecessary clearing of vegetation.

7.6.6 Noise and vibration risks

The site preparation for the storage tanks and rehabilitation of the borehole during construction phases may have the most negative impact to the ambient noise and vibration in the project area especially if there is settlement within the proximity of the active sites. Further majority of the work

around the boreholes is not associated with deep excavation/drilling or rock breaking that result to excessive vibrations resulting from equipment's such drillers. Still, a number of measures may be undertaken by the contractor to reduce the impact of noise on the existing and potential residents as well as the workers involved in the project.

Impact	**Noise and vibration risks**
Impact Nature	Negative
Impact Type	Direct
Impact Severity	Low
Impact Duration	Short Term
Impact Extent	Project site
Likelihood of Occurrence	Low
Impact Significance	Low

Mitigation Measures

- The construction team must adhere to the Environmental Management and Coordination Act (EMCA 1999) Noise and Excessive Vibration Pollution Control Regulations, 2009. This includes limiting noise levels, particularly during sensitive times such as early mornings and evenings.
- 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.
- All construction machinery and vehicles should be regularly serviced to ensure they operate quietly and efficiently.
- Ensure that construction activities for the project are staggered to decrease the levels of noise and vibration in the area
- Throttle settings will be reduced, and equipment and plant turned off, when not being used
- Provision of Personal Protective Equipment and clothing (PPE/C) including ear buds to workers.

7.6.7 Water pollution

During construction, waste in form of rubble, dust and excavated material and other forms may cause pollution to water that can affect downstream users. Potential sources of water pollution include site runoff and drainage from excavation activities, effluent from general construction activities, un-serviced plant and equipment on site (or even servicing equipment on site) could result to oils and fuels leaks that could contaminate the river rising the BoD and adversely affecting aquatic organism in the rivers/ streams and sewage effluent from the construction workforce. Though the project magnitude is not that big, care and caution has to be taken to ensure no spills take place at the site.

Impact	Water pollution
Impact Nature	Negative
Impact Type	Direct
Impact Severity	Medium
Impact Duration	Medium Term
Impact Extent	Project site
Likelihood of Occurrence	Medium
Impact Significance	Medium – high

Mitigation Measures

- Ensure that no oil/ fuel spills at the site which may affect the water quality. Restrict vehicle/ machine servicing to designated yards equipment with sump to contain used oil, or restrict servicing and fueling to licensed dealers' yards
- No hydrocarbon-contaminated water may be discharged into the river.
- Provide workers at the development site with sanitation facilities during this phase of the development.
- Store all raw materials away from the vicinity of water bodies located on the project area to avoid contamination in these areas.
- General waste generated during this phase of the development must be stockpiled in one central area of the project site, away from existing reservoir and collected, transported and disposed of appropriately at the designated disposal site by county government.
- Tools and plant will be cleaned in designated areas within the site where runoff can be isolated for treatment before discharge to the river
- Discharge of Grey water or uncontrolled discharges from the site/working areas (including wash down areas) to adjacent rivers shall not be permitted
- Water containing pollutants such as cements, concrete, lime, chemicals and fuels shall be discharged into a conservancy tank for planned removal from site
- Works that are likely to generate silt-laden runoff such excavations will be undertaken preferentially during the drier months of the year; December-March
- Maintain spill response kits at the site office.

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

7.6.8 Disturbance of Traffic or blockage of access

The entire project will use road reserve for the pipeline route. The earth 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.

Impact	**Blockage of access**
Impact Nature	Negative
Impact Type	Direct
Impact Severity	Medium
Impact Duration	Short Term
Impact Extent	Local
Likelihood of Occurrence	Low
Impact Significance	Medium Low

Mitigation measures

- 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.
- Expedite construction works so as to reduce the times where roads are blocked.
- Alternatives access ways should be communicated to the community.

7.6.9 Occupational Health and safety risks

Use of heavy machinery during construction presents safety hazards to the workers and the community. The sources of impact on the health and safety of project workers 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,

Arising from the above-mentioned activities that will take place during construction, the workers and other personnel 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

- 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
Impact Significance	Medium High

Mitigation Measures:

- As part of the C-ESMP, contractor will develop and implement an overall Workers' Health and Safety Management Plan/System to ensure worker's health and safety are paramount, and which will include the following measures:
    - Workers will be provided with suitable PPE including: to avoid cuts on the feet, hands and head during the course of duty. This includes helmets, gloves, safety boots overalls, face masks and ear plugs in dusty and noise activities;
    - Provision of adequate sanitary facilities to workers separate for either gender.
    - Train all workers on Safety Health and Environment (SHE) with an aim of improving awareness;
    - The workers or their representatives will be trained on first aid and provided with first aid kits
    - Trenches over 1.5m deep will be secured against accidental entry by workers and the public using barriers and warning tapes.
    - The contractor will install appropriate safety signage along the work areas;
- Ensuring that the drivers and machine operators hired to work on the site are qualified.
- There should be safety policy clearly displayed on the site.
- Machines should be properly maintained.
- 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.

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.

Table 7.15 Mitigation measures and Action proposed

Issue	Mitigation measure/Action to be implemented
Working Conditions and Management of Worker Relationship	Develop human resource policies and procedures appropriate to an organization's workforce; a policy for working conditions to provide reasonable working conditions and terms of employment. Other important aspects to be addressed include 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 organizations. Additionally, introduce mitigation measures to ensure suppliers are taking steps to prevent life threatening situations.
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. 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.

7.6.10 Labour Conflicts and Forced Labour

During construction, labor unrests can lead to disruption of business operations, bringing critical projects to a halt and resulting in delayed schedules and reputational damages. Labor management

procedures refer to the Rules and Policies which govern and organize employment. The Labor Management Procedures is intended to support the project to achieve the following;

7. Increased production.
8. Reduced turnover.
9. Enable managers and supervisors to forecast workforce requirements.
10. Track productivity.
11. Provide essential training and coaching for employees not meeting their goals.
12. Ensure operations are running smoothly.
13. Provide for recruitment of workers separate between skilled and non-skilled workers
14. Implement the workers grievances procedures as provided in the project Grievance Mechanism
15. Recruit and maintain women in the workforce

Impact	**Labour conflicts and labour influx**
Impact Nature	Negative
Impact Type	Direct
Impact Severity	Medium
Impact Duration	Short Term
Impact Extent	Local
Likelihood of Occurrence	Likely
Impact Significance	Medium High

Mitigation Measures

- Implement labour management procedures.
- Developing criteria (skills and qualifications) for all positions due for recruitment.
- Documenting relevant worker information including terms of employment.
- Ensure equal opportunity and fair treatment during recruitment.
- Protection of workers legal right to form unions or other workers organizations of their own choosing and to bargain collectively with their employers.
- No employment of underage persons (under 18 years).
- Implement the workers grievance mechanism for all direct workers and contracted workers.
- Compliance to labour relations practices as provided for by Kenya legislations and International Labour Organisation;
- Advertising at the local villages and markets for any position that needs to be filled; and
- Disclosure of labour forecasts and labour returns to the community members periodically.
- Sub-contractor requirement to submit a past forced labour performance declaration, and a declaration of ongoing Bidder commitment to prevent, monitor and report on any forced labour.
- Include in contracts with subcontractors/ suppliers/ manufacturers of materials (pipes, fittings, solar panels and equipment) obligations to prevent Forced Labor among the staff,

employees, workers and any other person employed or engaged by the Subcontractor/ supplier/ manufacturer.

- The Contractor, including its Subcontractors/ suppliers/ manufacturers, shall not employ or engage forced labour. Forced labour consists of any work or service, not voluntarily performed, that is exacted from an individual under threat of force or penalty, and includes any kind of involuntary or compulsory labour, such as indentured labour, bonded labour or similar labour-contracting arrangements

7.6.11 Labour Influx

The influx of migrant workers may increase incidences of communicable diseases, conflict, insecurity, theft, SGBV and increased pressure on social amenities. Non-local people hired directly by the project or main contractors may lead to direct labour influx. Non-local people who come to the area seeking association with the project workforce, including workers' families, speculative job seekers, or those involved in related businesses. This movements may lead to increased demand and competition for water, electricity, housing, and other local services, such as social and health services such as increased spread of communicable diseases, and increased drug and alcohol use, violence, rates of illicit behaviour and crime.

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	Likely
Impact Significance	Medium High

Mitigation Measures.

- Implement the project labour influx management plan.
- Prioritize local labour force.
- Regular community engagements.
- Regular community and project workers training, awareness and sensitization on HIV/AIDS.
- Clear and culturally sensitive GM and SEAH/GBV procedures at the project site.
- Contractors provide adequate welfare amenities for their staff including accommodation and supplies.
- Provision of opportunities for workers to regularly return to their families through long weekends on paydays.
- Ensuring that children and minors are not employed directly or indirectly on the project.
- Water conservation and recycling of water.

- Use of wood for fuel prohibited.
- All project workers to be trained on SEAH and sign the Code of Ethical Conduct (CoC).

7.6.12 Occupational Health and Safety Risks

Use of machinery during construction which include backhoe excavator, water bowser, tipper truck, double cab pick-up, poker vibrator, concrete mixer, dewatering pump, pressure testing kit, and plate compactor presents safety hazards to the workers and the community. The sources of impact on the health and safety of project workers will arise from the following construction activities:

- Site clearing activities.
- Excavation works up to depths of 900mm and ground levelling.
- Working at trenches and excavated areas.
- Use of heavy machinery.
- Construction noise.

Arising from the above-mentioned activities that will take place during construction, the workers and other personnel 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 falls into the 900mm deep 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	Likely
Impact Significance	Medium High

Mitigation Measures:

- Develop a health and safety management plan.
- Ensure compliance to OSHA 2007.

- Undertake safety risk assessments before commencement of works.
- Environment, health, safety and security induction of all project personnel.
- Matching personnel, tasks and competencies.
- Workers to be provided with appropriate/risk-based PPEs.
- Appropriate safety signs provided suitably.
- First aid kits should be provided and trained first aiders should always be on site.
- Provide appropriate fire suppression equipment's on site.
- Proper scheduling of activities to avoid workers being overworked.
- Machines/equipment for the intended purpose.
- Zero tolerance to alcohol and drugs at work places.
- Regular training of project workers on OHS aspects.
- Documentation and reporting of occupational accidents, diseases and incidents.
- Develop and implement an emergency prevention, preparedness and response plan.
- Provide conveniently accessible, clean, orderly, adequate and suitable welfare facilities within the site.

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

Issue	Mitigation measure/Action to be implemented
	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.

7.6.13 Community Safety and Security

Refers to the potential negative effects a project might have on the safety and security of the local community, including impacts on fire safety, traffic safety, crime rates, social cohesion, access to emergency services, and overall sense of well-being, often arising from changes in population dynamics, increased traffic, or disruptions to existing social structures caused by the project development.

The Table below provides a summary of the key requirements of the ESF pertaining to community health and safety.

Issue	Mitigation measure/Action to be implemented
Community Health, and Safety	A community health and safety plan must be developed by the contractor before commencement of works. 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. Sensitizing communities on the construction safety and health risks and providing protection including watering the roads, placing signs on dangers around the construction and barricading/limiting access to construction sites.
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. 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 Security management plan (SMP) and sector SOPs will form the mechanism for community interaction regarding the security processes.

Impact	Community safety and security
Impact Nature	Negative
Impact Type	Direct
Impact Severity	Medium
Impact Duration	Short Term
Impact Extent	Local
Likelihood of Occurrence	Likely
Impact Significance	Medium High

Mitigation Measures

- Regular stakeholder engagements to facilitate open dialogue with community leaders and residents to address concerns and incorporate feedback into project implementation including traffic management plan.
- Operationalize the grievance mechanism.
- Implement site specific construction management plans which in the event of inadequacy, could potentially pose health and safety risks and/or nuisance to surrounding communities. Such include noise, air quality, waste, and traffic management plans;
- Community awareness campaigns through training communities about project safety protocols, emergency procedures, and reporting mechanisms.
- Restrict unauthorized entry to project sites by community members as much as possible by installation of perimeter fences/hoarding around construction sites;
- Provide adequate security lighting in all project installations and sites.
- Undertake HIV/Aids awareness, training and sensitization programs.
- Accord the local people the first priority in employment.
- Employ at least two trained and qualified guards to man and guard each campsite during the day and at night.
- Install adequate CCTV cameras at the main entrance and within the campsite to monitor and secure the premises.

7.6.14 Impacts on Heritage, Monuments and other Cultural Resources

No heritage or monumental sites were identified within the project area during the Environmental and Social Impact Assessment (ESIA) study. However, Chance Find Procedures will be triggered if any culturally significant artefacts or physical cultural resources (PCR) are discovered unexpectedly during project implementation.

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	Low
Impact Significance	Low

Mitigation Measures

- ✓ Implement stakeholder engagement plan to identify, document, assess potential project impacts, and determine appropriate mitigation measures;
- ✓ Avoid disturbance to cultural heritage sites by staking out the construction areas prior to works, screening with community elders;
- ✓ Train/make aware the construction contractor of how to deal with these sites, and ensure that there is supervision from contractors' side for the management of all such sites.
- ✓ Restore all sites to their original shape post construction.

Adopt the chance find procedures provided in Appendix H

7.6.15 Sexual Exploitation Abuse and Harassment (SEAH)

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 SEAH in the Project. The project will experience the influx of people who will be seeking employment during the construction phase, therefore, SEAH will be a critical aspect to be monitored.

Impact	**SEAH**
Impact Nature	Negative
Impact Type	Direct
Impact Severity	Medium
Impact Duration	Short Term
Impact Extent	Local
Likelihood of Occurrence	Likely
Impact Significance	Medium High

Mitigation:

- The project has developed a stand-alone SEAH Prevention and Response Plan that will guide the PCU, PIUs and contractors on how to plan for and management the SEAH risks. The SEAH action plan follows 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 SEAH Action plan ensures that:

- It clearly defines the SEAH prevention and response measures for contractors in the bid documents.
- There is clearly explanation and definition of the requirements of the CoC to bidders before submission of the bids.
- The project's social assessment includes assessment of the underlying SEAH risks and social situations, using the assessment tool to provide guidance on safety and ethical considerations related to SEAH data collection.
- Mapping out SEAH prevention and response actors in project communities and those in neighboring areas and share information on the referral pathway with workers and community members.
- Induction of all project contractors and workers on SEAH.
- Inclusion of clear provisions in the workers' CoC on SEAH.
- Sensitization of the communities on SEAH.
- Use of an oversight of an independent Third-Party Monitor (TPM) organization/Independent Verification Agent (IVA) (CSOs, international or local NGOs, academic partners, private sector firms) with experienced GBV staff for monitoring the implementation of the SEAH Prevention and Response Action Plan and ensuring all parties are meeting their responsibilities.
- Sensitization of the PCU/PIUs on the importance of addressing SEAH on the project, and the mechanisms or implementation.
- Ensuring that there is a functional GM sensitive to SEAH and that the workers and community members have access to it

7.6.16 Risk of Spreading of HIV/AIDS

The arrival of construction workers in the project area may introduce and spread communicable diseases such as HIV/AIDS and other sexually transmitted infections (STIs). Workers may also be exposed to diseases for which they have low immunity, increasing the risk of transmission between them and local residents. This could contribute to a greater public health burden within the community.

Impact	**HIV/Aids**
Impact Nature	Negative
Impact Type	Direct
Impact Severity	Medium
Impact Duration	Short Term
Impact Extent	Local
Likelihood of Occurrence	Likely
Impact Significance	Medium High

Mitigation Measures

- In collaboration with a local health service provider, or the Ministry of Health in Turkana county, provide awareness, training and sensitization for both the project workers and community members on HIV/AIDS and STI prevention.
- Health education workshops to provide information on disease prevention, safe practices, and access to healthcare services.
- Provision of protective measures including condoms at the construction site to promote safe sexual practices.
- Develop and implement a comprehensive health and safety management plan that includes strategies for preventing the spread of communicable diseases.
- Liaison with the local health facility to monitor HIV/Aids situation in the PA.

7.6.17 Violation of Children Rights

Violence against Children (VAC) 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, labour, 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 project has developed a labor influx management plan (LIMP) to mitigate on these risks.

The contractor will undertake the below listed mitigation measures.

Impact	**Violation of Children Rights and Forced Labour**
Impact Nature	Negative
Impact Type	Direct
Impact Severity	Medium
Impact Duration	Short Term
Impact Extent	Local
Likelihood of Occurrence	Likely

Impact Significance	Medium High

Mitigation:

- Domesticate the LIMP as part of the CESMP;
- Develop and implement a Children Protection Strategy that will ensures minors are protected against negative impacts associated by the Project.
- Training and signing of CoC by the project team;
- 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.
- No engagement of minors in the project directly or indirectly.
- Conduct child protection training for workers, contractors, and local leaders.
- Display clear signage at the site warning against child labour and abuse
- Erect fencing or barriers to prevent children from accessing the site and other ancillary sites e.g. quarries, borrow pits.
- Include a strict prohibition on child Labor in all contractor agreements and CoCs for each worker
- Client and consultant to conduct regular labour inspections to ensure compliance.
- Sensitize parents, teachers, and local leaders on the risks of child abuse around construction sites

7.6.18 Exclusion of vulnerable groups from consultations and inclusion in designs

Exclusion of PwD, vulnerable groups meeting the criteria in ESS 7, women, children and elderly from consultations and inclusion of their views in accessible facility design.

