MINISTRY OF AGRICULTURE, LIVESTOCK AND FISHERIES

STATE DEPARTMENT FOR CROP PRODUCTION AND AGRICULTURAL RESEARCH

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR SUMMARY PROJECT REPORT FOR THE PROPOSED DRILLING AND EQUIPPING OF KAPUNIA COMMUNITY BOREHOLE IN KAPUNIA VILLAGE, MASOL LOCATION, WEST POKOT

PROGRAM TO BUILD RESILIENCE FOR FOOD AND NUTRITION SECURITY IN THE HORN OF AFRICA-KENYA

Summary Project Report **September 2021**

Prepared By:	
Mr. Boaz Bett, Lead Environmental Expert Reg. No: 6994, P.O. Box 20171-0200 TEL 0721514803 Nairobi, Kenya boazbet@gmail.com	Ms. Bernadette Kinyungu, Associate Expert Reg. No: 6151, P.O. Box 35332-0200 TEL 0720286389 Nairobi, Kenya kbkinyungu@gmail.com

FACT SHEET

Project Name	Summary Project Report for The Proposed Drilling And Equipping of Kapunia Community Borehole in Kapunia Village, Masol Location, West Pokot County
Assignment Name	Environmental and Social Impact Assessment (ESIA)
Location	Kapunia Village, Masol Location, West Pokot County
GPS Coordinates	Latitude 1°28'21.67855"N and Longitude 35°36'58.80182"E 1309.21m above sea level
Project Description	Drilling and Equipping of Kapunia Borehole project comprising of; • Drilling and Equipping of the borehole • Testing pumping • Installation of Pumping System • Installation of 10 CM Plastic tank on a 12m high platform • Irrigation system Installation • Fencing of the borehole site with a gate
Project Coordinator,	Drought Resilience And Sustainable Livelihoods Programme (DRSLP II)
Address of the proponent.	Hill Plaza 9th Floor, Ngong Road P.O. Box 30028 00100 Nairobi.

SUBMISSION OF DOCUMENTATION

ENVIRONMENTAL CONSULTANT

I, **Boaz K. Bett** herein referred to as environmental consultant submits this **Summary Project Report** for the proposed Drilling and equipping of a Borehole for Kapunia community in Kapunia Village, West Pokot County. To the best of my knowledge, all information contained in this report is an accurate and truthful representation of all findings as relating to the proposed project as per project information provided by proponent.

Signed at **Nairobi** on this ……**9TH …**…… Day of **September, 2021.**

Signature: 

Designation**: Lead Environmental Consultant. NEMA Reg. No. 6994**

PROJECT PROPONENT

I, **JANET ACHIENG OYUKE,** on behalf of **the proponent**, submit this **Summary Project Report** for the proposed Drilling of a Borehole for Kapunia Community in Kapunia Village, West Pokot County. To the best of my knowledge, all information contained in this report is an accurate and truthful representation of all findings as relating to the proposed project as per project information provided by proponent

Proponent Representative Name ..Janet Achieng Oyuke..

Proponent Representative Title ..Environment Specialist..

Proponents Representative Contacts ..0726657238, achiengoyuke@yahoo.com

Signature: ..... **Date:** 7/9/2021

THE PROJECT COORDINATOR
DROUGHT RESILIENCE & SUSTAINABLE LIVELIHOOD PROGRAMME
HILL PLAZA, 9th FLOOR
P. O. Box 30028 - 00100
NAIROBI

EXECUTIVE SUMMARY

The Government of Kenya through the **Drought Resilience and Sustainable Livelihood Project [DRSLP II]** intends to drill one production borehole at Kapunia Village, Masol Location, West Pokot County for the community to improve livestock and farming activities within the community. The project is aimed at strengthening livelihoods resilience and improving the community capacity to cope with drought that is recurrent in ASAL areas. The project site is on **latitude 1°31'14.23555" N and longitude 35°36'58.80182" E 1309.21m above sea level**. The development of water harvesting structures is one of the activities listed under schedule II of the Environmental Management and Co-ordination Act (EMCA, 1999).

DRSLP II therefore contracted Environmental Impact Assessment (ESIA) Consultant to conduct ESIA and submit a summary project report to address any ESIA of the proposed project and establish anticipated impacts on the environment. This SPR study was conducted through consultation with the farmers, pastoralists, local administration, local leaders, government officers in West Pokot and the EIA team headed by the consultant. Several methods were employed to collect baseline data. This involved participatory approaches, a walk through the proposed project site and making observations on the natural environment. The main activity will be drilling of a borehole at the identified site in the village.

Section 58 of Environmental Management and Coordination Act (EMCA), 1999 and **Section 7(1) of Environmental (Impact, Audit and Strategic Assessment) (Amendment) Regulations, 2019, legal notice No. 32** has outlined various projects to undergo Environmental Impact Assessment/ Audit and put it categorical into three phases; **a) Low risks b) Medium risks and c) High risk projects.** Therefore, the above project (Community borehole] is under category one which is low risk project, thus it requires the proponent to prepare a detailed summary project report (SPR) to NEMA for recommendation and way forward on the drilling of the said community borehole. ***Based on National Environment Management Authority Public Notice on Processing of Environmental Impact Assessment Reports, Water Resources and Infrastructure such as drilling for purposes of utilizing ground water resources and related infrastructure is listed under Medium risk projects, also Community water projects including boreholes, water pans, sand dams and sub-surface dams are classified as Low Risk Projects***. These projects have been seen to have got less impacts to the environment which does not require a comprehensive Project Report {CPR} unless directed by the authority.

Nature of the project

The proposed project will be established within the land donated by the community and will be managed by the community. The main purpose will be to provide water for domestic purposes use within the area, school and community at large. It will have water trough for animals" consumption which will be managed by the community.

The borehole should be drilled at the selected point as per the hydrological survey which is known to the proponent-DRSLP II, county staff and the local community, to a minimum of 8-inch diameter and to a **minimum of 130m and a maximum depth of about 150m.**This will ensure that the deeper aquifers will be fully penetrated. The borehole

should be installed with mild steel casings and gas-slotted screens resistant to corrosion by aggressive waters.