Impact	**Exclusion of vulnerable groups from consultations and inclusion in designs**
Impact Nature	Negative
Impact Type	Direct
Impact Severity	Medium
Impact Duration	Short Term
Impact Extent	Local
Likelihood of Occurrence	Likely
Impact Significance	Medium High

Mitigation Measures.

- Adopt and implement the Indigenous Peoples/Vulnerable and Marginalized Groups (IP/VMG) Plan
- Schedule meetings at convenient times and locations to accommodate women, persons with disabilities, and other vulnerable groups.
- Focused engagements with the vulnerable groups. This will include dedicated consultations with the PwDs to understand their needs.
- Apply universal design in infrastructure to ensure accessibility for persons with disabilities to the water points.
- Ensure that consultations are culturally appropriate, accessible, including the use of sign language interpreters, braille, and vernacular languages.
- Implement the designed gender-sensitive and culturally appropriate measures.

7.6.19 The transition phase from construction to operation

During the transition phase from the completion of the project to the start of operations, the following will be done:

i. Remove any wastes from the site.

ii. Rehabilitate any areas adversely affected by the construction through spillages of pollutants: liquids, chemicals, cement, and paint among others at the site and any other areas disturbed as a result of the construction outside the site.

iii. Re-vegetation through planting of indigenous trees at the site.

iv. Put up fencing around the site for protection from intruders and unauthorized persons and ensure privacy.

7.7 Operation phase

7.7.1 Anticipated Positive Impacts

7.7.1.1 Permanent employment opportunities

Permanent employment opportunities are one of the long-term major impacts of the project that will be realized during the operation and maintenance of the borehole. It is expected that some community members will be permanently employed as borehole/Kiosks attendants.

7.7.1.2 Access to safe drinking water

The community members have had to travel far distances to get water. The proposed project rehabilitation of boreholes and increased distribution network proposed will increase access to safe drinking water to the people of Loreamatet area leading to improved standard of living; and changes in exposure to both communicable and non-communicable diseases. The design incorporates elements for troughs for both small and large stock, as well as a community water point (CWP)/Kiosks.

7.7.1.3 Increased participation of women in socio-economic development

The proposed borehole when completed will provide a ready and reliable source of water to the community. Women and children will most benefit from this as time spent in searching and fetching water will be reduced. Women will have time to engage in other viable economic activities. Children will have enough time for school. The outcome will be increased household well-being.

7.7.1.4 Improved Health and Sanitation

Availability of enough water will have a direct impact on health and sanitation especially in relation to waterborne diseases such as diarrhoea and skin infections. Families that are unable to wash clothes or bathe will be able to do so due to close proximity to water sources

7.7.1.5 Reduced time drudgery

According to the household survey done, many households in the area spend at least 60 minutes or more to obtain water for domestic use. In some households, repeat trips are needed. This burden of unpaid household chores, leaving little time for paid labour or social and leisure activities falls disproportionately on the woman and girls, resulting in time poverty. At the same time, tackling time poverty of rural women is an important lever in closing a larger gender gap.

From the discussions with community members, most families spend much time in search of water. The construction of the proposed project will lead to significant time savings due to reduced distances to water points. It is expected that same will improve the economic and social status of women and children since there will be more time for other activities.

7.7.2 Anticipated Negative Impacts

7.7.2.1 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.

Impact	**Water system leaks**
Impact Nature	Negative
Impact Type	Direct
Impact Severity	Medium
Impact Duration	Short Term
Impact Extent	Local

Likelihood of Occurrence	Low
Impact Significance	Medium Low

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);

7.7.2.2 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.

Impact	**Deficiencies in water distribution system**
Impact Nature	Negative
Impact Type	Direct
Impact Severity	High
Impact Duration	Short Term
Impact Extent	Local
Likelihood of Occurrence	Low
Impact Significance	Medium Low

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.

7.7.2.3 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.

Population density is low and water demands even including water for livestock is low compared to the renewable groundwater resources. In the Economics of Water study of Somalia (World bank) it was demonstrated that in the border areas, which are hydrogeologic ally, demographically and climatologically comparable to the rural areas of the Arid and Semi-Arid Lands (ASAL) counties, groundwater abstraction is lower than 10 % of renewable groundwater resources. This is below the critical 20 and 40 % scarcity and severe water scarcity levels, respectively (UNWATER), which are generally used as criteria for sustainable groundwater development in the absence of detailed information. Critical situations arise only where urban water supply and large-scale irrigation projects abstract groundwater.

Impact	**Ground water depletion**
Impact Nature	Negative

Impact Type	Direct
Impact Severity	Medium
Impact Duration	Short Term
Impact Extent	Local
Likelihood of Occurrence	Low
Impact Significance	Medium Low

Mitigation measures

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

ii. The borehole should be installed with a Master Meter and an Airline/Piezometer to monitor groundwater abstraction and to facilitate regular measurements of the static water level in the borehole, respectively.

7.7.2.4 Water Conflicts with Regards to Water Sharing

Water resources have potential of triggering conflicts amongst users if distribution is not managed properly with adequate community involvement especially for ASAL communities living in the area. Unprecedented increase in number of animals or use of the water for other purposes such as irrigation would also mean increase water demand. Dependency on the water scheme for domestic, livestock and other purposes may result on water use related conflicts.

Also, water resources have potential of triggering conflicts amongst users if distribution is not managed properly and without adequate community involvement. This requires that the WSP will put in place elaborate measures as discussed below to eliminate water use related conflicts. Towards, this endeavor, a sustainability plan is developed to ensure the community also contribute towards maintenance by paying a fee as discussed during the FGD.

Further, Poor leadership, lack of transparency and accountability would result in the mismanagement of the will result into the project not meeting its intended goals leading to more conflicts.

Impact	**Water conflicts**
Impact Nature	Negative
Impact Type	Direct
Impact Severity	Medium
Impact Duration	Short Term

Impact Extent	Local
Likelihood of Occurrence	Medium
Impact Significance	Medium High

Mitigation Measures.

- Adopt and operationalize the project security management plan;
- Grievances that may arise out of the investment are handled by an elected GRC.
- Conduct training on water saving technology to ensure efficient water use.
- Train workers and the project management committee and rank members on conflict management and resolution
- Develop and implement a community users' development plan in consultation and partnership with the local community and existing WRUAs.

7.7.2.5 Inadequate project management

The water supply scheme will be the most common source of water in the project area. However, the project can become non-operational if there will be no proper community management framework for operation, repair, and maintenance of the same.

Impact	**Inadequate project management**
Impact Nature	Negative
Impact Type	Direct
Impact Severity	Medium
Impact Duration	Long Term
Impact Extent	Local
Likelihood of Occurrence	Low
Impact Significance	Medium High

Mitigation measures

- The project proponent will train the community members on proper operation, management, and maintenance of the borehole to ensure sustainability; and
- The proponent will consult on reasonable water tariffs to sustain the water supply.

7.7.2.6 Outbreak of livestock diseases

The coming together and mixing of livestock from different households will increase the chance for the spread and outbreak of livestock pest and diseases. Possible outcome of this if not well managed will be poor animal health, reduced livestock productivity and even livestock loss.

Impact	**Outbreak of livestock diseases**
Impact Nature	Negative
Impact Type	Direct
Impact Severity	Medium
Impact Duration	Short Term
Impact Extent	Local
Likelihood of Occurrence	Medium
Impact Significance	Medium High

Mitigation measures

- Regular disease surveillance by the veterinary department and community
- Monitoring of the livestock by the community/farmers
- Sensitization of the community on disease spread, monitoring and control
- A livestock disease management plan be put in place by the veterinary department to ensure disease incidences are promptly responded to and addressed

7.7.2.7 Vandalism

Vandalism in construction sites is the intentional damage or destruction of property. It can include graffiti, broken glass, and damage to equipment and installations.

Impact	**Vandalism**
Impact Nature	Negative
Impact Type	Direct
Impact Severity	Medium

Impact Duration	Short Term
Impact Extent	Local
Likelihood of Occurrence	Medium
Impact Significance	Medium High

Mitigation Measures

- Sturdy fences and gates to limit access to vulnerable areas;
- Using motion-activated lights to illuminate areas at night;
- Proper lighting in public spaces to deter activity in darkness;
- Ensure consistent follow-up with reporting and addressing vandalism to maintain deterrence;
- Educational programs in schools to teach responsible behavior;
- Locking gates and doors to restricted areas; and
- Public awareness campaigns about the harms of vandalism.

7.8 Decommissioning Phase

There is no anticipation of decommissioning of this project. But the ESIA team recommends that if decommissioning will be triggered at any point, an ESIA be prepared for the same and a decommissioning contractor engaged.

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

Table 7.19: Decommissioning Phase

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 machinery 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.

No	Impacts	Description
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 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 incidence of communicable diseases such as HIV/AIDS.

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.This Environmental and Social Management Plan (ESMP) seeks to manage, mitigate and keep to a minimum the negative environmental and social impact associated with the design, construction and operation of the ground water infrastructure, WRUAs and catchment plans under the HoAGW4R and at the same time enhance the positive and beneficial impacts.

The ESMP aims at ensuring that the HoGW4R project is implemented the within the principles of the World Bank's Environmental and Social Framework and the applicable Kenyan ESHS regulations.

8.2 Overview of Proposed Site Activities

Below is an overview of the project activities for the proposed rehabilitation, equipping, and expansion of operations of the rural groundwater source of the Loturtur Water Supply Scheme Project:

8.2.1 The preconstruction phase

This phase involves preparatory activities to ensure the smooth execution of the project:

Feasibility Studies and Site Surveys: Conducting of eligibility criteria and screening of boreholes, hydrological, geological, and geotechnical studies to assess borehole conditions and water quality.

Environmental and Social Impact Assessment (ESIA): Undertaking and preparation of an Environmental and Social Impact Assessment Study Report to identify potential environmental and social risks, including engagements and consultations with all key stakeholders and community members.

Permits and Approvals: Obtain necessary licenses, permits and clearances, including water abstraction permits, NEMA license, DOSHS Workplace registration, land use approvals, and construction authorizations.

Design and Planning: Prepare technical designs for borehole rehabilitation, equipping, and expansion.

Community Engagement: Engage the local community to ensure awareness, participation, and support for the project as well as incorporating of their views and concerns in the designs and at all stages of the project phases.

The Client (Water Sector Trust Fund, (WSTF)) is the holder of authorizations issued by the relevant

environmental regulating authorities responsible for authorizing and enforcing environmental compliance. The Client, either directly or through Supervising Consultant will ensure that all project operations are conducted in accordance with the applicable environmental regulations and in

accordance with this ESMMP. The Client will ensure that the ESMMP and other requirements related to health, safety and environment are implemented in full.

8.2.2 The Construction Phase

This phase involves the physical implementation of the project:

Site preparation: Clear and level the area around the borehole for construction activities.

Rehabilitation of the borehole: Perform necessary repairs of the borehole to improve water yield.

Equipping the borehole: Install pumps, pipes, power systems (e.g., solar or grid-based), and control systems for water abstraction.

Expansion of operations: Build or upgrade infrastructure such as storage tanks, raising of main and distribution pipelines, and water distribution systems or repair of existing infrastructure such as masonry tanks.

Health, Safety, and Environmental (HSE) management: Implement measures to manage construction-related risks, including dust, noise, waste, and worker safety.

Monitoring and quality control: Conduct regular inspections to ensure compliance with design standards and environmental regulations.

8.2.3 The Operation Phase

This phase focuses on managing of the rehabilitated and expanded borehole:

Water abstraction and distribution: Operate the borehole to supply water for domestic, agricultural, or industrial use as planned.

Maintenance of infrastructure: Perform regular maintenance of pumps, pipes, and storage facilities to ensure optimal performance.

Monitoring and reporting: Continuously monitoring of water levels, quality, and usage to ensure sustainable operation and compliance with environmental standards.

Community involvement: Collaborate with local communities and WRUAs for equitable access and sustainable management of the rural groundwater supply system.

Training and capacity building: Train operators and community members on the proper use and maintenance of the borehole system.

8.2.4 The Decommissioning Phase

This phase involves safely closing or transitioning the borehole system at the end of its lifecycle:

Infrastructure dismantling: Removal of equipment such as pumps, pipes, and storage tanks if necessary.

Site restoration: Restore the borehole site to its natural state or as agreed with stakeholders to prevent long-term environmental impacts.

Waste management: Dispose of or recycle decommissioned materials in an environmentally responsible manner.

Community consultation: Engage the local community to plan for alternative water sources or solutions if required.

Documentation and reporting: Prepare a final report documenting the decommissioning process and lessons learned.

8.3 Objectives of the ESMP

The objectives of this ESMP are to:

- Identify a range of mitigation measures which could reduce and mitigate the potential impacts to minimal or insignificant levels and identify measures that could optimize beneficial impacts.
- To provide guidance on how to manage EHS risks in the construction and operation phases of the Project in compliance with EHS policies, standards and legal regulations and to ensure that Project commitments are fulfilled,
- To establish clear roles and responsibilities of the PCU, PIU, Sub PIU (County-level implementation unit), consultants and contractors in the Environmental, Social, Health and Safety organization during construction and other project phases.
- To establish site specific plans and procedures to implement ESMF tools at the sub project sites, the tools include ESCP, SEP and GRM, LMP, SEAH/GBV action plan and SMP;
- Detail specific actions deemed necessary to assist in mitigating the environmental, social, health and safety impacts of the project.
- To establish a method of monitoring and auditing environmental and social management practices during construction phase; and
- Propose mechanisms for monitoring compliance with the ESMP and reporting thereon.

8.4 Environmental & Social Management Plan (ESMP)

This ESMP is prepared for the three project stages where potential significant negative impacts manifest and will therefore exist in three forms and these are:

i. Construction Phase ESMP;
ii. Operation Phase ESMP; and
iii. Decommissioning Phase ESMP.

Table 8.1: Environmental and social management plan

E & S impacts and their Sources	Proposed Mitigation Measure	Monitoring and Measurement	Responsible Entity	Supervising Agency
Preconstruction Phase				
Land acquisition Loss of pasture land Fencing of land restrict free movement of animals and people. Grievances related to land take/transfer The proposed Pipelines, solar farm, elevated storage tanks, water kiosks, sanitation facility, administration, guard and pump houses and livestock troughs for Loturtur Water Supply Scheme will require approximately 3.21 acres. The land is expected to be transferred from community to public ownership.	• The project alignment must avoid private land as the project component include outright land acquisition • Align water pipelines along public roads and spaces to avoid any physical and/or economic displacement as much as possible, or infringement on the land rights holders	Approved project design that is not affecting private land owners	Engineering consultant E&S Specialists	WSTF MoWSI
	• Complete the process of land transfer from community to public before the operation of the project	Valid allotment letters/title deeds for the scheme	TURWASCO/TURUWASCO County Government of Turkana	WSTF National Land Commission
	• Hold community consultations to discuss the final design of the scheme, the associated impacts and project implementation timelines before construction	Minutes of disclosure meeting, Agenda and attendance register	TURWASCO/TURUWASCO County Government of Turkana	WSTF NEMA
	• Follow the land take procedures outlined in the project ESMF	Compliance report	Consultant	WSTF MoWSI National Land Commission
Construction Phase				
Potential soil Erosion	• Develop and implement soil erosion control measures	Number of soil erosion control measures in the program of works,	Contractor Supervision Consultant	NEMA

E & S impacts and their Sources	Proposed Mitigation Measure	Monitoring and Measurement	Responsible Entity	Supervising Agency
Site Excavation, Earthworks for Construction Works: Clearing vegetation for borehole infrastructure, water kiosks, pipelines, and livestock water troughs, Excavation of trenches for foundations and trenches, Storage of excavated spoilt soil and construction materials, Uncontrolled surface run-off from construction site Spillage of water during borehole testing,		amount of resources set for soil erosion control		
	• Minimize and restrict vegetation removal to the project footprint.	Project design that considers areas with minimal vegetation, Amount of vegetated area spared by the project	Supervision Consultant	
	• Expedite back-filling and compaction of excavated soil.	Number trenches that are backfilled and compacted	Contractor	
	• Use existing access tracks to minimize the need for new tracks.	Number of enforcement measures to ensure use of the existing routes during site access	Contractor	
Soil and subsurface water pollution Spills of the fuel and hazardous chemicals stored at the site, fugitive spillage of fuel and used oil from equipment, poor management of construction and sanitation waste	• Develop and implement soil pollution prevention measures to include storage of chemicals, procedure for fuelling at the site and	Availability of soil pollution measures in the program of works	Contractor/ Supervision Consultant	WSTF NEMA
	• Ensure the waste oil, fuel, lubricants and other chemicals stores have an impervious surface	Number or availability of fuel and chemical stores with impervious surface	Contractor/ Supervision Consultant	WSTF
	• training workers on handling of the hazardous materials/wastes; provide appropriate tools/equipment for transfer of the hazardous materials	Training records and plans, attendance lists, number of workers trained	Contractor/ Supervision Consultant	NEMA

E & S impacts and their Sources	Proposed Mitigation Measure	Monitoring and Measurement	Responsible Entity	Supervising Agency
	• Regular maintenance of machinery to control leaks.	Program of equipment maintenance	Contractor/ Supervision Consultant	WSTF
	• Engage NEMA registered waste handler	Valid waste handler license and filled waste tracking sheets	Contractor/ Supervision Consultant	NEMA
	• Maintain spill response kits at the site.	Availability of a complete spill kit at the site	Contractor/ Supervision Consultant	WSTF
	• Use of drip trays when carrying out minor servicing of equipment and fueling at the site	Availability of operational drip trays at the equipment servicing area	Contractor/ Supervision Consultant	NEMA
Air pollution through generation of excess dust **Nuisance to neighbors** **Impaired visibility;** Construction activities including Clearing vegetation, grading, and excavation works, use of cement, movement of vehicles and equipment. Wind blowing on bare surfaces and potential dust storms **Demolition works**: Removal of old, worn-out infrastructure or equipment	• Sprinkle water on dusty surfaces to suppress dust at the site and when working near dust sensitive receptors	Evidence of watered working areas where applicable	Contractor/	WSTF NEMA
	• Equip workers who are directly in the location where dust is dispersed with dust masks.	Number of workers with appropriate dust masks	Contractor	
	• Training the workers on air quality hazards	Air Quality Training included in the EHS staff induction Training records	Contractor Supervision Consultant	

E & S impacts and their Sources	Proposed Mitigation Measure	Monitoring and Measurement	Responsible Entity	Supervising Agency
Exhaust emissions from vehicles, including particulate matter (PM), carbon monoxide (CO), and nitrogen oxides (NOx), can contribute to air quality deterioration and pose health risks	• Scheduled maintenance of the machinery to reduce emissions including carbon monoxide, oxides of nitrogen.	Evidence of site-specific equipment planned maintenance schedule	Contractor/ Supervision Consultant	WSTF NEMA
Noise and vibrations Material transportation: Movement of trucks and loaders. Excavation and construction: Digging and concrete works. Use of powered equipment. Borehole testing: Noise from pump flow tests.	• All Construction near noise sensitive receptors like schools, hospitals and residential houses should implement measure to minimise production of extra noise.	Noise control measures included in the program of works	Contractor/ Supervision Consultant	NEMA County Department of Environment
	• 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.	Relevant planned maintenance scheduled of the equipment available at the site Noise rating of the equipment	Contractor/ Supervision Consultant	
	• Pneumatic drills and other noisy appliances should not be used after normal working hours.	Evidence of no night working policy at the site	Contractor/ Supervision Consultant	
	• Workers exposed to occupational noise 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.	Number of workers working in noisy environment with appropriate PPE for noise	Contractor/ Supervision Consultant	
	• The public should be informed that short periods of noise may be inevitable but prior warning of when noisy activities 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.	Noise warning signs where applicable, evidence of noise agenda in the community consultation meeting	Contractor Supervision Consultant	

E & S impacts and their Sources	Proposed Mitigation Measure	Monitoring and Measurement	Responsible Entity	Supervising Agency
Loss and disturbance of the vegetation Introduction of alien invasive species Site clearing, Excavation works, and pipeline laying disrupt habitats. Movement of vehicles on the vegetated areas	• Mature trees and vegetation outside project site will not be cleared.	Evidence of Measures implemented to avoid clearing mature trees and vegetation outside project site	Contractor/ Supervision Consultant	Kenya Forest Service/ NEMA/ County Department of Environment
	• No use of herbicides/ pesticides for vegetation clearing	Evidence of proper methods applied to clear vegetation		
	• Re-vegetation of disturbed areas with native plant species.	No of tree seedling planted		
	• Control of invasive alien plant species through monitoring and physical/manual removal of invasive species as they appear as well as routine cleaning of newly deployed machines to the sites	Availability and implementation of measures to identify and control alien species		
Disruption of existing minimal fauna in the project area through excavation, vegetation clearing, and pipeline laying activities	• Avoid clearing mature trees that are important habitats for birds and other small animals	Evidence of Measures implemented to avoid clearing mature trees and vegetation outside project site	Contractor/ Supervision Consultant	Kenya Forest Service/ Kenya Wildlife Service
	• Create awareness among project staff (esp. plant operators) and local community on animal welfare and against animal harassment.	No of workers sensitized on protection of animals	Contractor	Kenya Wildlife Service
	• Protection of the encountered wild animals	Availability, Awareness and implementation of measures to protect stray animals	Contractor	Kenya Wildlife Service
	• Engage the road authority where the project will undertake road crossing and	Evidence of consultation with relevant road	Contractor/ Supervision Consultant	Kenya Highways Authority (KeNHA)

E & S impacts and their Sources	Proposed Mitigation Measure	Monitoring and Measurement	Responsible Entity	Supervising Agency
Traffic incidents and accidents Increased vehicles: More construction and supply vehicles on local roads. Narrow roads: Existing roads unable to accommodate increased traffic. Construction activities: Blockage or diversion of roads during works. Heavy equipment: Slow-moving machinery disrupting traffic flow.	use of road reserve. • Excavation of trenches should be carried in consultation with the concerned road authorities.	departments and agencies where applicable		Kenya Rural Roads authority (KERRA) County Government of Turkana
	• Erect warning signs of on-going works when pipeline crosses the road.	Availability of appropriate safety signs at the road crossing point	Contractor	County Government of Turkana
	• Adequate care/caution is taken so as not to cause any hindrance to the movement of traffic.	Traffic (vehicle, human and livestock) control measures where applicable	Contractor	County Government of Turkana
	• Alternatives access ways should be communicated to the community where road cutting is taking place	Number and condition of the provided alternative routes	Contractor	County Government of Turkana
Short-term disruption of community activities Excavations along home accesses, business access and roads.	• Implement the stakeholder engagement plan to ensure timely project information sharing with the community and stakeholders. • Alternatives access ways should be communicated to the community.	Community consultation plan, Number of consultation meetings	Contractor/ Supervision consultant TURWASCO/TURUWASCO	TURWASCO/TURUWASCO
	• Hoarding and installation of safety signs on road crossings.	Number of appropriate road signs installed	Contractor/ Supervision consultant TURWASCO/TURUWASCO	
	• Provide diversions or temporary passages where roads are closed due to works. • Provide temporary accesses to business and homes on excavated sections.	Number and condition of the provided alternative routes	Contractor/ Supervision consultant TURWASCO/TURUWASCO	

E & S impacts and their Sources	Proposed Mitigation Measure	Monitoring and Measurement	Responsible Entity	Supervising Agency
Labour conflicts and forced labour Recruitment and pay conflicts, working conditions and forced labour	• Implement site Labor Management Procedures (LMP) for the project based on the project LMP	Availability of the site specific LMPs	Contractor supervision consultant	WSTF
	• Contractors to be trained on the LMP for the project before site mobilization	Training records and attendance list	supervision consultant	WSTF
	• Developing and implementing criteria (skills and qualifications) for all positions due for recruitment.	Availability of recruitment criteria Number of workers engaged through the criteria	Contractor	WSTF
	• All the project workers to undergo induction and to be engaged formally via contract with start date, end date, job description, wage, disciplinary measures among others	Formal contracts the workers Number of workers with contract	Contractor	WSTF
	• Documenting relevant worker information including terms of employment.	Well documented worker information	Contractor	
	• Ensure equal opportunity and fair treatment during recruitment.	Formal commitment by the consultant to offer equal opportunities Number of workers recruited through transparent process	Contractor	
	• Protection of workers' legal right to form unions or other workers' organizations of their own choosing and to bargain collectively with their employers.	Human Resource Policy with workers' rights	Contractor	

E & S impacts and their Sources	Proposed Mitigation Measure	Monitoring and Measurement	Responsible Entity	Supervising Agency
	• No employment of underage persons (under 18 years).	ID for all the employed persons Evidence of no child engaged	Contractor	
	• Implement the workers grievance mechanism for all direct workers and contracted workers.	Availability of GRM that is relevant to Loturtur site	Contractor	
	• Compliance to labour relations practices as provided for by Kenya legislations and International Labour Organisation (ILO)	Legal register for the lot	Contractor	
	• Advertising at the local villages and markets for any position that needs to be filled; and	Number of job adverts placed in the chief's office or common public area	Contractor	
	• Sub-contractor requirement to submit a past forced labor performance declaration, and a declaration of ongoing Bidder commitment to prevent, monitor and report on any forced labor.	Evidence of submitted forced labor performance declaration	Contractor	
	• Include in contracts with subcontractors/ suppliers/ manufacturers of materials (pipes, fittings, solar panels and equipment) obligations to prevent Forced Labor among the staff, employees, workers and any other person employed or engaged by the Subcontractor/ supplier/ manufacturer.	Formal commitment to prevent forced labour	Contractor	
Potential tension/conflicts between local	• Prioritize local labour force.	No of workers from Loturtur area employed in the project	Contractor/Supervision consultant	WSTF

E & S impacts and their Sources	Proposed Mitigation Measure	Monitoring and Measurement	Responsible Entity	Supervising Agency
communities and incoming workers over jobs, resources, or land. Influx of workers leading to the spread of infectious diseases Increased competition for local resources: food, water, and other community resources. Social tensions: Unresolved workers grievances Hiring of workers outside the project area Increased demand on infrastructure: Strain on local transport, sanitation, and healthcare facilities. Cultural disruption: Cultural differences between workers and the local community			TURWASCO/TURUWASCO	
	• Regular community engagements.	No of community engagements	Contractor/ TURWASCO/TURUWASCO	WSTF
	• Regular community and project workers training, awareness and sensitization on HIV/AIDS.	Training Plan Number of the workers trained.	Contractor/ TURWASCO/TURUWASCO	WSTF
	• Implement clear and culturally sensitive GM and SEAH/GBV procedures at the project site.	Clear and culturally sensitive GM and SEAH/GBV procedures at the project site.	Contractor/ TURWASCO/TURUWASCO	WSTF
	• Provide adequate and appropriate welfare conveniences for the staff- including washrooms, rest area and changing room	Number of sanitation conveniences and changing rooms for both genders Appropriate rest area	Contractor/ TURWASCO/TURUWASCO	WSTF
	• Ensuring that children and minors are not employed directly or indirectly on the project.	Policy against child labour, Identification Numbers for all the employees	Contractor/ TURWASCO/TURUWASCO	WSTF
Insecurity Existing Intra and inter community conflict Unresolved project, land and intertribal conflicts	• Prepare and implement a site Security Management Plan (SMP) in accordance with project Security Management Plan and SOPS.	Availability of approved site specific SMP.	Contractor/ TURWASCO/TURUWASCO	WSTF County Government of Turkana
	• The site specific SMP must be cleared by the E&S Team at the CPU before site mobilization		Contractor/ TURWASCO/TURUWASCO	WSTF

E & S impacts and their Sources	Proposed Mitigation Measure	Monitoring and Measurement	Responsible Entity	Supervising Agency
	• Have sufficient emergency response plan before mobilizing to the field			
	• Use the county and community as entry points before mobilizing to the field	Evidence of consultation with CC	Contractor/ TURWASCO/TURUWASCO	WSTF
Occupational Safety and Health (OSH) hazards Physical hazards: slips, trips, falls, and injuries from machinery or tools. Exposure to intermittent and occupational noise, dust, heat and chemicals, exposure to harsh climatic conditions, manual handling hazards, electrical hazards: Risks from installing solar panels and working with electrical systems, fall from height heights, falling objects hazards during steel tank erection Poor sanitary facilities may result in waterborne or communicable diseases. Traffic incidents and accidents at the site	• Develop and implement a site-specific Health and Safety Action Plan based on the project Health and Safety Action Plan	Availability and implementation progress of the HSAP	Contractor/ Supervision consultant	DOSHS
	• Register the construction site with DOSHS	Valid construction workplace certificate from DOSHS	Contractor	
	• Undertake an appropriate Health and safety risk assessment and submit the report to DOSHS Turkana	DOSHS signed copy of RA report	Contractor	
	• Induction of workers on health and safety before commencing works	Number of workers inducted	Contractor	
	• Engage a qualified and competent health and safety officer for the lot	Qualification of the Health and safety officer at the site	Contractor	
	• Ensure there are trained first aider and fire Marshalls	Number of trained first aider and fire marshals	Contractor	
	• Conduct daily toolbox talks	Records of Tool Box Talks	Contractor	
	• Provide appropriate personal protective equipment (PPE) to workers and training on appropriate use. (Reflective jackets, helmets, face masks, ear plugs gloves, safety boots, etc.)	No of workers with appropriate PPEs	Contractor	

E & S impacts and their Sources	Proposed Mitigation Measure	Monitoring and Measurement	Responsible Entity	Supervising Agency
	• There should be adequate provision of the requisite sanitation facilities for human waste disposal	Clean and convenient sanitation facilities	Contractor	
	• Recording of all injuries that occur on site in the incident register, corrective actions for their prevention are instigated as Appropriate	Availability of incident register at the site Well filled incidents	Contractor	
	• The contractor should have a WIBA insurance policy to cushion self and workers against loss of income or an accident on site	Workers with WIBA	Contractor	
	• Ensure that all site personnel are provided with an adequate supply of safe drinking water, which should be at accessible points at all times.	Number of water points for the workers	Contractor	
	• Provide conveniently accessible, clean, orderly, adequate and suitable washing facilities within the site.	Clean and convenient sanitation facilities	Contractor	
Community Health and Safety Traffic accidents and incidents. Noise Nuisance from Construction activities Dust and air pollution: Excavation and material handling can affect air	• **Ensure the safety of residents by providing safety signs at strategic places around the access roads.**	No of road appropriate safety signs provided	Contractor/ Supervision consultant E & S Specialists TURWASCO/TURUWASCO	
	• **All trenches must be barricade using the appropriate safety tape** •	Trenches with barricading tape		
	• **Cordoning off working sites to protect the public or unauthorized persons**	Area cordoned off		

E & S impacts and their Sources	Proposed Mitigation Measure	Monitoring and Measurement	Responsible Entity	Supervising Agency
quality, leading to respiratory issues. Spread of diseases: Interaction between workers and the community may increase the risk of communicable diseases. open trenches, unprotected construction area, and unsecured equipment pose safety risks to nearby residents and livestock Structural hazards: Poorly constructed facilities, such as water kiosks or tanks, may lead to accidents post-construction. Disruption of services: Temporary interruptions in water supply or access due to pipeline works.	• **Use of signs and warnings on sites with high risks such as the elevated tank site**	Number of appropriate safety signs installed at the construction site		
	• **Reduce unnecessary speeding to control for accidents from the movement of pedestrians or livestock in the area.**	Speed limit at the site and within the project area		
	• **The elevated water tank to be installed a safe distance from human activities or property**	Evidence of the consideration of community settlement in tank design		
	• **The design and construction of the elevated steel tank to consider the changes in wind force in the area.**	Approved design and construction methods		
Sexual exploitation and harassment (SEA-H) Potential SEAH risk among the workers at the project site Workers may take advantage of power imbalances to exploit local	• Engage competent GBV / social safeguard officer	• Qualification of the GBV / social safeguard officer • Number of incidences (both reported and unreported), their investigation, solution and closure	Consultant Contractor/Supervision Consultant Local Community Leaders TURWASCO/TURUWASCO SEAH Expert	MoWSI WSTF

E & S impacts and their Sources	Proposed Mitigation Measure	Monitoring and Measurement	Responsible Entity	Supervising Agency
women or vulnerable individuals in the project area Lack of reporting mechanisms: Without proper channels, victims of SEAH or GBV may not report incidents due to fear of retaliation or lack of support.		according to the SEAH Response Plan	MOWSI	
	• Conduct SEA-H sensitization to the workers during induction	No of workers sensitized		MoWSI WSTF
	• Background checks for the workers, subcontractors and suppliers.	Well documented procedures for background checks		MoWSI WSTF
	• Conduct SEA-H sensitization to the community in the project area	No of community sensitization meeting		MoWSI WSTF
	• Ensure all the workers signs the CoC developed for the project and sensitization of staff on responsibilities related to the COC and consequences of non-compliance; project-level IEC materials;	Number of the signed CoC		MoWSI WSTF
	• Implement the project SEAH action plan with an Accountability and Response Framework as part of the C-ESMP.	Level of the SEAH plan implementation at the site		MoWSI WSTF
	• Response to SEA-H: including survivor-cantered coordinated multi-sectoral referral and assistance to complainants according to standard operating procedures	Effective SEAH response plan		MoWSI WSTF
Infringement of Children rights	• Domesticate the Labor Management Procedures (LMP) as part of the CESMP;	Level of the LMP implementation at the site	Contractor, Consultant WSTF	County Children's Department