However, the depth may vary depending on the recommendation of supervising hydro geologist. The steps to be followed will be synchronized as follows;

- drilling of borehole,
- Equipping of the borehole,
- development of the borehole,
- test pumping the borehole and
- carrying out water quality analysis (physical, chemical and biological) followed by
- Installation of solar panels for pumping and distribution of water for use.

A water storage tank will be placed at a higher ground where solar pump will be used to pump in the water for communal water points kiosks.

Project ownership

The proposed borehole will be a facility owned by the community, the land ownership where the project is located is donated by the community and will be under management committee from the elected representatives of the community which they will ensure sustainability of the project through maintenance.

Project justification

The need for a reliable and safe water supply supersedes all pre-requisites for general development. This is because water ensures good health for the residents within the community, other accruing benefits include improved crop farming and sustainable income of the pastoralist community, hence lack of it would mean otherwise.

Lack or inadequate water supply in any locality leads to poor sanitation, low health and hygiene standards hence contributing to water borne diseases and low quality of life. Traveling far distances in search of water also wastes a lot of time that would have been used on more productive activities. It is also economically unfriendly to the community as a lot of funds will be used in treating both water and people who fall victims of water borne diseases.

Potential Environmental Impacts that might arise during the phases

- Reduction of water use conflicts
- Increased water availability
- Employment creation
- Revenue generation and improved local development
- Improved local sanitation standards
- Depletion of underground water resources
- Increase incidences of water related diseases
- Solid Waste generation
- Soil erosion and noise pollution

Conclusion and Recommendations

The proponent recognizes the need to strike a balance between utilization of the development project and environmental concerns raised, thus ensuring the sustainability of the project. This Project is in line with the Government of Kenya Policies as outlined in mandates of various Ministries (Ministry of Water and Irrigation, Ministry of regional government, Ministry of Agriculture and Ministry of Arid land development. The economic feasibility of the proposed project activities will benefit the proponent, community involved and the entire country; it will enhance sustainable economic development within the project site and also the diverse areas where the water will be distributed. There were no major complaints or concerns raised by the stakeholders that may hinder the commencement of the project.

The proponent agrees to adhere to the above EMP and therefore it is recommended that:

- The project be approved to proceed with the implementation as the proponent is ready to ensure that all environmental and social concerns identified are mitigated using the identified measures.
- The proponent should address and implement all proposed mitigation measures in all the phases of the project life cycle and should stick to the EMP. Similarly, other players who have been assigned the responsibilities in the EMP should also play their part.
- The capacity of the proponent should be enhanced by constant training on plumbing works, water conservation, record keeping, and conflict resolution and project management.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS

%	Percentage
°	Degrees (A unit of measuring latitudes and longitudes)
°C	Degrees Celsius
AFDB	African Development Bank
AIDS	Acquired Immune Deficiency Syndrome
ALVs	African Leafy Vegetables
BP	Bank Procedure
Cap.	Refers to chapter in the Laws of Kenya
CBO(s)	Community Based Organization(s)
CDE	County Director of Environment
C-ESMP	Construction Environmental and Social Management Plan
CIDP	County Integrated Development Plan
CO	Carbon-monoxide
CO2	Carbon-dioxide
COVID-19	Corona Virus Disease
CPCU	County Project Coordination Unit
dBA	Decibels (a unit of measuring sound)
EA	Environmental Audit
EIA	Environmental Impact Assessment
EMCA	Environmental Management and Coordination Act
EMP	Environmental Management and Monitoring Plan
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMONP	Environmental and Social Monitoring Plan
ESMP	Environmental and Social Management Plan
FGD(s)	Focused group discussion(s)
ft	Foot/feet (a unit of measuring length)
GBV	Gender-based Violence
GHG	Green House Gas
GOK	Government of Kenya
GRM	Grievance Redress Mechanism
HIV	Human Immuno-deficiency Virus
KEBS	Kenya Bureau of Standards
KES	Kenya shilling(s) (a unit of measuring currency in Kenya)
Km	Kilometers (a unit of measuring ground distance)

KNBS	Kenya National Bureau of Statistics
M/m	Metre(s) (A unit of measuring length)
M2/m2	square metres (a unit of measuring surface area)
M3/m3	Cubic metre(s) (a unit of measuring volume)
MDA	Ministry Department and Agency
Mm/mm	Millimeter(s) (A unit of measuring length)
MOALF	Ministry of Agriculture, Livestock and Fisheries
MTP	Medium-Term Plans
NEAP	National Environment Action Plan
NEMA	National Environment Management Authority
NGO(s)	Non-Governmental Organization(s)
NO2	Nitrogen Dioxide
NPCU	National Project Coordination Unit
OP	Operational Policy
OSHA	Occupational Health and Safety Act
PAPs	Project Affected Persons
PLWD	People Living with Disabilities
PMP	Pest Management Plan
PPE	Personal Protective Equipment
Reg. No.	Registration number
SEA	Sexual Exploitation and abuse
SH	Sexual Harassment
SHG	Self-Help Group
SOPs	Standard Operating Procedures
STIs	Sexually Transmitted Infections
WHO	World Health Organization

1. INTRODUCTION AND BACKGROUND INFORMATION

1.1. PROJECT BACKGROUND

The government of Kenya through the Drought Resilience and Sustainable Livelihood Project [DRSLP II] intends to drill one production borehole at Kapunia Village for community to improve livestock and farming activities within the community. The project is aimed at strengthening livelihoods resilience and improving the community capacity to cope with drought that is recurrent in ASAL areas. The project is located on land at donated by the community purposely for domestic use by the community, school and livestock. The project site is on latitude 1°31'14.23555" N and longitude 35°36'58.80182" E 1309.21m above sea level. The development of water harvesting structures is one of the activities listed under schedule II of the Environmental Management and Co-ordination Act (EMCA, 1999). DRSLP II therefore contracted Consultants (Firm of Experts) to conduct a summary project report to address any EIA of the proposed project and establish anticipated impacts on the environment. This SPR study was conducted through consultation with the farmers, pastoralists, local administration, local leaders, government officers in West Pokot and the EIA team headed by the consultant. Several methods were employed to collect baseline data. This involved participatory approaches, a walk through the proposed project site and making observations on the natural environment. The main activity will be drilling of 10m3/day borehole as the projected water demand in the area. A detailed environmental management plan has also been developed to help the proponent take care of negative impacts that may arise from the project. The study findings show that there are potential negative environmental impacts that vary both in magnitude and scope. These impacts include: de-vegetation, soil degradation, and interference with run off flow, risk of spread of malaria and other water borne diseases, human settlement around the water source, livestock-crop conflict arising from crop damage by unattended animals and air pollution from dust during the drilling phase. This calls for designing of mitigation measures that will adequately and promptly address the risks and dangers that these impacts pose to the community and the environment. The proponent needs to integrate the measures within the project components and hence there will be minimal added cost to the implementation of the environmental management plan outlined in this report. There are also inherent positive impacts in the project that include: improved food security, improved household incomes, improved farmers' skills, promotion of agro-forestry and general improvement in the living standards of the community. On the basis of data and information analyzed, potential negative impacts of the project can easily be mitigated and managed for the project to be environmentally sound and sustainable since the positive impacts and the benefits to the community are immense and welcome. EIA team therefore, recommends that the client should be awarded an environmental license as long as the mitigation measures highlighted in the EMP are adhered to given that the project will improve food security and overall economy.

1.2. PROJECT JUSTIFICATION AND RATIONAL

In accordance with the EMCA, 1999 and subsequent amendments (2015 & 2019), all new projects with potential impact on the environment must undergo environmental impact assessment study to comply with the EIA Regulation, 2003. The proposed intervention is expected to have an overall positive impact on the people and the environment. However, water abstraction, construction phases and certain aspects of the operations are anticipated to have environmental and social impacts that would require to be mitigated.

Water related project developments are listed in the 2nd schedule of EMCA, 1999 and subsequent amendments (2015 & 2019) as among projects that should undergo EIA. In addition, the National Policy on Water Resources as well as the Water Rules established under the Water Act, 2016 calls for environmental impact assessment on water related projects for long-term sustainability and acceptability by the beneficiaries.

The most significant environmental issues concerning borehole water supply projects include noise and vibrations associated with the drilling works, geologic risks, and risk of contaminating the water, excessive consumption of fossil fuels, over pumping of ground water aquifers and improper commissioning and rehabilitation of boreholes. EIA should be applied to all water abstraction projects particularly boreholes since their scale of impacts require mitigate measures to be planned and implemented.

1.3. OBJECTIVES OF THE SPR

1.3.1. General Objective

The objective of the study was to identify significant potential impacts of the proposed development project to the physical, biological, social, Cultural and economic environment. And also to comply with Section 58 of the Environmental Management Act (EMCA) of 1999 and subsequent amendments (2015 & 2019) which requires that a project proponent carries out a Comprehensive EIA Study before being issued with a license to undertake a project that is found in Schedule 11 of the Act. The study team will further formulate recommendations to mitigate any adverse impacts to the environment and people's health throughout all phases of the project while at the same time enhancing the positive impacts. This will ensure that the project is environmentally friendly, socially acceptable and sustainable.

1.3.2. Specific Objectives

The specific objectives of the assessment are to;

- Document the ecological and socioeconomic baseline conditions of the study area and the affected communities;
- Inform and obtain input from stakeholders, (e.g., governmental authorities, the public, and vulnerable groups) and capture their relevant issues and concerns;
- Assess in detail the environmental, social, and health impacts that would result from the Project;
- Identify environmental and social mitigation measures to address the impacts identified;
- Develop the ESMPs, based on the mitigation measures developed in the SPR;
- Meet the requirements or recommendations of applicable national and international regulations and standards;
- Be guided by the policies, guidelines, and procedures of the relevant international treaties and agreements; and
- Be consistent with NEMA's policies and corporate values.

1.4. STUDY APPROACH AND METHODOLOGY

The approach to the assessment process was structured so as to cover the requirements under the EMCA, 1999 and subsequent amendments (2015 & 2019) as well as the Environmental Impact Assessment and Audit regulations 2003. However, the EIA study team's overall approach to the assignment was guided by the requirements of the TOR. The process was carried out in accordance with both NEMA and International Best practice/standards. Within the overall framework, the study team approaches were;

- Use of a multi-disciplinary team,
- Observations through transect walk in the project area
- Stakeholder participation and consultations
- Use of study cases both locally and internationally.

In order to achieve the objectives of the assignment, the EIA report undertook desk study, field visits and public participation and consultation forums. The main steps followed in the EIA exercise were as indicated below:

- Initial examination of the environmental issues including preliminary literature review, environmental screening and scoping.
- Description of the legal and administrative framework as well as detailed literature review of available publications and reports.
- Preliminary and detailed field surveys, investigations and data collection of physical, biological, social, economic and cultural environment.
- Data Analysis and processing
- Public meetings and consultation
- Identification of potential environmental and social Impacts
- Identification of mitigation measures
- Preparation of both the ESMP and EMP
- Preparation of required reports

1.5. EIA TEAM

Environmental scoping and subsequent preparation of the SPR was accomplished through involvement of several experts with varied inputs. The assignment team composition is indicated in table 1-1.

Table 1-1: EIA Team

No	Name of Expert	Proposed Position
1.	Mr. Boaz Bett	Lead Environmentalist
2.	Ms, Bernadette Kinyungu	Associate Expert

1.6. REPORT STRUCTURE

1.6.1. Purpose of the Report

The report is intended to meet the overall assignment objectives of carrying out an EIA of the proposed Kapunia Community Borehole project in accordance with statutory requirements by NEMA on projects under EMCA 1999 and subsequent amendments (2015 & 2019) schedule II. The report will assist NEMA and lead agencies in decision making process as well as ensuring that the project complies with sound environmental management practice. The report is also intended to assist the client in her obligation of maintaining environmental integrity in the overall management of the project.