E & S impacts and their Sources	Proposed Mitigation Measure	Monitoring and Measurement	Responsible Entity	Supervising Agency
Engagement of children in construction works Sexual abuse of children in the project area by the project workers Exposing Drug and alcohol to children Workers working with the school	• Develop and implement a Children Protection Strategy that will ensures minors are protected against negative impacts associated by the Project.	Availability and implementation status of Children Protection Strategy for the Lot	Contractor, Consultant WSTF	
	• Training and signing of CoC by the project team • sign, committing themselves towards protecting children, which clearly defines what is and is not acceptable behaviour;	Number of workers trained on and signed CoC	Contractor/ Supervision consultant	
	• Children under the age of 18 years shall not be hired on site as provided by Child Rights Act (Amendment Bill) 2014.	No of the workers with national identification card numbers at the site	Contractor/ Supervision consultant	
Infringement on Vulnerable and Marginal Groups (VMGs) rights Exclusion of vulnerable groups from consultations and inclusion in designs Failure to implement the Stakeholder Engagement Plan (SEP)	• Schedule meetings at convenient times and locations to accommodate women, persons with disabilities, and other vulnerable groups.	Plan of public consultation that is appropriate for community	Contractor/ Supervision consultant	
	• Focused engagements with the vulnerable groups. This will include dedicated consultations with the PWDs to understand their needs.	Number of VMGs identified and number of consultation	Contractor/ Supervision consultant	
	• Apply universal design in infrastructure to ensure accessibility for persons with disabilities to the water points.	Design that is user friendly to PWD	Supervision consultant	
	• Ensure that consultations are culturally appropriate, accessible, including the use of sign language interpreters, braille, and vernacular languages.	Site specific GRM Involvement of site GRC	Supervision consultant	

E & S impacts and their Sources	Proposed Mitigation Measure	Monitoring and Measurement	Responsible Entity	Supervising Agency
Water losses through Water system leaks and loss of pressure Improper installation or maintenance, inadequate corrosion protection, stress from traffic and vibrations and overloading	• Develop and implement a predictive scheme maintenance plan including sectional meters and pressure management systems, Regular pipeline surveillance and Burst reporting and response mechanism • Prompt repair of detected leaks, and using high-quality pipes with appropriate materials. •	Availability of predictive scheme maintenance plan	TURWASCO/TURUWASCO Contractor/ Supervision consultant	
Depletion of groundwater resources due to over abstraction Over abstraction of ground water resources due to Excessive pumping Failure to comply with WRA	• Ensure there is water abstraction permit all the time	valid water abstraction permit	TURWASCO/TURUWASCO	WRA
	• Install the WRA approved telemetric meter and ensure monitoring of the yield.	Presence and/or number of working and calibrated telemetric meters	TURWASCO/TURUWASCO	WRA
	• Ensure quarterly payment of water use fee to WRA	Evidence of payment	TURWASCO/TURUWASCO	WRA
	• Promote efficiency in water use among the beneficiary communities through consultation	Number of sensitization meetings	TURWASCO/TURUWASCO	County Government of Turkana
	• Conduct regular borehole discharge and water quality analysis.	Water quality analysis reports	TURWASCO/TURUWASCO	
Contamination of water supply Exposure of water to pathogens at the storage facilities and from external sources	• The animal trough should be located at least 100m away from the boreholes. •	Approved design and construction with the animal trough located	Contractor TURWASCO/TURUWASCO	
	• Fencing and protection of the borehole from livestock and wild animals. • All the water tank areas should be fenced and have controlled entry	Well fenced and protected borehole area	Contractor TURWASCO/TURUWASCO	

E & S impacts and their Sources	Proposed Mitigation Measure	Monitoring and Measurement	Responsible Entity	Supervising Agency
Contamination of water sources by the livestock waste	• The borehole area should be manned and should have controlled access	Availability of the security personnel at the borehole area	Contractor TURWASCO/TURUWASCO	
	• Community health and safety awareness meetings	No of meeting	Contractor TURWASCO/TURUWASCO	
Outbreak and spreading of livestock diseases Presence of large herds of livestock at the watering area Animal movement: livestock moving between regions, spreading diseases and pests. **Lack of vaccination:** Insufficient vaccination programs leaving animals vulnerable.	• Regular disease surveillance by the veterinary department and community	No of disease surveillances undertaken	County Department of Livestock TURWASCO/TURUWASCO	
	• Sensitization of the community on disease spread, monitoring and control	No of meetings	County Department of Livestock TURWASCO/TURUWASCO	
	• Livestock disease management plan be put in place by the veterinary department to ensure disease incidences are promptly responded to and addressed	Livestock Disease management plan in place	TURWASCO/TURUWASCO	
Vandalism of the water supply equipment Damages and recovery of valuable materials from the project infrastructure.	• Sturdy fences and gates to limit access to vulnerable areas;	Well maintained fence	TURWASCO/TURUWASCO	
	• Proper lighting in public spaces to deter activity in darkness;	No of installed security lights where necessary	TURWASCO/TURUWASCO	
	• Ensure consistent follow-up with reporting and addressing vandalism to maintain deterrence;	Evidence of insecurity response measures at the scheme	TURWASCO/TURUWASCO	
	• Educational programs in schools to teach responsible behavior;	Number of the educational programs implemented	TURWASCO/TURUWASCO	

E & S impacts and their Sources	Proposed Mitigation Measure	Monitoring and Measurement	Responsible Entity	Supervising Agency
	• Public awareness campaigns about the harms of vandalism and supporting community policing.	Number of public awareness meetings	TURWASCO/TURUWASCO	
Water-related conflict Resource scarcity especially during the dry periods: Limited availability leading to tensions between users. Environmental changes: Climate change or natural disasters exacerbating resource shortages.	• Regular stakeholder engagements to facilitate open dialogue with community leaders and residents to address concerns and incorporate feedback into project design. • Community awareness campaigns through training communities about project safety protocols, emergency procedures, and reporting mechanisms;	Number of public awareness meetings	TURWASCO/TURUWASCO	WSTF County Government of Turkana
	• Develop and operationalize grievance redress mechanism;	Availability of site specific GRM, Grievances recorded, addressed and closed	TURWASCO/TURUWASCO	WSTF County Government of Turkana
	• Promoting equitable access to water resources and services;	Evidence of involvement of the communities in	TURWASCO/TURUWASCO	WSTF County Government of Turkana
	• Establishing systems to identify potential conflict triggers and respond proactively;	Effective GRM and SMP available at the site	TURWASCO/TURUWASCO	WSTF County Government of Turkana
	• Promoting responsible reporting and raising awareness of conflict issue; and	Number of public awareness meetings	TURWASCO/TURUWASCO	WSTF County Government of Turkana
	• Adopting the inter-community conflict resolution mechanisms; and			WSTF County Government of Turkana

Livestock diseases	Outbreak of Livestock Diseases	• Regular disease surveillance by the veterinary department and community • Monitoring of the livestock by the community/farmers • Sensitization of the community on disease spread, monitoring and control • Livestock disease management plan be put in place by the veterinary department to ensure disease incidences are promptly responded to and addressed	Department of livestock and veterinary/community	Number of disease surveillance conducted No of Sensitization meetings held A livestock disease management plan	Routine checks	Use internal capacity
Vandalism	Damages and recovery of valuable materials from the project infrastructure	• Sturdy fences and gates to limit access to vulnerable areas; • Using motion-activated lights to illuminate areas at night; • Proper lighting in public spaces to deter activity in darkness; • Ensure consistent follow-up with reporting and addressing vandalism to maintain deterrence; • Educational programs in schools to teach responsible behavior; • Locking gates and doors to restricted areas; and • Public awareness campaigns about the harms of vandalism.	TURUWASCO Community WWUAs	Fences with gates Security lighting Awareness creation activities	Monthly reporting on status	Use internal capacity
Ground water depletion	Excessive pumping	• The proponent should ensure it complies with the conditions of the water abstraction permit issued by WRA; • Monitor aquifer water levels; • Promote efficiency in water use among the beneficiary communities; and	TURUWASCO WRA	WRA permits and authorisations Monitoring of water quality	Quarterly	-

		• Conduct regular borehole discharge and water quality analysis.				
Water sharing Conflicts	Resource scarcity especially during the dry periods: Limited availability leading to tensions between users.	• Regular stakeholder engagements to facilitate open dialogue with community leaders and residents to address concerns and incorporate feedback into project design; • Develop and operationalize grievance redress mechanism; • Community awareness campaigns through training communities about project safety protocols, emergency procedures, and reporting mechanisms; • Promoting equitable access to resources and services; • Investing in education and skills development; • Establishing systems to identify potential conflict triggers and respond proactively; • Promoting responsible reporting and raising awareness of conflict issue; and • Adopting the inter-community conflict resolution mechanisms; and • Promoting equitable access to resources and services	TURUWASCO	Water Sharing Plan in place Reduction in conflict cases reported	Regular Checks	Use internal capacity
Decommissioning phase						
Disposal of waste	Contamination of soil Adverse human health Aesthetic degradation Ground water contamination Surface water contamination	• Appropriate Segregation of waste for proper disposal and reuse of other materials • Involvement of a NEMA Registered Firm for Hazardous materials	• Decommisioning Contractor	• Approved Decommissioning Plan	Through separate contract	

Fugitive Dust Management	Air pollution Nuisance to the community Impaired visibility; Adverse Human health- occurrence of RTIs	• 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	Adverse Human health Contribution to Greenhouse effect (global warming) Nuisance to workers and neighbors	• 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			
Noise	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			
Site Rehabilitation	Restoration of site	• Site revegetation through planting of indigenous trees		• Restoration Plan	Through separate contract

Table 3: Kangakimak Environmental and social monitoring plan

Activity	Monitoring and Measurement/Indicator	Frequency of Monitoring	Means of verification	Responsible
Preconstruction				
	Approved project design with that is not affecting private land owners	Before construction	Document review	Engineering consultant WSTF
	Valid allotment letters/title deeds for the scheme	Before commissioning/ handing over the scheme to TURWASCO		County Government Turkana
	Minutes of disclosure meeting, Agenda and attendance register	Before commissioning/ handing over the scheme to TURWASCO		County Government Turkana
	Compliance report	Before construction		WSTF
Construction				
Soil Erosion Control Monitoring	Number of soil erosion control measures in the program of works, amount of resources set for soil erosion control	Weekly Based on Activities	Site assessment	E&S Te Contractor E&S consultant E&S Sub PIU E&S PIU
	Project design that considers areas with minimal vegetation, Amount of vegetated area spared by the project	Before construction Weekly Based on Activities	Document review Site assessment	
	Number trenches that are backfilled and compacted	Weekly Based on Activities	Site assessment	
	Number of enforcement measures to ensure use of the existing routes during site access	Weekly Based on Activities	Site assessment	
Soil pollution prervention	Availability of soil pollution measures in the program of works	Weekly Based on Activities	Site assessment	E&S Te Contractor

Activity	Monitoring and Measurement/Indicator	Frequency of Monitoring	Means of verification	Responsible
	Number or availability of fuel and chemical stores with impervious surface	Monthly Based on Activities	Site assessment	E&S consultant E&S Sub PIU E&S PIU
	Training records and plans, attendance lists, number of workers trained	Monthly Based on Activities	Document review Site Assessment	
	Program of equipment maintenance	Weekly Based on Activities	Document review at the site	
	Valid waste handler license and filled waste tracking sheets	During and after dispatch of waste	Site assessment	
	Availability of a complete spill kit at the site	Based on Activities	Site assessment	
	Availability of operational drip trays at the equipment servicing area	Weekly Based on Activities	Site assessment	
Air pollution prevention	Evidence of watered working areas where applicable	Daily On need basis	Site assessment	E&S Te Contractor
	Number of workers with appropriate dust masks	Daily	Site assessment	E&S Te Contractor
	Air Quality Training included in the EHS staff induction, training records	Monthly	Document review at the site	E&S Te Contractor
	Evidence of site specific equipment planned maintenance schedule	Monthly	Document review at the site	E&S consultant E&S Sub PIU
Noise pollution prevention	Noise control measures included in the program of works	Before construction Monthly	Document review at the site	E&S Te Contractor
	Relevant planned maintenance scheduled of the equipment available at the site, noise rating of the equipment	Monthly	Document review at the site	E&S Te Contractor

Activity	Monitoring and Measurement/Indicator	Frequency of Monitoring	Means of verification	Responsible
	Evidence of no night working policy at the site	Monthly	Document review at the site	E&S Sub PIU E&S PIU
	Number of workers working in noisy environment with appropriate PPE for noise	Monthly	Site assessment Document review	E&S Te Contractor
	Noise warning signs where applicable, evidence of noise agenda in the community consultation meeting			E&S Sub PIU E&S PIU and PC
Minimal impacts on Flora and Fauna	Evidence of Measures implemented to avoid clearing mature trees and vegetation outside project site	Monthly	Site assessment Document review	E&S Te Contractor E&S Te consultant E&S Sub PIU E&S PIU and PC
	Evidence of proper methods applied to clear vegetation	Daily during construction	Site assessment Document review	
	Number of tree seedling planted	Monthly	Site assessment Document review	
	Availability and implementation of measures to identify and control alien species	Monthly	Site assessment Document review	
	Evidence of Measures implemented to avoid clearing mature trees and vegetation outside project site	Monthly	Site assessment Document review	
	No of workers sensitized on protection of animals	Monthly	Site assessment Document review	

Activity	Monitoring and Measurement/Indicator	Frequency of Monitoring	Means of verification	Responsible
	Availability, Awareness and implementation of measures to protect stray animals	Monthly	Site assessment Document review	
Measure to reduce Traffic Impacts	Evidence of consultation with relevant road departments and agencies where applicable	Before construction works	Site assessment	E&S Sub PIU E&S PIU and PC
	Availability of appropriate safety signs at the road crossing point	Daily during construction along the roads	Site assessment	E&S Te Contractor
	Traffic (vehicle, human and livestock) control measures where applicable	Daily during construction along the roads	Site assessment	E&S Te consultant
	Number and condition of the provided alternative routes	Weekly	Site assessment	Contractor
	Community consultation plan, number of consultation meetings	Before construction	Document review at the site	E&S Te Contractor
	Number of appropriate road signs installed	Daily	Site assessment	E&S Te consultant
	Number and condition of the provided alternative routes	Weekly	Site assessment	Contractor
Prevention of forced labour and labour related conflicts	Availability of the site specific LMPs at the construction site	Before site mobilization Throughout the construction	Document review at the site	E&S Sub PIU E&S PIU and PC
	Training records and attendance list	Monthly	Document review at the site	
	Availability of recruitment criteria, number of workers engaged through the criteria	Monthly On need basis	Document review at the site	E&S Sub PIU E&S PIU and PC
	Formal contracts for the workers Number of workers with contract	During site mobilization Throughout the construction	Document review at the site	E&S Sub PIU E&S PIU and PC

Activity	Monitoring and Measurement/Indicator	Frequency of Monitoring	Means of verification	Responsible
	Well documented worker information	Throughout the construction	Document review at the site	
	Formal commitment by the consultant to offer equal opportunities Number of workers recruited at the scheme through transparent process	Throughout the construction	Document review at the site	E&S Sub PIU E&S PIU and PC
	Human Resource Policy with workers' rights	Throughout the construction	Document review at the site	HR Contractor
	ID for all the employed persons, evidence of no child engaged	Throughout the construction	Document review at the site	HR contractor
	Availability of GRM that is relevant to project site	Throughout the construction	Document review at the site	E&S Sub PIU E&S PIU and PC
	Legal register for the lot allocated to the contractor	Throughout the construction	Document review at the site	E&S Sub PIU E&S PIU and PC
	Number of job adverts placed in the chiefs office or common public area at the project area	Throughout the construction	Site assessment	E&S Cotra
	Evidence of submitted forced labor performance declaration	Throughout the construction	Document review at the site	E&S Sub PIU E&S PIU and PC
	Formal commitment to prevent forced labour	Throughout the construction	Document review at the site	E&S Sub PIU E&S PIU and PC
Prevention of social tensions	No of workers from from the project area area employed in the project	Throughout the construction	Document review at the site	HR contractor
	No of members of community employed	Throughout the construction	Document review at the site	HR contractor
Prevention of SEAH GBV	SEA-H Training Plan, No of the workers trained.	Monthly	Document review at the site	GBV Expert PIU

Activity	Monitoring and Measurement/Indicator	Frequency of Monitoring	Means of verification	Responsible
	Clear and culturally sensitive GM and SEAH/GBV procedures at the project site.	Throughout the construction	Document review at the site	GBV Expert PCU
	Number of sanitation conveniences and changing rooms for both genders, appropriate rest area	Throughout the construction	Document review at the site	E&S Contractor
	Policy against child labour, Identification Numbers for all the employees	Throughout the construction	Document review at the site	E&S Sub PIU E&S PIU and PC
Maintaining site security	Availability of approved site specific SMP.	Throughout the construction	Document review at the site	E&S Sub PIU E&S PIU and PC
	Evidence of consultation with CC	Throughout the construction	Document review at the site	E&S Contractor
Workers Occupational Safety and Health (OSH) hazards	Availability and implementation progress of the HSOP	Throughout the construction	Document review at the site	E&S Sub PIU E&S PIU and PC
	Valid construction workplace certificate from DOSHS	Before Construction	Document review at the site	E&S Sub PIU E&S PIU and PC
	DOSHS signed copy of RA report	Before Construction	Document review at the site	
	Number of workers inducted	Throughout the construction	Document review at the site	Contractor
	Qualification of the Health and safety officer at the site	Throughout the construction	Document review at the site	Contractor
	Number of trained first aider and fire marshals	Throughout the construction	Document review at the site	E&S Contractor
	Records of daily Tool Box Talks	Throughout the construction	Document review at the site	E&S Contractor
	No of workers with appropriate PPEs	Throughout the construction	Document review at the site	E&S Te Contractor

Activity	Monitoring and Measurement/Indicator	Frequency of Monitoring	Means of verification	Responsible
	Clean and convenient sanitation facilities	Throughout the construction	Document review at the site	E&S Te Contractor
	Availability of incident register at the site Well filled incidents	Throughout the construction	Document review at the site	E&S Te Contractor
	Workers with WIBA	Throughout the construction	Document review at the site	HR Contractor
	Number of water points for the workers at project site	Throughout the construction	Document review at the site	E&S Te Contractor
Community Health and Safety	Clean and convenient sanitation facilities	Throughout the construction	Document review at the site	E&S Te Contractor
	No of road appropriate safety signs provided	Throughout the construction	Document review at the site	E&S Te Contractor
	Trenches with barricading tape	Throughout the construction	Document review at the site	E&S Te Contractor
	Area cordoned off	Throughout the construction	Document review at the site	E&S Te Contractor
	Number of appropriate safety signs installed at the construction site	Throughout the construction	Document review at the site	E&S Te Contractor
	Speed limit at the site and within the project area	Throughout the construction	Document review at the site	E&S Te Contractor
	Evidence of the consideration of community settlement in tank design	Before construction	Document review at the site	Supervision consultant
	Approved design and construction methods	Before construction	Document review at the site	Supervision consultant
Protection of Children rights	Qualification of the GBV / social safeguard officer Number of incidences (both reported and unreported), their investigation, solution and closure according to the SEAH Response Plan	Before construction	Document review at the site	E&S contractor E&S Consultant

Activity	Monitoring and Measurement/Indicator	Frequency of Monitoring	Means of verification	Responsible
	No of workers sensitized	Throughout the construction	Document review at the site	E&S Sub PIU, and PCU
	Well documented procedures for background checks	Throughout the construction	Document review at the site	
	No of community sensitization meeting	Throughout the construction	Document review at the site	
	Number of the signed CoC	Throughout the construction	Document review at the site	
	Level of the SEAH plan implementation at the site	Throughout the construction	Document review at the site	
	Effective SEAH response plan	Throughout the construction	Document review at the site	
	Level of the LMP implementation at the site	Throughout the construction	Document review at the site	E&S contractor E&S Consultant E&S Sub PIU, and PCU
	Availability and implementation status of Children Protection Strategy for the Lot	Throughout the construction	Document review at the site	
	Number of workers trained on and signed CoC	Throughout the construction	Document review at the site	
	No of the workers with national identification card numbers at the site	Throughout the construction	Document review at the site	
Protection of VMGs rights	Plan of public consultation that is appropriate for community	Throughout the construction	Document review at the site	E&S contractor E&S Consultant E&S Sub PIU, and PCU
	Number of VMGs identified and number of consultations	Throughout the construction	Document review at the site	
	Design that is user friendly to PWD	Throughout the construction	Document review at the site	

Activity	Monitoring and Measurement/Indicator	Frequency of Monitoring	Means of verification	Responsible
	Site specific GRM Involvement of site GRC	Throughout the construction	Document review at the site	
Operation				
Prevention of water contamination	Availability of predictive scheme maintenance plan			County Government Turkana
Underground water resource conservation	valid water abstraction permit	Quarterly	Document review	County Government Turkana
	Presence and/or number of working and calibrated telemetric meters	Quarterly	Site assessment	
	Evidence of payment	Quarterly	Site assessment	
	Number of sensitization meetings	Quarterly	Site assessment	
	Water quality analysis reports	Quarterly	Site assessment	
Ensuring the water is fit for human consumption	Regular Water quality reports that are meeting the standards for portable water	Quarterly	Site assessment	County Government Turkana
	Approved design and construction with the animal trough located	Quarterly	Site assessment	
	Well fenced and protected borehole area	Quarterly	Site assessment	
	Availability of the security personnel at the borehole area	Quarterly	Site assessment	
	No of meeting held with the community	Quarterly	Documents review	
Prevention of Livestock diseases	No of disease surveillances undertaken	Quarterly	Documents review	County Government Turkana
	No of meetings	Quarterly	Documents review	

Activity	Monitoring and Measurement/Indicator	Frequency of Monitoring	Means of verification	Responsible
	Livestock Disease management plan in place	Quarterly	Documents review	
Prevention of Vandalism	Well maintained fence	Quarterly	Documents review	County Government Turkana
	No of installed security lights where necessary	Quarterly	Documents review	
	Evidence of insecurity response measures at the scheme	Quarterly	Documents review	
	Number of the educational programs implemented	Quarterly	Documents review	
	Number of public awareness meetings	Quarterly	Documents review	
Prevention of water related conflicts	Number of public awareness meetings	Quarterly	Documents review	County Government Turkana
	Availability of site specific GRM, Grievances recorded, addressed and closed	Quarterly	Documents review	
	Evidence of involvement of the communities in	Quarterly	Documents review	
	Effective GRM and SMP available at the site	Quarterly	Documents review	
	Number of public awareness meetings	Quarterly	Documents review	
	Number of public awareness meetings	Quarterly	Documents review	

8.5 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.

8.5.1 Internal Monitoring

While the contractor will implement most mitigation measures in line with contract conditions, the ultimate responsibility for supervising and monitoring the implementation of the Environmental and Social Management Plan (ESMP) and compliance with Health, Safety, and Environment (HSE) requirements rests with the project proponent.

Compliance with ESMP implementation and HSE management will be assessed based on the Construction ESMP (CESMP), which the contractor must prepare before construction begins. The CESMP should reflect site-specific conditions and must be approved by the project proponent. It will include relevant sub-plans, such as:

- Erosion Control and Site Restoration
- Biodiversity Protection
- Air Quality Management
- Noise and Vibration Management
- Waste Management
- Traffic Management
- Health and Safety Plan
- Emergency Preparedness Plan

These plans must align with the mitigation measures recommended in the Environmental and Social Impact Assessment (ESIA).

Objectives of Internal Monitoring and Audits

- Identify gaps in the contractor's implementation of the ESMP.

- Ensure compliance with legal requirements under the Environmental Management and Coordination Act (EMCA) 1999.
- Guide the contractor's management of HSE requirements, particularly in addressing unforeseen impacts.

The project proponent will continue monitoring during the project's operation and decommissioning phases to ensure minimum allowable environmental parameters are maintained.

Monitoring Areas

- **1. Workforce Training**

The contractor must conduct induction training for workers, ensuring they are adequately trained in HSE management in addition to job-specific skills. The project proponent will monitor records of induction training and toolbox talks regularly. The contractor will also train site-specific HSE supervisors to enforce these requirements.

- **2. Accident Prevention and Health Management**

An independent HSE consultant will be hired by the project proponent to conduct regular audits of the contractor during project implementation. Site inspections will be carried out (as agreed with the contractor) to evaluate workforce management, accident prevention, and health practices.
The contractor's safety manager must ensure:

- Availability of appropriate safety signage.
- Provision of personal protective equipment (PPE) to workers at all times.

Key Indicators:

- Provision of adequate PPE at all project phases.
- Displayed safety warning signs at active sites.
- Adequate sanitation facilities at active sites.
- Community awareness of safety risks.
- Records of accidents/incidents.
- Reporting of health cases related to the project.

- **3. Soil Erosion and Conservation**

Construction activities, including excavation and transportation of materials, may cause soil erosion. The contractor must implement soil conservation and erosion control measures throughout the construction phase.

- **4. Noise Levels Monitoring**

Noise emissions, primarily from machinery, will occur during construction. The contractor must regularly monitor noise levels to ensure they remain within recommended limits. Engaging neighbouring communities will help assess the impact of noise.

- **5. Air Quality Protection**

The contractor must monitor dust and emissions from machinery, implementing measures such as:

- Watering active sites and roads.
- Maintaining machinery to reduce excessive emissions.
- Temporarily halting dust-generating activities during high winds.
- **6. Solid and Liquid Waste Management**

The contractor's HSE manager will monitor waste management at construction sites and campsites to ensure:

- Accurate records of waste types and quantities.
- Adequate and segregated waste management facilities.
- Containment of all waste within site boundaries.
- Availability of human waste disposal facilities.
- Proper disposal of waste at county-approved sites.
- **7. Biodiversity Monitoring**

Invasive species must be monitored as they appear, with timely control and physical removal to prevent further spread.

8.5.2 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.

8.5.3 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.

8.6 Grievance Management/Redress Mechanism

A Grievance Redress Mechanism GRM should be 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 will be 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;
- Failure to fulfil commitments;
- 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;

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

8.7 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 implementer.

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.

8.7.1 Institutional Framework for implementation of ESMP

8.7.1.1 E&S Organization

To support timely and effective implementation of environmental and social project components and mitigation measures, the ESMP draws on the ESIA's assessment of the existence, institutional arrangement / roles, and capability of environmental and social units on site or at the PCU at Ministry and at County levels. The ESMP should articulate the roles of such units, and where need be proposing the training of staff, to allow implementation of ESIA recommendations. Specifically, the ESMP should provide a specific description of institutional arrangements responsible for carrying out the mitigation and monitoring measures (e.g., for operation, supervision, enforcement, monitoring of implementation, remedial action, financing, reporting, and staff training).

8.7.1.2 Roles and Responsibilities

Implementing/ supervising Agency	*Title of the responsible staff*	*Responsibilities in the ESMP*
PCU	Environmental Specialist	- Monitor and report on compliance with the ESMF and ESMP. - Ensure that subproject investments are screened, and safeguard instruments are prepared, cleared, and disclosed. - Review subproject environmental performance and prepare quarterly monitoring reports. - Ensure that environmental mitigation measures are incorporated into works contracts. - Approval of the CESMP
	Social Specialist	- Monitor social risks and ensure compliance with social safeguards. - Facilitate community engagement and consultations as per the ESMP. - Track and report on social impacts and mitigation measures.
	GBV Focal Point	- Monitor and manage GBV-related issues in the project. - Ensure that GBV/SEAH prevention and response measures are integrated into the ESMP. - Report and follow up on GBV/SEAH incidents, ensuring corrective actions are taken.
PIU	Environmental Specialist	- Oversee and monitor environmental compliance at the subproject level. - Ensure that environmental mitigation measures are effectively implemented by contractors. - Provide guidance to contractors on environmental safeguards and practices. - Monitor and report on the implementation of the ESMP.

Implementing/ supervising Agency	*Title of the responsible staff*	*Responsibilities in the ESMP*
	Social Specialist	- Ensure compliance with social safeguards at the subproject level. - Monitor and report on the implementation of social mitigation measures. - Facilitate community consultations and social impact assessments. - Support the preparation and monitoring of RAPs (if applicable).
Sub PIU	Environmental Specialist	- Monitor the implementation of ESMPs at the subproject level. - Ensure compliance with national and World Bank environmental policies. - Ensure contractors' adherence to the EHS management plan and ESMP. - Report on environmental impacts and mitigation efforts to the PIU.
	Social Specialist	- Oversee the implementation of social safeguards at the subproject level. - Conduct community engagement activities and ensure stakeholder involvement. - Monitor social impacts and track the effectiveness of mitigation strategies. - Report on social issues, including land acquisition, resettlement, and community concerns.
	GBV Focal Point	- Ensure that GBV/SEAH prevention and response measures are followed at the subproject level. - Track and report any GBV/SEAH incidents, ensuring prompt response and mitigation. - Conduct training and awareness programs on GBV issues for project stakeholders.

Implementing/ supervising Agency	*Title of the responsible staff*	*Responsibilities in the ESMP*
Engineering and ESIA consultant	Team Leader	- Oversee the preparation and review of ESIA and ESMP documents. - Provide technical guidance on environmental and social risks, and mitigation strategies. - Ensure that the ESMP is effectively integrated into subproject planning and execution. - Lead the preparation of monitoring and evaluation reports for the ESMP.
	EHSS Specialist	- Support the implementation of environmental, health, safety, and social safeguards. - Ensure compliance with environmental regulations and mitigation measures during construction. - Monitor environmental and social performance during the operational phase. - Provide recommendations for improvement in environmental and social management. Incident Reporting
	Social Specialist	- Ensure that social safeguards are incorporated into the ESMP. - Monitor social impacts and mitigation measures during project implementation. - Facilitate community consultations, grievance redress, and public participation in project activities.
Contractor	Project Manager	- Ensure the implementation of the ESMP and safeguard measures at the project site. - Coordinate with the PIU and consultants for regular reporting and compliance. - Oversee contractor compliance with the environmental and social clauses in the contract.

Implementing/ supervising Agency	*Title of the responsible staff*	*Responsibilities in the ESMP*
		- Ensure timely submission of monthly progress reports, including ESMP implementation status.
	EHS Manager	- Oversee the environmental, health, and safety management systems on site - Ensure that the project complies with all environmental, health, and safety regulations and standards. - Implement EHS risk management strategies and monitor their effectiveness. - Report on EHS compliance and any incidents or accidents.
	Project sociologist	- Manage and implement community engagement activities. - Monitor social risks and ensure the implementation of social mitigation measures. - Support grievance redress mechanisms and address any social issues arising during the project. - Report on social impacts and ensure that the community's concerns are addressed effectively.

8.7.1.3 E & S Management Plans

Effective implementation of the Environmental and Social Management Plan (ESMP) is crucial for ensuring that potential environmental and social risks and impacts identified during the ESIA study, are mitigated and managed throughout the project lifecycle. This section outlines specific Environmental and Social (E&S) Management Plans that provide a structured approach to manage identified risks and impacts systematically and sustainably. Each plan specifies clear objectives, responsibilities, timelines, and monitoring mechanisms to address all aspects of environmental and social performance. These E&S plans align with international standards, including World Bank's Performance Standards and other relevant regulatory requirement. The overarching goal is to promote positive environmental and social outcomes while minimizing adverse effects, ensuring compliance, and fostering transparency and accountability.

These E&S Management Plans include:

1. Construction Occupational Safety & Health Measures;
2. Security & Community Safety Management -Measures;
3. Pollution Prevention measures;

4. Traffic Management;
5. Waste Management;
6. Emergency Preparedness and Response;
7. Employment and Training;
8. Stakeholders Engagement;
9. Labour Influx Management Strategy;
10. Grievance Redress Mechanism;
11. SEA and GBV action measures;
12. Chance Find Procedures; and
13. Child protection strategy.

8.7.1.4 Costs of ESMP Implementation

The ESMP for Loturtur Water Supply Scheme is not costed since the tender documents for the project will require the contractor to incorporate environmental and social obligations into their rates, as such certain ESHS obligations will be implemented at no additional costs to the contract sum. However, all the water schemes will be allocated resources to ensure implementation of the SEAH prevention Action Plan, Stakeholders Engagement Plan, Grievance Redress Mechanism and Sensitization of HIV/AIDS during construction.

8.7.1.5 Emergency Contacts

Before the commencement of the proposed project, it is essential to have an emergency contact list that encompasses key stakeholders, authorities and institutions to ensure quick response and coordination. Below is a list of key contacts to have:

Security Agencies

- Turkana County Commissioner & Turkana central Sub-County Commissioner
- Area OCS
- Loreamatet Police Station
- Area Chief and Asst Area Chief
- Village Elders (Mzee wa mitaa)

Emergency Services

- Turkana County Referral Hospital Ambulance Hotline
- Turkana County Government. Fire Department
- Loreamatet Health Dispensary and the settlements health centres

Govt Institutions

- TURWASCO
- Snr Hydrologist WRA
- DOSHSs Office Hotline
- NEMA Hotline

Contractor

- Health and Safety Officer
- First Aid Marshalls for each section
- Fire Fighters for each section
- WIBA Insurance Number (to notify immediately in case of incidence)

9 Projects Climate Change Mitigation and Adaptation

9.1 Background

Climate change creates several challenges for the water and sanitation sector, because infrastructure systems are highly vulnerable to weather and climate variations. Climate impacts due to the occurrence of extreme weather events include impacts on infrastructure lifetime and capacity. Although water supply systems and their infrastructure are designed to withstand typical weather patterns, the impacts of current climate change and those arising in the short, medium, and long term can influence the infrastructure itself, the efficiency of the network, operations, and the ability of the infrastructure to withstand extreme events outside the "typical" range. This indicates that infrastructures not only need to be reliable when submitted to standard load, but also be able to minimize the magnitude and duration of failures under exceptional conditions such as increased rainfall intensity, changes in precipitation patterns, and more extreme weather events.