1.6.2. Structure of the Report

The EIA project report has been structured to cover areas required under EMCA, 1999 and subsequent amendments (2015 & 2019) and Environmental Impact Assessment and Audit regulations 2003, in assessing environmental and social issues that will result from the project implementation, operation and decommissioning process. The report is also consistent with the international best practices. It contains ten chapters as outlined below;

- Chapter 1 introduces the project in general giving the background, project justification and rational as well as the overall approach and methodology used to achieve the objectives of the study.
- Chapter 2 describes the project components, project design and the various alternatives considered.
- Chapter 3 outlines the environmental baseline information including physical, biological and social economic of the project area. The chapter also highlights how the project will influence or be influenced by the baseline conditions.
- Chapter 4 summarizes the public consultative process and the outcomes
- Chapter 5 outlines the project alternative analysis
- Chapter 6 give the project impacts both positive and negative that will be due to the design, implementation, operation and decommissioning stages of the proposed development project.
- Chapter 7 presents the project Environmental and Social Management Plan (ESMP)
- Chapter 8 presents Capacity Development for Environmental Monitoring Plan (EMP) outlining impacts that require supervision and monitoring during project implementation, operation and decommissioning stages.
- Chapter 9: presents the study team's conclusions and recommendations
- Chapter 10: presents references used in preparing the report

2. CHAPTER TWO: PROJECT DESCRIPTION

2.1. OVERVIEW

The overall objective of the design is to create a structurally stable, long-lasting, efficient well that has enough space to house pumps or any other extraction. The design is aimed at allowing groundwater to move effortlessly and sediment free from the aquifer into the borehole at a desired volume and quality. The design should also be in such a manner that it prevents bacterial growth and material decay in the borehole. The borehole shall consist of a bottom sump, borehole screen, and casing (pipe) surrounded by a gravel pack and appropriate surface and borehole seals. Water enters the well through the perforations or openings on the screen. A detailed description of the components of the borehole design is in the sections below.

2.2. PROJECT LOCATION

The proposed project will be located on land donated by the community of Kapunia Village, Masol Location, West Pokot County purposely for water provision for domestic and livestock use for the community. The project site is on **latitude 1°31'14.23555" N and longitude 35°36'58.80182" E 1309.21m a.s.l .** The figure below shows the google earth location of the proposed site.

Figure 2.1: Google Earth image of the proposed borehole site

2.3. SCOPE OF THE PROJECT

1. Undertake a hydro geological survey (Survey report attached) - This is either done by a licensed private hydro geologist or by the Water Resources Management Authority in West Pokot. The survey report contains the following information; recommended depth, exact point of drilling, Location map sheet, elevation and coordinates, Hydrogeology of the area, Geophysics

2. Application for Authorization to drill - This is obtained from the Water Resources Management Authority upon submission of the following documents; Copies of hydro geological survey report in triplicate, Copies of deed plan or title deed in triplicate and Permit application form duly filled and signed.

3. Undertake an Environmental Impact Assessment to establish the potential Impacts of the proposed project and subsequent application of the NEMA license.

4. Borehole drilling and Equipping – A 254 mm diameter borehole is drilled and 120mm steel plain casing installed up to the bottom depending on the productivity of the borehole. 2-4mm gravel pack is installed between the borehole wall and the casing. This is very essential as it filters water from the rocks (aquifers) before going into the screens. Borehole development follows after gravel packing with the use of compressor to flush out continuously for several hours until the water is clean. Test pumping is then carried out by performing a 24-hour continuous discharge test to ascertain the exact yield of the borehole in m^3/hr. Recovery test continuous immediately after constant discharge test for 1 hour. The borehole is then covered by installation of permanent surface casing and finally a five (5) liters bottle of water is collected during test pumping and taken to government chemist to check on the chemical analysis of water.

2.4. PROJECT DESIGN, DEVELOPMENT AND WORKS

2.4.1. Ground water survey

In compliance with the provisions of the Water Act 2016, a hydro-geologist conducted a ground water survey. The survey indicated that there is sufficient underground water to meet the desired water requirements by the proponent. The report was submitted to Water Resources Management Authority seeking an authority to drill the proposed borehole. A copy of the hydrogeological report has been submitted to NEMA along with the EIA report. See Annex 3 of this report

2.4.2. Drilling

The borehole will be circular in shape. The maximum recommended depth by the hydro geologist is 130 metres. It is important that the proposed diameter be not more than 254 mm since there is no great advantage derived by increasing

the diameter. From the Dupuit equation for steady flow and holding all other factors remaining constant, increasing the well diameter enhances the yield only marginally i.e. about 10%. The diameter should therefore be in the range of 203 – 254 mm. The logging data must be collected successively throughout the drilling process for analysis. The analyzed information obtained is extremely useful when finalizing the well design, which includes a determination of the depth of the well screens, the size of the screen openings, and the size of the gravel pack material.

2.4.3. Water well design

Borehole design and construction details are determined after a test hole has been completed and the geological zones have been logged. The design of a borehole has many components which are taken into consideration by the borehole driller. Some of the main components include but not limited to type of well, intended use, well depth, casing material, size and wall thickness, grouting, plumpness and alignment among others. These differ with regions due to varying hydro-geological settings. In addition, a water meter and an airline should always be installed for the purposes of monitoring of groundwater abstraction and the static water level measurements respectively. An airline consists of an open tube or several pipes. These pipes are connected together and are normally attached to the pump's drop pipes. A water meter and the airline are required for the purpose of determining the relationship between the rate of groundwater abstraction and the static or dynamic water level in the borehole at any given time

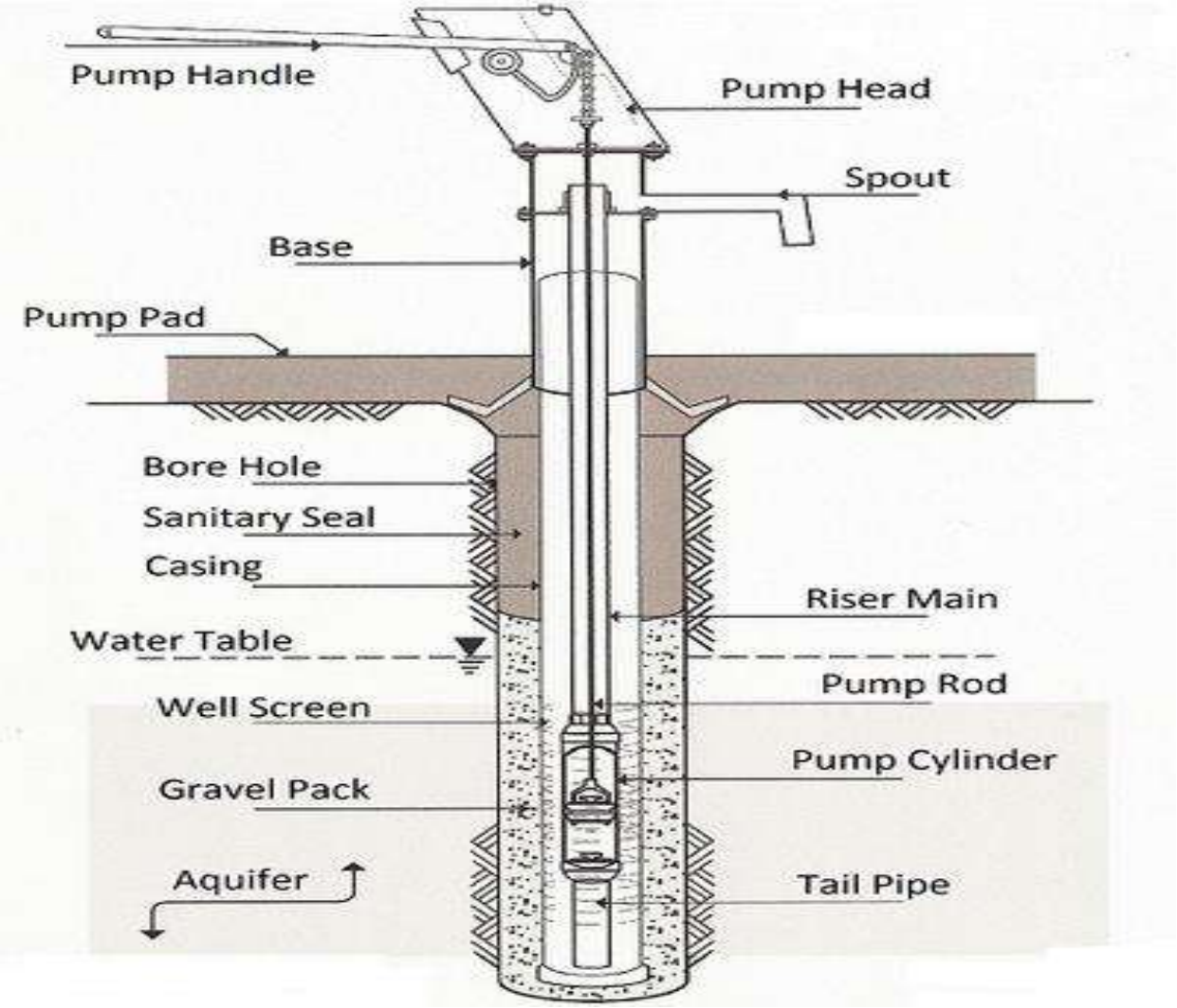

Figure 2-1: Borehole components: Source: Living Water International

2.4.4. Casing and Screens

A borehole casing is usually a pipe made of steel or PVC, installed in a borehole to prevent the borehole from collapsing and surface contamination, prevent water of undesirable quality entering the borehole and prevent fines from entering the borehole. It is also used to separate aquifers from each other. Casings are lowered or pushed into the hole by the drilling rig to the required depth; the lengths of casing may be joined together by means of screw threads, flange-and-spigot, gluing, riveting, or welding. They normally extend up to the surface, with a certain amount standing above ground level. Screens are installed in the water-bearing formation and are usually of sufficient open area, determined by slot size and length, to allow water to flow freely into the well while keeping sand and gravel from the gravel pack out of the well. Screen length should not be compromised to save cost as it can result in a dry

borehole. They come in sizes and joints similar to casing, so can be interconnected with suitable plain casing in any combination, or 'string.' Screens can also be obtained with a variety of aperture (slot) shapes and sizes, from simple straight slots to more complex bridge slots and wire-wound screens made with V-cross section wire.

2.4.5. Grouting

Grouting is the placement of a sealing material such as neat cement or bentonite into the annular space between a well casing and the borehole created during construction. Grouting is an effective and necessary measure for the protection of public health and ground water quality. It reduces or eliminates their permeability of the earth materials by consolidating them, or increasing their strength. Though it is not always a part of a well, gravel packing is often used in addition to the well screen. The length of the borehole section to be grouted depends on the water well codes, aquifer structure and water quality.

2.4.6. Plumpness and alignment

Water well should be both straight and plumb, although in practice any borehole of substantial depth may not be perfectly straight or perfectly plumb. A well bore may be straight but not plumb. A deviation from plumpness of two-thirds the wells inside diameter per 30 meters is reasonable, considering the difficulties of drilling in earth materials. Straightness of the well bore is important, because it determines whether or not the casings and a properly sized pump can be installed in the well to the desired depth. One of the best methods used to clean rock holes is the water jetting/air-lift pumping method in which inflatable packers are used to isolate the zones that supply water to the well.

2.4.7. Borehole's development

Borehole development is a frequently neglected but is usually vital step in the commissioning of a borehole water supply. Borehole Development has two broad objectives:

i. To repair damage done to the formation by the drilling operation so that the natural hydraulic properties are restored, and
ii. To alter the basic physical characteristics of the aquifer near the borehole so that water will flow more freely to a well.

Every borehole should be developed before being put into production to achieve sand-free water at the highest possible specific capacity. The entire process involves pumping and cleaning to remove any fluids added to the formation during drilling, and the removal of fine material from the borehole and surroundings. Flocculants may at times be added to remove mud caked on the borehole sidewalls and acid may be added to improve hydraulic performance. Most common borehole development methods area: over pumping, mechanical surging, bailing and jetting.

2.4.7.1. Over pumping

Over-pumping involves pumping at a rate rapid enough to draw the water level in the well as low as possible and allowing it to recharge. This process is repeated until sediment-free water is produced.

2.4.7.2. Mechanical Surging

Surging involves raising and lowering a surge block or surge plunger inside the well. The resulting surging motion forces water into the formation and loosens sediment to be pulled from the formation into the well. Occasionally, sediments must be removed from the well with a sand bailer to prevent sand locking of the surge block. This method may cause sand pack around the screen to be displaced to a degree that damages its value.