The majority of the impacts to water supply systems are caused by heavy downpours and subsequent erosion and flooding. The main hazards noted along the project area are related to:

1. Water quality;
2. Water quantity;
3. High operations and maintenance costs;
4. Flooding;
5. Washouts; and
6. Erosion

To mitigate and adapt to the climate impacts, a number of strategies are proposed:

9.2 System Efficiencies

Development of a highly efficient water supply system that will reduce non-revenue water (NRW), i.e. leakage, metering errors and water theft, metering of water consumption to ensure balance between access and compensation, and installation of sectional meters to support system monitoring and regulation and promote leak detections and timely repairs.

9.3 Pipe type

The project will use HDPE (High Density Polyethylene) pipes which are produced in 100M lengths, this will reduce the jointing between pipes and the potential risks of water ingress due to saturated soils due to heavy rainfalls.

9.4 Depth of water pipelines

All conveyance and distribution pipelines will be laid at a minimum depth of 1000mm, backfilled with the excavated soils to ordinary ground level and compacted to consolidate the soils.

9.5 Catchment protection

The proponent in conjunction with Kenya Forest Services to promote catchment revegetation; borehole site, storage areas and other suitable sites to ensure that the infrastructure risks of overtopping and flooding are mitigated.

9.6 Slope protection measures

In pipeline sections with high grades to be protected with gabions, erosion control blankets and turf reinforcement mats, which can also be used for ditch protection, surface roughening, slope drains, gabion structures. Slopes will be protected to ensure that the risks of failures are minimized so as to protect the pipelines.

9.7 Clean Energy

The project during construction will adopt clean energy mechanisms for its energy requirements especially for office and residential energy demand. This will include solar energy, skylights and energy conservation training and sensitization.

9.8 Training and Awareness

Climate change training will focus on teaching project workers and communities about the science, causes, impacts, and solutions related to climate change. It aims to help individuals understand the complex nature of climate change, and to empower them to take action to mitigate and adapt to its effects both at work place and at their private spaces. Training will focus on raising the understanding of workers and communities on how to tackle the consequences of global warming, encourages them to change their behaviors and helps them to adapt to what is already a global emergency by reducing water usage and the consequent household total water demand.

10 Conclusions and Recommendations

10.1 Conclusion

This ESIA report has been prepared to offer comprehensive and relevant information on the proposed Loturtur Water Supply Scheme Project to facilitate NEMA's review, assess the project's sustainability, and determine whether its activities may pose significant environmental and social impacts. The report outlines mitigation measures for the identified impacts and includes an ESMP detailing the proposed implementation strategies. The ESMP serves as a practical tool for the WSTF Project Team and the Contractor throughout the project's lifecycle. To ensure responsibilities for implementing the findings and recommendations of this ESIA are properly distributed, the ESMP will be incorporated into the Conditions of Contract and Bills of Quantities where applicable. The Project Proponent—WSTF—is responsible for ensuring these measures are reflected in all relevant documentation, including Tender Documents.

The expectation is that the Project ESMS will effectively mitigate the impacts associated with the development. The Project's impact on the physical environment will generally be manageable and primarily limited to short-term construction-related activities, which will be mitigated accordingly. Mitigation strategies have been laid out in the ESMP matrix in Chapter 8 for implementation across different project phases. Considering the Environmental Assessment conducted for this Project and its strong economic rationale, the Project complies with environmental protection standards, provided the mitigation, monitoring, and reporting plans are adhered to.

The environmental and social impact assessment has been conducted in compliance with national legislative requirements, county regulations, World Bank Operational Policies, and World Bank Group EHS guidelines. The study included site visits, surveys of baseline environmental and social conditions, biodiversity assessments, stakeholder consultations, and an analysis of potential project interventions. The experts evaluated potential environmental impacts related to all project aspects.

Feedback from public participation and stakeholder engagements indicates broad support for the project. There are no significant obstacles preventing the proposed water supply project from moving forward, provided the recommended mitigation measures and the ESMP are effectively implemented and integrated into the final engineering design and construction phases. The ESIA study team's recommendations are detailed in the following section.

10.2 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.

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CIDP 2023-2027 Turkana County

Assessing Labour Productivity for Turkana County No. 58/2023-2024 KIPPRA

Turkana County Water Resources Factsheet A 3R and MUS Analysis

Exploring Kenya Inequality Turkana County KNBS

Turkana County Water Resources Factsheet

County Climate Change Action Plan 2023-2027 Turkana County Government

11 Appendices

11.1 Appendix B: KII Consultation Log

CAS CONSULTANTS LTD
CONSULTING ENGINEERS AND ENVIRONMENTALISTS
1st Floor, Le'Mac Building, Church Road, Off Waiyaki Way, Westlands
P.O. Box 20023- 00200, Nairobi, Tel: +254 020 4445265, +254722829554
E-mail: info@casconsultants.co.ke/casconsult@africaonline.co.ke

FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs) (PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHABILITATION AND EXPANSION OF GROUND WATER –BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF MARSABIT AND TURKANA

STAKEHOLDER CONSULTATION LOG – K.I.I

No.	Name	Organisation	Signature
1.	Samson K. Kabala	WRA	
2.	ALFRED LEMAIYAN	DIRECTOR-P.H	
3.	Lukas Ekete	MOH	
4.	Eliud Ebenyo	Gender Department	
5.	Amos Abong	LABOUR	
6.	DAVID MANA	M.O.E CDE OFFICE	
7.	EZEKIEL ICHOR	DIRECTOR-ECDE-EDUCATION-EDUCATION	
8.	JAMES OSEWA	Children's Dept.	
9.	MARK EKULAM	DCS	
10.	Joseph Nyaunga	DOL	
11.			

AN ISO 9001:2015 CERTIFIED COMPANY

ISO 9001 BUREAU VERITAS Certification

11.2 Appendix C-1: Minutes of the meeting

MINUTES OF PUBLIC CONSULTATION MEETING FOR ESIA STUDY FOR THE REHABILITATION AND EXPANSION OF GROUND – WATER BASED RURAL WATER SUPPLY SYSTEMS IN TURKANA COUNTY HELD ON 3RD DECEMBER 2024 AT LOTURTUR BOREHOLE POINT FROM 9.40AM TO 11.00AM.

Participants; i. The community	See attached attendance log
ii. Consultant	Kibet Koech Sheila Akinyi - Sociologist
iii. Technical team (TCG)	Jacob Mutua – Principal Environmental Officer, Turkana County John Ewoi – Water officer, Turkana Central.
iv. Assistant consultant	Winnie Gachohi - Environmentalist

1. Agenda of the meeting

The agenda was as follows:

a. Opening remarks
b. Introduction of the consultants
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 village administrator, Ms Myline called the meeting to order at 9.40am and requested a resident to open with a word of prayer. She proceeded to welcome the area chief to take over the meeting and present the agenda of the meeting to the residents. The chief, after a brief introduction of all present welcomed Mr. John Ewoi, the subcounty water officer to give a brief description of the project scope. He then called on the consultant to take over the meeting.

3. Project description

The consultant allowed the Turkana County Principal Environmental Officer, Mr. Jacob Mutua to give his comments first. He 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. He stated that the Act provides for environmental protection through processes such as Environmental Impact Assessment, which was currently being undertaken.

The consultant thanked all present for agreeing to participate in the ESIA process. 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. The consultant retaliated the words of the water officer and emphasized about the project's nature and objectives.

The consultant also proceeded to give a brief outline of the projects anticipated environmental and social impacts. 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.

At this point, the discussion was opened for questions and issues of concern.

4. ESIA process (EIA consultant)

Considering the anticipated environmental and social impacts of the project, evaluated in terms of severity, reversibility, longevity, and geographical scope, it has been determined that the water supply scheme requires a comprehensive Environmental and Social Impact Assessment (ESIA). This study will facilitate a detailed identification and analysis of potential impacts and guide the development of appropriate mitigation and enhancement measures.

5. Plenary Discussions

The meeting then progressed to an interactive session moderated by Winnie Gachohi whereby the residents of Loriamatet 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	**Issues/comments raised**	**Responses**
Loriam Erogo (chairman of water committee)	Thanked the experts for the informative session	
	The current water yield for each borehole was not sufficient and the project was welcomed as it would help fix their shortage issue.	Standard pipes will be used. Where water pressure is an issue, pressure release values will be installed.
	What measures would be put in place to ensure the project does not fail as witnessed in the previous projects.	Due processes were being followed to ensure the project is sustainable.

Participants name	Issues/comments raised	Responses
	Will there be job opportunities for the local people?	Yes, Local residents will be considered.
	When will the proposed project start?	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.
Sheila Kinyo	Will the contractor import the resources needed or will utilize what is readily available in the area?	The contractor will be adviced to source locally all available resources such as sand as a way of improving the locals livelihoods.
	Contractors are known to introduce vices within the community such as alcoholism. What will be done to ensure the moral fabric of the community is protected?	The contractor has to have a labour management plan that includes the code of conduct for all its employees. This will be enforced to protect the community.
	Job opportunities available, consideration for women and the youth to be prioritized. Equal chances for all members of the community.	The recommendations will include prioritizing employment opportunities for local residents including women.
John Nanok	In case of a pipe passing through cultural area such as grave, what will be done?	Areas of cultural importance need to be identified and protected from destruction. In such cases proper readjustments should be made by the contractor.
David Echom	What is he arrangement to offer safety awareness for the local people?	The consultant highlighted a few safety mitigation measures such as securing of construction sites and having regular updates regarding safety guidelines communicated to the people.
	The trees offered for revegetation, only indigenous trees such as Ewoi, Esiekon, Edapale among others.	Revegetation will be prioritized with seedling provided for replanting and increasing the tree cover. The community will also be consulted on their preference of type.

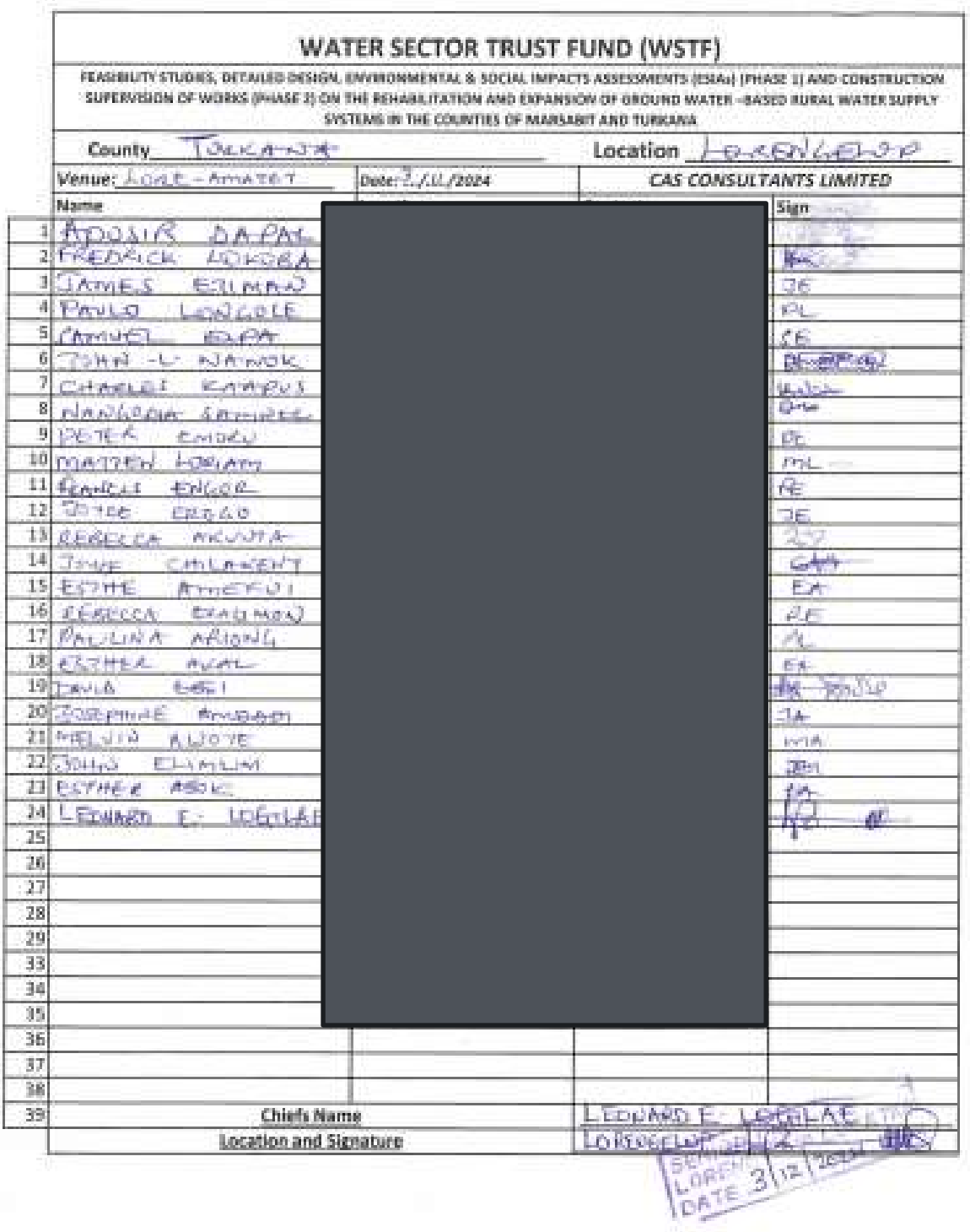
Participants name	Issues/comments raised	Responses
	What procedures are in place to prevent GBV, early pregnancies issues involving the contractor?	There is a SEA/SH/GBV Prevention and Response Plan prepared for the project to guide mitigation of these risks, the contractor will adopt this. In addition, the contractor will be required to put in place policies and other measures that are aimed at protecting the local people including the vulnerable such as women and children.
Ekwom Nakeypel	Appreciating the forum to educate them on anticipated impacts of the project. Will there be more community awareness forums moving forward?	The consultant confirmed that that stakeholder engagement will continue throughout the entire project life cycle and that such forums can be convened as necessary. The community can also request for more if they deem necessary.
Sedna Amaret	Can I connect if a distribution line passes near me?	Anyone willing to connect is allowed to apply through the WSP. Illegal connections will not be allowed.



CONFIRMATION OF THE MINUTES

	NAME	SIGN	DATE
ESIA Lead Expert	Kibet Kwech		
Area Chief	LEONARD E. LOGILAE	SENIOR CHIEF 3/12	

11.3 Appendix C-2: Attendance list



WATER SECTOR TRUST FUND (WSTF)

FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs) (PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHABILITATION AND EXPANSION OF GROUND WATER –BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF MARSABIT AND TURKANA

County TURKANA Location LOKICHOGGIO

Venue: LOKLE – AMATET Date: 2./11./2024 CAS CONSULTANTS LIMITED

	Name	Sign
1	ADOSIR DAPAL	
2	FREDRICK LOKORA	
3	JAMES EDUMAO	JE
4	PAULO LOKOLE	PL
5	SAMUEL EAPA	SE
6	JOHN -L- NJANOK	
7	CHARLES EMAPUS	
8	NANGOMA SAMUEL	
9	PETER EMOEU	PE
10	MATTEW LOMIATO	ML
11	FRANCIS ENGOR	FE
12	JOYCE EREGO	JE
13	REBECCA NKUNTA	
14	JANE CHILAKENT	
15	ESTHER AMEFUI	EA
16	REBECCA EDAMOU	RE
17	PAULINA ARIONG	PA
18	ESTHER AKAL	EA
19	DAVID EMOI	
20	JOSEPHINE AMUDAWI	JA
21	HELVIA AUOYE	HA
22	JOHN ELIMUM	JE
23	ESTHER ASOK	EA
24	LEONARD E. LOKOLAE	
25		
26		
27		
28		
29		
33		
34		
35		
36		
37		
38		
39	Chiefs Name	LEONARD E. LOKOLAE
	Location and Signature	LOKICHOGGIO

SERIAL LOKICHOGGIO DATE 3/12/2024

11.4 Appendix C-3: Initial Meeting

(Minutes, Land Consent and Attendance list)

CAS CONSULTANTS Ltd
CONSULTING ENGINEERS AND ENVIRONMENTALISTS
1st Floor, La'Mac Building, Church Road, Off Waiyaki Way, Westlands
P.O. Box 20023- 00200, Nairobi, Tel: +254 020 4445265, +254722828654
E-mail :info@casconsultants.co.ke/casconsult@africaonline.co.ke

FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs) (PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHABILITATION AND EXPANSION OF GROUND WATER -BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF MARSABIT AND TURKANA

Form: Attendance List

Task: FGD - LORENGELEI

No.	Name	Ta		Date
1.	NANGOPA A MARLYNE	A		3/12/24
2.	DAVID EBEI NANGOPA	E		2/12/2024
3.	FREDRICK LOKOBA			02/12/2024
4.	LONGOLE ELPA			02/12/2024
5.	ESTHER AKAE			02/12/2024
6.	JOICE CHILAKENI LOUPA			03/12/2024
7.	MATTEW LOREAM	E		02/12/2024
8.	JOHN ELIMLIM			02/12/2024
9.	LEONARD E. LOGILAE	A		3/12/2024
10.				
11.				
12.				

[redacted]

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LEONARD E. LOGILAE
SUB CHIEF L. LORENGELUP LOCATION
DATE 3/12/2024

11.6 Appendix D-2: Sample FGD Questionnaire

REPUBLIC OF KENYA

Ministry of Water, Sanitation and Irrigation

THE WORLD BANK

WaterFund

CONSULTANCY TO UNDERTAKE AN INVENTORY OF EXISTING RURAL WATER SUPPLY SYSTEMS, O&M INSTITUTIONAL CAPACITY AND COMMUNITY WATER VULNERABILITY AND NEEDS ASSESSMENTS IN FIVE ASAL COUNTIES OF KENYA.

MARSABIT AND TURKANA KEY INFORMANT INTERVIEW GUIDE

INTRODUCTION

The Government of Kenya, in partnership with the World Bank under the Horn of Africa Groundwater Resilience Program, is undertaking efforts to enhance access to groundwater resources in Kenya's arid and semi-arid regions (ASALs). This project aims to rehabilitate and expand boreholes in the counties of Turkana, Marsabit, Mandera, Wajir, and Garissa, where water scarcity and climate shocks have posed long-standing challenges. Through the program, we seek to strengthen resilience to droughts and improve water availability for domestic, agricultural, and pastoral use, benefiting the communities most affected by water shortages.

To ensure that the project meets the needs and expectations of local communities, we are conducting this Key Informant Interviews (KII) as part of the Environmental and Social Impact Assessment (ESIA) for the project. This Guide will gather vital information about the current water situation, community needs, and views on the proposed project from an expert's viewpoint. By participating, you will help us understand the specific challenges, concerns, and potential benefits of the borehole rehabilitation initiative, guiding us to develop an inclusive and sustainable water supply solution.

Your responses will be treated with confidentiality and used solely for the purpose of this assessment. We appreciate your time and honesty in answering these questions, as your insights are essential to the success of this program. Thank you for your cooperation.

GENERAL INFORMATION

Date..11/12/2024.....

Name ..Ezekiel Ichor.....

Organization/Institution ..County Department of Education

Role/Position ....Director ECDE.....

County/Region of Operation ....Turkana.....

Contact information .....0713978727.....

QUESTIONS

1. What are the main sources of water in this community?

   i) Seasonal Rivers.
   ii) Aquifers e.g. Napuu Basin.
   iii) Lake Turkana.
   iv) Shallow wells.

2. What are the key challenges related to water access in this area?

   i) Too much time spent traveling to and fetching water.
   ii) Negative impact on school enrolment and attendance - school going children spent much time away in search for scarce water.
   iii) Natural disasters e.g drought and floods which destroy and contaminate water sources for communities.

3. Are you aware of the proposed borehole rehabilitation and expansion project?

   Yes☑ No☐

4. What benefits do you think the project could bring to the community?

   (i) Environmental Benefits

   • Climate change mitigation - afforestation.
   • Aesthetic value from vegetation cover e.g grass.

   (ii) Social Benefits

   • Irrigation fed agriculture/farming resulting in improved nutrition.
   • Increased school enrolment; children especially girls will not have to spend much time saving for water.
   • Improved performance - adequate time will be allocated for learnings reduced absenteeism to look for water.

5. In your opinion, what are some of the project's negative environmental and social impacts that might be a concern to the local community?

   (i) Negative Environmental Impacts

   • During construction, there could be too much dust emission from increased vehicular movement and drilling equipment.
   • Noise from machinery.

   (ii) Negative Social Impacts

   • Increased pressure on available utility (water).
   • Cultural conflicts resulting from population influx.
   • Risk of SEAH especially to children who support their parents/guardians engaged in the project for example as food vendors

6. What role do you think the community should play in maintaining the boreholes and ensuring long-term sustainability?

i) Participate actively by paying tariffs regularly for O. & M.
ii) Own the project, support it.

7. Are you in support of the proposed project?

Yes☑ No☐

8. Please share any additional comments you may have that could help in effective implementation of the project.

i) Consider connecting schools to water. However, the water should strictly be for school's use, whereas the nearby community be provided with their own connection. This will reduce conflict between school management and the community.
ii) Education department be regularly engaged/updated of project progress as part of key stakeholders.

THANK YOU SO MUCH FOR YOUR TIME.

11.7 Appendix E: Stakeholders Consultation Log

LOREN HARCET / NAIROLE KNIRUK

LAD CONSULTANTS LTD
CONSULTING ENGINEERS AND ENVIRONMENTALISTS
1st Floor, Le Mac Building, Church Road, Off Waiyaki Way, Westlands
P.O. Box 20023- 00200, Nairobi, Tel: +254 020 4445965, +254728628664
E-mail: info@ladconsultants.co.ke/ladconsult@africaonline.co.ke

FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAS) (PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHABILITATION AND EXPANSION OF GROUND WATER -BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF MARSABIT AND TURKANA

STAKEHOL

No	Name	Organisation	Signature
1.	NYAKADWA A NYAKWANE	TCG	
2.	LEONARD EPOOM LOELAE	OOP	
3.	ENOCH JOHN EKALALE	TCG	
4.	JACOB NYUTUA	TCG	
5.	CAMILLUS EBONGOM	OOP	
6.	EKENO MOJA	TCG	
7.			
8.			
9.			
10.			
11.			

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11.8 Appendix F: Water Quality report

FORM F/9/1/3

WATER RESOURCES AUTHORITY

NHIF building, 9th floor, Wing B
P.O. Box 45250-00100, Ngong Road, Nairobi
Tel: +254-020-2732291/2729048/9
Email: wra@wra.go.ke,
Website: www.wra.go.ke

Central Water Testing Laboratories
P.O. Box 45250, 00100, Off Dunga Road, Nairobi
Tel: +254 773903729
Email: cwtl@wra.go.ke; centralwatertestinglabs@gmail.com

Physical-Chemical Laboratory Results Certificate

Report Issue Date:	16/10/2024	**Sample No:**	WRA/HQ/CWTL-27846	**Year:**	2024
Name of Customer:	Lodwar Water & Sanitation Company	**Date Received:**	20/09/2024		
Email Address:		**Type of Sample:**	Borehole water		
Telephone Number:	0712108839	**Date of Sampling:**	03/09/2024		
Sample submitted by:	Lodwar water & Sanitation Company	**Source of sample:**	Loreamatet, B/H 2 - Loreamatet		
Purpose of Sampling:	Domestic	**Received by:**	Dennis Onyango		
County:	TURKANA				

PARAMETERS	UNIT	ANALYTICAL METHOD	RESULTS	KS EAS 12:2018 STANDARDS (MAX.)
pH	pH Scale	APHA 4500-H+ B	8.2	5.5-9.5 (6.5-8.5)*
Colour	mgPt/l	APHA 2120 B	7.5	50(15)*
Turbidity	N.T.U	APHA 2130 B	0.7	25 (5)*
Conductivity (25°C)	µS/cm	APHA 2510B	372	2500 (1500)*
Iron	mg/l	APHA 3500-Fe B	ND	0.3
Manganese	mg/l	APHA 3500-Mn B	ND	0.1
Calcium	mg/l	APHA 3500-Ca B	8.8	150
Magnesium	mg/l	APHA 3500-Mg B	6.8	100
Sodium	mg/l	APHA 3500-Na B	59	200
Potassium	mg/l	APHA 3500-K B	4.9	50
Total Hardness	mg $CaCO_3$/L	APHA 2340 C	50	600 (300)*
Total Alkalinity	mg $CaCO_3$/L	APHA 2320 B	208	500**
Chloride	mg/l	APHA 4500-Cl- B	3.0	250
Fluoride	mg/l	APHA 4500-F- C	1.1	1.5
Nitrate	mg/l	APHA 4500-NO3-D	0.37	45
Nitrite	mg/l	APHA 4500-NO2- B	0.3	0.9
Sulphate	mg/l	APHA 4500-SO42- E	9.0	400
Free Carbon Dioxide	mg/l	APHA 4500-CO2 C	16	Not Applicable
Total Dissolved Solids	mg/l	APHA 2510 A	231	1500 (1000)*
Arsenic	µg/l	-	3.0	10

**Maximum limits for treated potable water; **WHO maximum guideline value; APHA: American Public Health Association (2005) - Standard methods for the examination of water & wastewater; "<": value below method detection limit; ND: Not detectable*

Comments:

The water is chemically suitable for domestic use.

Dennis Ochieng
Laboratory Analyst

WATER RESOURCES AUTHORITY
CENTRAL WATER TESTING LABORATORY
Tel: 0773 903 729
P. O. Box 45250 - 00100, NAIROBI
centralwatertestinglabs@gmail.com

John Muasya
Principal Water Quality & Pollution Control Officer

The results contained herein apply to the particular sample(s) tested, whose sample number and tests carried out are as detailed in these results. The information contained here reflects the laboratory's findings as at the time of analysis and based on the samples submitted by the client.

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Page 1 of 1

FORM F/9/1/3

WATER RESOURCES AUTHORITY

NHIF building, 9th floor, Wing B
P.O. Box 45250-00100, Ngong Road, Nairobi
Tel: +254-020-2732291/2729048/9
Email: wra@wra.go.ke,
Website: www.wra.go.ke

Central Water Testing Laboratories
P.O. Box 45250, 00100, Off Dunga Road, Nairobi
Tel: +254 773903729
Email: cwtl@wra.go.ke; centralwatertestinglabs@gmail.com

Physical-Chemical Laboratory Results Certificate

Report Issue Date:	16/10/2024	**Sample No:**	WRA/HQ/CWTL-27847	**Year:**	2024
Name of Customer:	Lodwar Water & Sanitation Company	**Date Received:**	20/09/2024		
Email Address:		**Type of Sample:**	Borehole water		
Telephone Number:	0712108839	**Date of Sampling:**	03/09/2024		
Sample submitted by:	Lodwar water & Sanitation Company	**Source of sample:**	Loreamatet, B/H - Loreamatet		
Purpose of Sampling:	Domestic	**Received by:**	Dennis Onyango		
County:	TURKANA				

PARAMETERS	UNIT	ANALYTICAL METHOD	RESULTS	KS EAS 12:2018 STANDARDS (MAX.)
pH	pH Scale	APHA 4500-H+ B	8.9	5.5-9.5 (6.5-8.5)*
Colour	mgPt/l	APHA 2120 B	5.0	50(15)*
Turbidity	N.T.U	APHA 2130 B	0.4	25 (5)*
Conductivity (25°C)	µS/cm	APHA 2510B	307	2500 (1500)*
Iron	mg/l	APHA 3500-Fe B	0.03	0.3
Manganese	mg/l	APHA 3500-Mn B	ND	0.1
Calcium	mg/l	APHA 3500-Ca B	4.8	150
Magnesium	mg/l	APHA 3500-Mg B	2.4	100
Sodium	mg/l	APHA 3500-Na B	59	200
Potassium	mg/l	APHA 3500-K B	1.2	50
Total Hardness	mg $CaCO_3$/L	APHA 2340 C	22	600 (300)*
Total Alkalinity	mg $CaCO_3$/L	APHA 2320 B	168	500**
Chloride	mg/l	APHA 4500-Cl- B	3.0	250
Fluoride	mg/l	APHA 4500-F- C	0.7	1.5
Nitrate	mg/l	APHA 4500-NO3-D	3.1	45
Nitrite	mg/l	APHA 4500-NO2- B	<0.01	0.9
Sulphate	mg/l	APHA 4500-SO42- E	8.9	400
Free Carbon Dioxide	mg/l	APHA 4500-CO2 C	ND	Not Applicable
Total Dissolved Solids	mg/l	APHA 2510 A	190	1500 (1000)*
Arsenic	µg/l	APHA 3111 B	13	10

**Maximum limits for treated potable water; **WHO maximum guideline value; APHA: American Public Health Association (2005) - Standard methods for the examination of water & wastewater; "<": value below method detection limit; ND: Not detectable*

Comments:

All the analysed parameters are within the KEBS thresholds for natural potable water quality except for Arsenic.

Dennis Ochieng
Laboratory Analyst

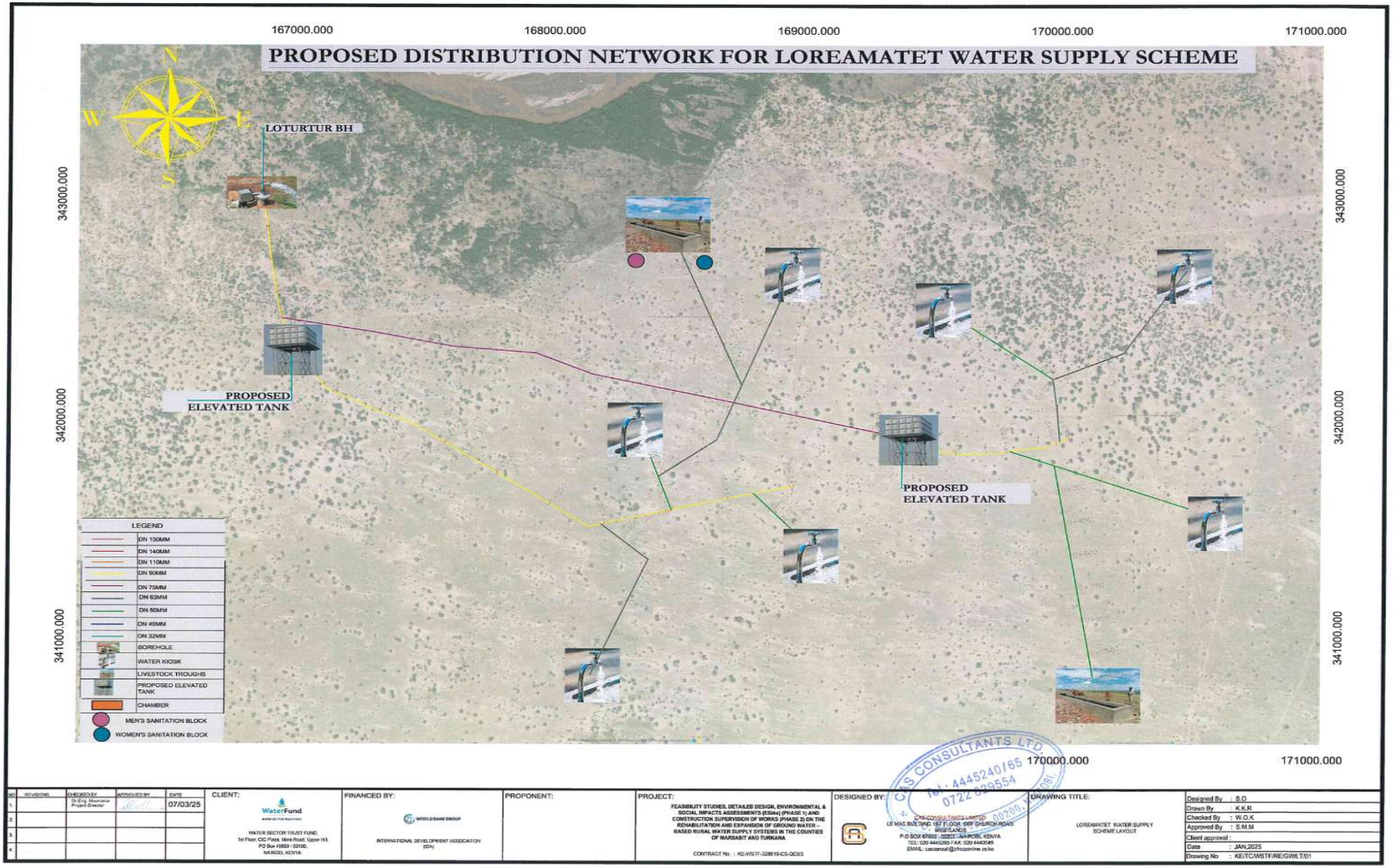
WATER RESOURCES AUTHORITY
CENTRAL WATER TESTING LABORATORY
Tel: 0773 903 729
P. O. Box 45250 - 00100, NAIROBI
centralwatertestinglabs@gmail.com

John Muasya
Principal Water Quality & Pollution Control Officer

The results contained herein apply to the particular sample(s) tested, whose sample number and tests carried out are as detailed in these results. The information contained here reflects the laboratory's findings as at the time of analysis and based on the samples submitted by the client.