2.4.7.3. Jetting

Jetting involves raising and lowering a small diameter pipe into the borehole a few feet above the screen and injecting water or air through the pipe under pressure so that sediments at the bottom are geysered out of the top of the borehole. It is advisable that water or air should not be jetted directly across the screen as this may cause fine sediments to be driven into the entrance of the screen openings hence causing blockage.

2.4.7.4. Bailing

Bailing involves the use of a simple check valve bailer to remove water from the borehole. Like other methods, the method should be repeated until sediment free is water is produced. This technique is used in an attempt to reduce sand pumping and enhance yields from wells after other development methods have been applied. If a rock is massive, with few joints or faults, the volume of water available is often inadequate.

2.4.8. Pumping Test Data

Pumping tests are conducted to determine the performance characteristics of a well, the hydraulic parameters of the aquifer and the specific yield of a particular aquifer or several aquifers during the course of drilling. There are two types of pumping tests: Single Well and Multiple Wells Pumping Tests. A single well pumping test involves pumping at a constant or variable rate and measuring changes in water levels during pumping and recovery. Such tests are used to determine transmissivity and hydraulic conductivity when water level recovery is too rapid for slug tests and no observation wells or piezometers are available. A simplistic single well test consists of pumping at a constant rate and measuring drawdown.

A multiple well test is implemented by pumping a well continuously and measuring water level changes in both the pumped and observation wells during pumping or subsequent recovery. Properly designed and conducted multiple well tests can be used to define the overall hydro-geologic regime of the area being investigated, including specific yield of a zone. They also can help design municipal well fields, predict rates of ground water flow, determine interconnectivity between saturated zones, and design a remediation system. There are two types of aquifer pumping tests: constant-rate test and step-draw down test. In the constant-rate test, the well is pumped for a significant length of time at one rate. In the step draw down test, the well is pumped at successively greater discharges for relatively short periods. Figure x below shows a multiple well pumping test.

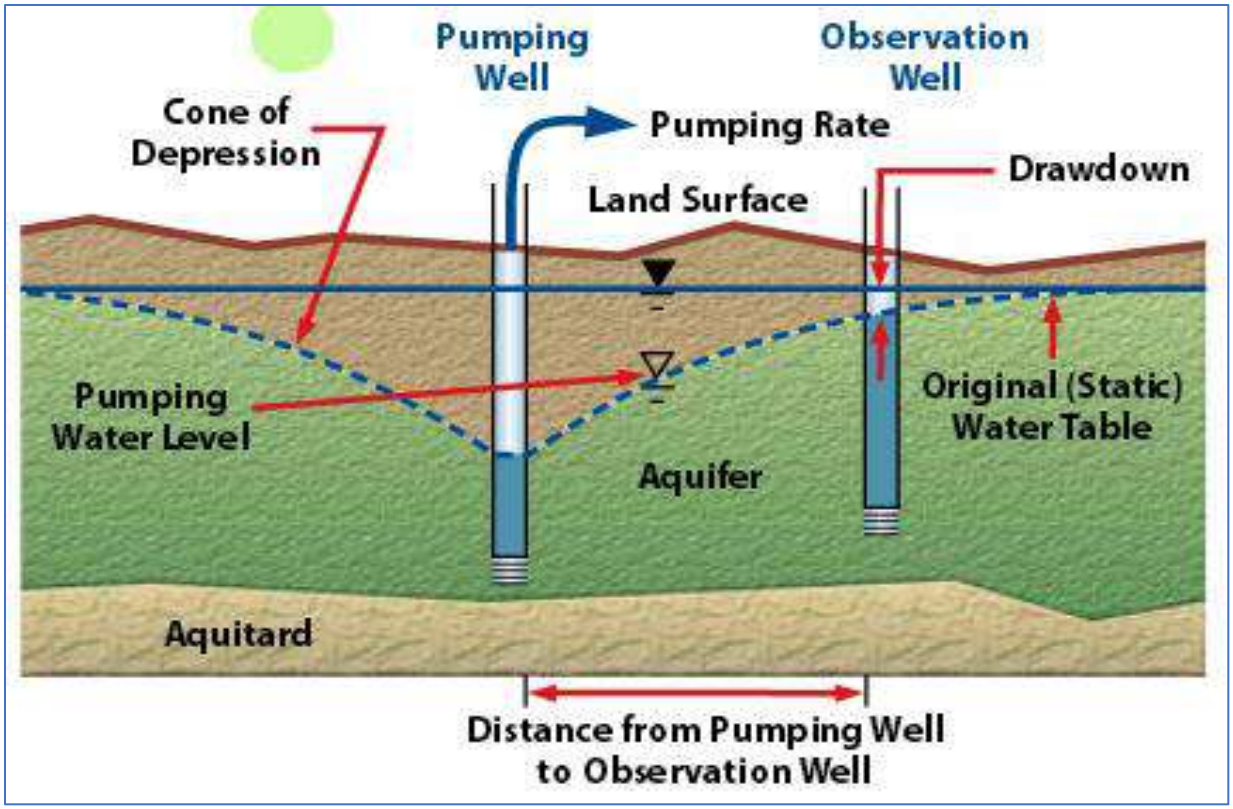

Figure 2-2: Multiple Well Tests Pumping - Source: Guide to conducting Well Pumping Tests, Water Stewardship Information Series

2.4.9. Material Inputs

The materials to be used fall into two categories: temporary and permanent

2.4.9.1. Temporary materials

Temporary Materials include the materials to be used in facilitating the drilling work.

- Water - Drilling water should not come from wetlands or seasonal swamps in the environs of the proposed borehole site. This is because these water supplies are likely to harbor pathogenic and iron bacteria and their subsequent growth in the borehole can cause serve problems both on human health and installed equipment in the hole. Water for drilling activities should be clean and of good quality.

- Drilling foam - Foam drilling is associated with the introduction, of air and surfactant mixed with water into the borehole being drilled. An ionic soap mainly comprising sodium alkyl ether is usually used. The foam is primarily used to enhance the rate of cuttings removal by preventing them from aggregating so that they can be lifted more easily to the surface. The advantages of the foam are: Higher solids carrying capacity, ability to lift large volumes of water, reduced air volume requirements, reduced erosion of poorly consolidated formations, effective dust suppression and increased borehole stability The foams used are slightly viscous amber colored fluid with a Biological oxygen demand/ Chemical oxygen demand (BOD/COD) ration greater than 0.1 which is readily

biodegradable. 1M3 of the injection fluid is required per 1m3 of ground removed. Lubricants and Diesel are also used to run the engines of the drilling machine, mud pump and generator just within the period of implementing the project.