Printed on 16/10/2024 09:02:10

11.9 Appendix F: Design layouts



11.10 Appendix G: NEMA practicing licenses



EAE 23064280

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/23327

Application Reference No: NEMA/EIA/EL/30565

M/S **kenneth kibet koech**
(individual or firm) of address
P.O. Box 5028 - 30100 Eldoret

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

registration number **1609**

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

Issued Date: **3/24/2025** Expiry Date: **12/31/2025**

Signature.....

(Seal)
Director General
The National Environment Management Authority

P.T.O.

ISO 9001 : 2015 Certified

11.11 Appendix H: Chance Find Procedures

CHANCE FIND PROCEDURES

This document describes the Chance Find Procedure for Loturtur Water Supply Project (hereafter referred to as "the Project"), outlining the procedures that the project will follow should potential cultural heritage discoveries occur during project construction and/or rehabilitation activities associated with the Project.

The Chance Find Procedure has been developed in alignment with international good practice, including the World Bank Environmental and Social Standards (notably ESS8), and also complies with the National Museums of Kenya (NMK) requirements.

The Loturtur Water Supply Project has established a provisional Chance Find Procedure before project start. The scope and scale of the Chance Find Procedure will be proportionate to the nature, scale and type of potential risks and impacts to cultural heritage that may arise from the Projects' construction and/or rehabilitation activities. In addition, the Chance Find Procedure will be commensurate with the type and scale of the planned construction/ rehabilitation activities. As such, construction/ rehabilitation activities deemed at screening to have a negligible potential negative impact on cultural heritage (e.g. borehole rehabilitation and solarization, etc.) or with a small/ negligible footprint will not require a Chance Find Procedure.

Cultural heritage is defined as resources with which people identify as a reflection and expression of their constantly evolving values, beliefs, knowledge and traditions. Cultural heritage encompasses tangible and intangible heritage, which may be recognised and valued at a local, regional, national or global level, as follows[1]:

- Tangible cultural heritage, which includes movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance. Tangible cultural heritage may be located in urban or rural settings, and may be above or below land or under the water; and
- Intangible cultural heritage, which includes practices, representations, expressions, knowledge, skills—as well as the instruments, objects, artifacts and cultural spaces associated therewith— that communities and groups recognise as part of their cultural heritage, as transmitted from generation to generation and constantly recreated by them in response to their environment, their interaction with nature and their history.

Tangible cultural heritage is the focus of this Chance Find Procedure and in particular, chance finds which are when archaeological, historical, cultural and/or remain material is unexpectedly encountered during project construction or operation.

For this Project, the construction and/or rehabilitation activities include:-

i. Borehole rehabilitation;
ii. Construction of water storage tanks and associated infrastructure;
iii. Site Clearing and Trenching; and
iv. Pipe Laying.

[1] World Bank Environmental and Social Framework, 2017.

As such, risks and impacts to tangible cultural heritage, and in particular, archaeological material, that may arise from Project activities could include damage to archaeological material owing to earth works, flooding areas, etc.

Purpose of the Chance Find Procedure

A Chance Find Procedure is a project-specific procedure which is to be followed if previously unknown cultural heritage is encountered during project activities. The Chance Find Procedure sets out how chance finds associated with the project will be managed. The procedure includes a requirement to notify (NMK of found objects or sites by cultural heritage experts; to fence off the area of finds or sites to avoid further disturbance; to conduct an assessment of found objects or sites by cultural heritage experts; to identify and implement actions consistent with the requirements of WB ESS8 and national law; and to train project personnel and project workers on chance find procedures[2].

The Chance Find Procedure aims to:

- Protect physical cultural resources from the adverse impacts of physical investment activities and support their preservation;
- Promote the equitable sharing of benefits from the use of Physical Cultural Resources; and
- Raise awareness of all construction workers and management on site regarding the potential for accidental discovery of cultural heritage resources.

This Chance Find Procedure therefore intends to provide the project and the contractors with an appropriate response in accordance with the relevant national legislation and international good practice. As such, all contracts for civil works will include this Chance Find Procedure.

In order for the Chance Find Procedure to be effective, the Site Agent/Project Manager must ensure that all the project personnel on site understand the Chance Find Procedure and the importance of adhering to it if cultural heritage resources are encountered. In addition, training or induction on cultural heritage resources that might potentially be found on site should be provided.

Procedure

Description of section:

- This section describes the procedure that should be followed if cultural resources are discovered when undertaking small-scale construction activities, civil works and/or renovation activities.

Prior to project implementation, the Site Agent/Project Manager is responsible for siting and designing project activities to avoid significant adverse impacts to cultural heritage. The environmental and social risks and impacts identification process at the screening stage should help determine whether the proposed location of a project is in areas where cultural heritage is expected to be found, either during construction or operations.

In such cases, the project contractor will develop provisions for managing chance finds through a chance find procedure which will be applied in the event that cultural heritage is subsequently discovered. The contractor and any sub-contractors will make sure not to disturb any chance find

[2] World Bank Environmental and Social Framework, 2017.

further until an assessment by competent professionals is made. Where necessary, this will include qualified experts, including the relevant government authorities and civil society organisations, as well as traditional knowledge holders and other people from the area who should be consulted on whether disclosure of information is desirable, since there are situations in which disclosure may compromise the safety or integrity of the cultural heritage in question and/or endanger the sources of information.

Procedures for accidental discovery of cultural resources (chance finds)

This Chance Finds Procedure covers the actions to be taken from the discovering of a heritage site or item to its investigation and assessment by a professional archaeologist or other appropriately qualified person to its rescue or salvage.

If cultural resources (e.g. archaeological sites, historical sites, remains, objects, graveyards or individual graves) are discovered when undertaking project construction activities, civil works and/or rehabilitation activities, the following procedure will be followed:-

1. Halt the construction activities around the chance find to avoid any (or further) damage;
2. Report the discovery to your supervisor or the Environmental Officer immediately;
3. Delineate and fence the discovered site or area and provide a 25 meter buffer zone around all sides of the find;
4. Secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a night guard will be arranged until NMK officers can take over;
5. Forbid any removal of the objects by the workers or other parties;
6. Note the type of archaeological materials you think you have encountered, their location (GPS) and if possible, the depth below the surface the find occurred;
7. Photograph the exposed materials, preferably with a scale (e.g. a file binder, coin, rules etc.);
8. Notify NMK immediately (within 24 hours or less);
9. NMK would oversee the protection and preservation of the site before deciding on subsequent appropriate procedures. This would require a preliminary evaluation of the findings to be performed by NMK. The significance and importance of the findings should be assessed according to the various criteria relevant to cultural heritage; these include the aesthetic, historic, scientific or research, social, and economic values;
10. Decisions on how to handle the finding shall be taken by NMK. This could include changes in the physical investment layout (such as when finding an irremovable remain of cultural or archaeological importance) conservation, preservation, restoration, and/or salvage;
11. Implementation for the NMK decision concerning the management of the finding shall be communicated in writing by NMK;

12. The mitigation measures could include the change of proposed Project design/ layout, protection, conservation, restoration, and/or preservation of the sites and/or objects;

13. Construction work at the site could resume only after permission is given from NMK concerning safeguard of the heritage; and

14. The physical investment proponent is responsible for cooperating with NMK to monitor all construction activities and ensure that the adequate preservation actions are taken and hence the heritage sites protected.

In addition, the Site Agent/Project Manager is obliged to declare the chance find discovery at the earliest possible date to the project proponent.

Appendix J: Minutes of the ESIA Disclosure & Consent

MINUTE OF COMMUNITY BARAZA ON LAND ALLOCATION, SURVEY AND PHYSICAL PLANNING FOR THE WATER PROJECT AUXILLARY STRUCTURES HELD IN LORE AMATET/LOTURTUR ON 26/06/25 STARTING FROM 9:00AM.

MEMBERS PRESENT

1. Mark Ewecit - National Land Commission Coordinator
2. Esther Lokitoe - Gend Expert
3. Jacob Mutua - Environment Specialist
4. Joseph lotimat - Land committee
5. Peter Ekal - Land committee
6. Charles Kaapus - Water Committee
7. Joyce chelakeny - Land committee
8. Regina Edukon - Land committee
9. Ekeno Musa - Village Administrator
10. Joseph Ekitela - Ward Administrator
11. Sarah Pedo - Area Chief

MEMBER ABSENT

ABSENT WITH APOLOGY

Rukoo Fredrick - Project coordinator

AGENDA

1. Preliminaries
2. Project disclosure
3. ESIA diswssion/disclosure
4. Land allocation, survey and design
5. Any other Business (AOB)

MIN 01/06/25 : PRELIMINARIES

The area assistance chief Mrs. Sarah Pedo called the

Water quality analysis and preparation of designs. the bidding/tendering process has been advertised. the contractors will come the following week for project pre-site visit.

MIN: 03/06/25: ESIA DISCLOSURE

The following impacts were summarised by Mr. Jacob Mutua

1. Environmental Impacts

→ Water resources over-extraction
→ Soil erosion
→ Vegetation cover clearance
→ Air and noise pollution

Mitigation Measures

→ Sustainable extraction
→ Revegetate and avoid rainy days
→ Tree planting
→ Use equipment that quiet and use PPE's

2. Social Impacts

→ land disputes
→ occupation health and safety risks
→ GBV/SEAH
→ Child oppression/abuse

Mitigation Measures.

→ Community consultation
→ Implement safety plans
→ Implement SEAH/GBV prevention plans
→ Compliance with children Act 2022

3. GBV disclosure

This entails providing information on GBV with the the project. It include the following aspects.

- Reporting all scenarios of GBV
- Safeguarding Children rights
- uphold integrity and respectful conduct
- uphold rights and protection of community members

4. Grievance Redress Committe

This is a special committee that deals specifically with conflicts and complains that arise from project especially during the implementation phase.
The Water Users Association that act as link between the community members and the project use this committee. They work closely with the social specialist

Mrs. Esther also spoke of the pending project activities and they include WRA permit and NEMA licence, contract awarding, commissioning and implementation period.

MIN 04/06/25: LAND TRANSFER, SURVEY AND PHYSICAL PLANNING

This is one of the objective of our visit. The community has to allocate enough land for construction of auxillary structures and also since the land is community land, the community is required to transfer the land for the scheme to public land.
The Surveyor and the physical planner will do the demarcation process and the information will be used to establish Project Development Plan (PDP)
The borehole and the water tank to be allocated 1 acre (63m by 63m) while the Kiosks and the water trough be given 50ft by 100ft (15m by 30m) each.
The Surveyor and physical planner have the coordination that pinpoint where the structure will be placed. The Community has the right to change the location depending on the minority of community members decision.

She invited Mr. Mark, the National land Commission Coordinator who said he is happy for the way the loturtur Community Member have accepted the water project and willing to give out enough land for the Project. He pointed out that he is there as a witness for the demarcation process and he will ensure the PAP is released by his office sooner than possible.

Community Views, Question, comments and Suggestion

1. Rebecca Ekal
- How long will the contractor stay on the sight

2. Charles Kaapu
Will the Project compensate us for the land we give out

3. James Epur
Will the contractor pay us well as casual labourers during the Project implementation

Responses

1. The Contractor is expected to stay on sight for a Period of 1 year as it is spelled on the Bill of quantities or Project requirement

2. No compensation because the land is communal and it has only been tranfered to Public land for Project activities

3. The contractor will decide that, but in case of any complains, the Grievance redress committee will handle it.

MIN 05/06/25: ANY OTHER BUSINESS (AOB)
After the Surveyor and the physical planner completed the demacation exercise, there was no other business. The meeting was ended at 11-15 am and closed with a word of prayer from Miss Joyce Cholakeny.

Minute:
Prepared by
Name: Jacob Mutua
Position: Environmental Specialist
Signature: [signature]

Approved by:
Name: SARAH ENYANG PEDO
Position: AREA SUB-CHIEF
Signature [signature]

ASST. CHIEF
DOY L
LODWAR
LOPEMELUP SUB-LOCATION

ame of Settlement: Lore Amaket/Loturtur County: Turkana Date of Engagement: 26/6/25

urpose of Engagement: ESIA disclosure and land transfer

otal Number of Participants 13

	Participants from the Community	Persons With Disabilities	Vulnerable and Marginalized Groups (VMGs)	Other Disadvantaged Groups (Child heading a household)	Local Leaders	Civil Society Organizations	County Government	National Government
Male	9	-			2	1	2	1
Female	4	-	1	0	1			
Total	13							

Key Issues Discussed (*In Verbatim*)

inute 1: ESIA disclosure

inute 2: Land transfer.

THE WORLD BANK
WORLD BANK GROUP

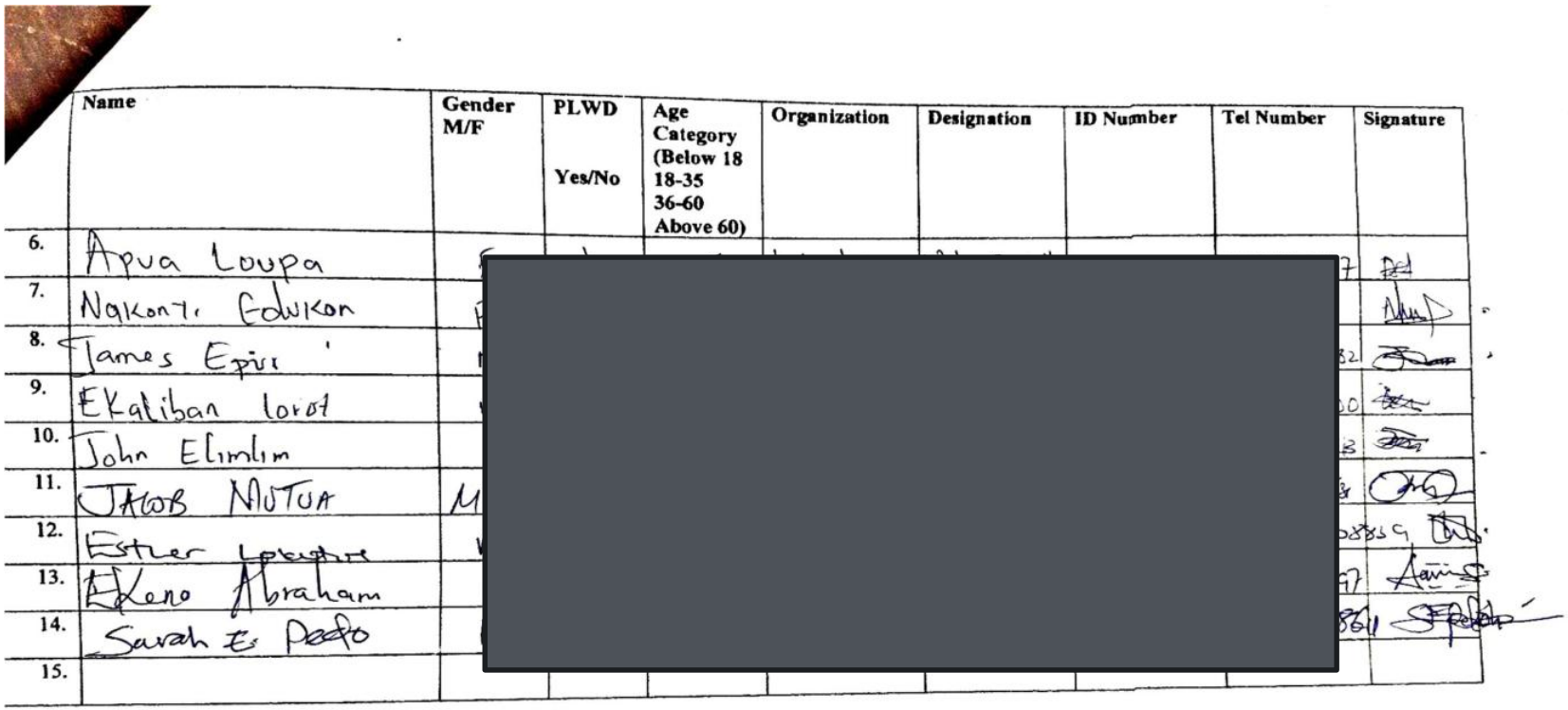
ATTENDANCE SHEET

MEETING: ESIA Disclosure and land transfer

DATE: 26/6/25 **VENUE:** Loturtur

	Name	Gender M/F	PLWD Yes/No	Age Category (Below 18 18-35 36-60 Above 60)	Organization	Designation	ID Number	Tel Number	Signature
1.	Joseph lotimat	m	[redacted]						
2.	Peter Ekal	m							
3.	Charles Kaapus	m							
4.	Rebecca Ekal	F							
5.	Joyce Chilakeny	F							

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	Name	Gender M/F	PLWD Yes/No	Age Category (Below 18 18-35 36-60 Above 60)	Organization	Designation	ID Number	Tel Number	Signature
6.	Apua Loupa								
7.	Nakonyi Edwikon								
8.	James Epiri								
9.	Ekaliban Lorot								
10.	John Elimlim								
11.	JACOB MUTUA	M							
12.	Esther Lokuru								
13.	Ekeno Abraham								
14.	Sarah Es Peelo								
15.									

[redacted]