2.4.9.2. Permanent Materials

Permanent materials include items to be installed after completing the drilling of the borehole. These include:

- Casings and Screens – Are Mild steel pipes installed in the drilled hole. They are usually not corrosive hence least likely to affect the water quality.
- Gravel Pack - Is a pack grain size in the range of 2 to 5 mm, rounded to well granules, usually 95% siliceous. The gravel pack is installed in the annular space (1" round space between the borehole wall and the casings) of the borehole. The activity is conducted to ensure the infiltration and achieve sediment and silt free groundwater to the borehole. Any fines in the gravel should be removed by washing or sieving.
- Bentonite - The material is mixed with water and used in the construction of the borehole in sealing some sections of the annular space for sanitary purposes.
- Cement - Cement grout in the annular space and slab on the surface is used for sanitary purposes.
- One meter (1m) steel casing – Used to avoid entry of surface water into the borehole. It is fitted with a cap at its top to prevent anybody from throwing foreign material into the hole.
- Dipper line - It is legal requirement under the Water Act, 2016 that every borehole sunk should be fitted with a dipper line (I.e. a 25 mm diameter u PVC airline attached to the rising main) in order to monitor the water level using a water deeper around seasons and whenever such need arises. This is a long term exercise and is vital because the owner or any stakeholder can assess the performance of a borehole by observing the pumped water level and static water level after the safe recommended yield is pumped for the recommended length of time.

2.4.10. Proposed Project output/Products

The main products from the proposed project will include: a well-constructed borehole fitted with a solar pump, a master meter and increased water drawing activities within the proposed project site. Possible mitigation measures and enhancements to the adverse and beneficial impacts respectively associated with the project establishment and operation are as discussed in chapter Seven.

2.5. PROJECT COST

Table 2-1: The cost of the project is as follows

Description	Cost (KSH)
Land	0.00
Hydro-geological survey and Abstraction License Acquisition	75,000.00
EIA and NEMA License Acquisition	50,000.00
Civil works, drilling and equipment	10,000,600.00
Total	**11,125,600.00**

3. CHAPTER THREE: BASELINE ENVIRONMENTAL AND SOCIAL CONDITIONS

3.1 INTRODUCTION

Baseline conditions cover all the biophysical and socio-economic conditions in the project areas. Gathering of baseline data is necessary to meet the following objectives:

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

3.2 DEMOGRAPHICS

West Pokot County is inhabited by the Pokot ethnic group with Sengwer as the Minority community. According to the 2019 census, the county has a population of about 621,241 people. The site under study lies within Masol Ward with a population of 8,601 and is located in West Pokot Sub- County which has a population of 621,241people and covers an area of 9,123 km²

3.2.1 LAND USE PATTERNS AND SOCIO-ECONOMIC ACTIVITIES

Land use patterns in the area feature nomadic pastoralism, livestock rearing, subsistence agriculture and sparse settlements. The bulk of the population in the area practice nomadic pastoralism owing to the dry weather conditions. The main livestock types reared include cows, goats and sheep. Subsistence agriculture is carried out in small areas along rivers and springs.

3.2.2 VEGETATION

The area has a variety of vegetation including a mixture of exotic and natural vegetation. Vegetation includes moist forest, dry woodland, bushland, and desert scrub. The highland areas are covered by forests, but deforestation owing to population pressure outpaces the designation of forest reserves; to increase forest cover, which is critical to water retention. The figure below shows a section of the vegetation cover of the area.

Figure 3.1: Sample vegetation of the project area

Notably, property and road edge vegetation planted with vegetation such as the Golden Duranta shrubs and Acacia species The project site is likely to experience temporal vegetative disturbance more so during the construction phase. This will however be replaced by landscaping on completion.

3.2.3 TOPOGRAPHY

The area has a hilly terrain, in general terms the topography can be said to be undulating with small open valleys and ridges slanting gently southwest. The ward generally slopes from the South East to the North West. The ward is characterized by high gradient hills and ridges at the high-altitude areas and plains at the low altitude areas.

3.2.4 GEOLOGY AND SOILS

The Western parts of area has igneous rocks (of volcanic origin) which are found at the surface while on the eastern part sedimentary rocks are found at the surface. Flood zones near the river banks have alluvial deposits which are scattered and unconsolidated. The soils, derived primarily from metamorphic rocks of the Precambrian Basement System, are willow, rocky, and prone to erosion in some areas; deep, fertile, and well-drained in others. The area has loose porous silt-sandy soils.

3.2.5 RAINFALL AND CLIMATE

The area experiences a hot semi-arid climate with an average temperature of 24.4ºC and average rainfall precipitation of 508mm per annum. The driest month is January in which there is 11mm of precipitation. Most of the precipitation in the area falls in April, averaging 96 mm. March is the warmest month with an average temperature of 25.4ºC while July is the coldest month averaging 23.3ºC

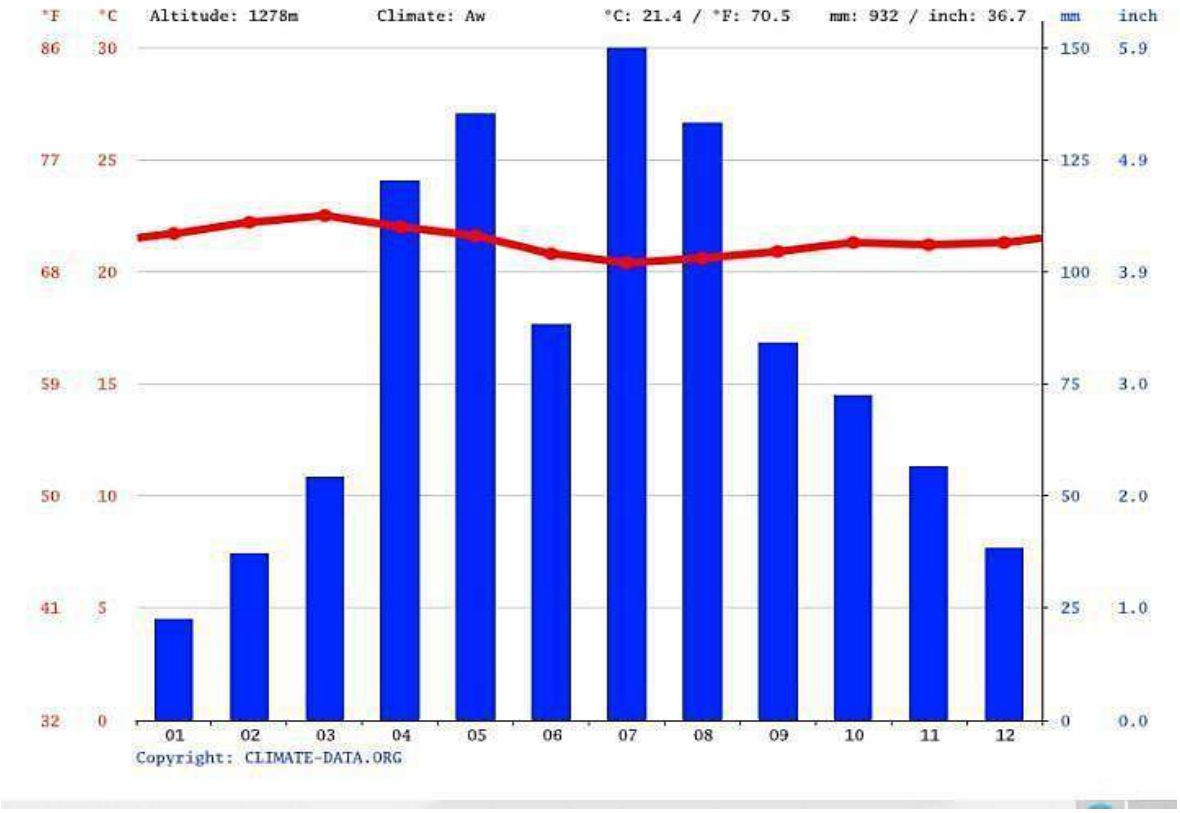

Figure 3.3; Climate of the project area

3.3 WATER RESOURCES AND HYDROLOGY

The county has a bimodal type of rainfall. The long rains fall between April and August while the short rains fall between October and February. There is, however, great variation in the total amount and distribution of the rainfall received in the county. The lowlands receive 600 mm per annum while the highlands receive 1,600 mm per annum. The county also experiences great variations in temperature with the lowlands experiencing temperatures of up to 30ºC and the highlands experiencing moderate temperatures of 15ºC. These high temperatures in the lowlands cause high evapotranspiration which is un-favorable for crop production.

4. CHAPTER FOUR: STAKEHOLDERS CONSULTATION

4.1 OVERVIEW

Community water projects often have positive and negative significant impacts on local population. There is need therefore for the local people to understand these impacts to participate in enhancing positive impacts and mitigating against negative ones. Therefore, local people's participation in the process is essential. In view of these, the environmental assessment team adopted a participatory approach during the study noting that stakeholders' participation in Kenya is entrenched in the constitution, several legal instruments and international instruments to where Kenya is a party.

4.2 LEGAL REQUIREMENT FOR PUBLIC PARTICIPATION

4.2.1 The Constitution of Kenya

Public participation is enshrined in several articles across the Kenya constitution 2010. Article 6 provided for devolution and access to services. Responsibilities in major decision-making process have been bestowed to the public (in the bill of rights, articles 118, 174, 196 and 201). The constitution further in article 21 section 3, states that the needs of vulnerable groups and the marginalized should be addressed by all state organs and public officers. This can be effectively achieved through active involvement of such groups in decision making process at all levels. Hence need to involve the local people in the project area in the studies and implementation of the proposed Kapunia Community Borehole Water Project.

4.2.2 Environmental Management and Coordination Act, 1999 and Subsequent Amendments

Section 17 of the Environmental (Impact Assessment and Audit) Regulations of 2003 requires that all EIA report incorporate consultation with the public during the study process. The aim of public consultation in Kapunia Community Borehole Water Project was to ensure that all stakeholders' environmental concerns or social interest in the proposed project are identified and their opinion considered during project planning, implementation, operation and decommission phase.

4.2.3 County Government Act 2012

Public participation is integral in Kenya's development process set out in the decentralized system of governance. The county government Act which sets out the service delivery procedure of county governments, has recognized local people involvement in decision making as key to governance. The Act in part VIII stipulates the principles of citizen participation and in part IX it guarantees the citizens' right to public communication as well as access to information. To ensure that there is optimal participation, the Act provides for civic education in part X to build the capacity of local people. Therefore, meaningful public consultation is significant during planning, implementing and operation of development projects hence the need for such consultations for the Kapunia Community Borehole Water Project.

4.2.4 International Convention (Aarhus Convention 1998)

The Aarhus convention on access to information, public participation in decision-making and access to justice in environmental matters entered into force on October 2001. The convention grants the public rights regarding access to information, public participation and access to justice, in public decision-making processes on matters concerning the local, national and trans-boundary environment. It focuses on interactions between the public and public authorities.

4.3 OBJECTIVES OF PUBLIC CONSULTATIONS

Public participation is not a one off event but a process throughout the project cycle that requires regular consultations. In regard to the preceding observation, Kapunia Community Borehole Water Project EIA involved stakeholders' participation with the following objectives;

- Disseminate and inform the project stakeholders about the proposed Project, its key components and Activities, location and expected impacts with particular attention to potentially affected or benefiting persons;
- Create awareness among the public and stakeholders on the need for the EIA for the Kapunia Community Borehole Water Project and its due process.
- To obtain information about the needs, concerns, comments, suggestions and priorities of affected persons as well as their general reactions to proposed project Activities;
- To provide an opportunity to stakeholders to ensure that their concerns are known to the decision making bodies, project planning team and the developer at an early phase of project planning and implementation
- To obtain the cooperation and participation of the key stakeholders and local communities in activities required to be undertaken for planning, implementing and operating of the proposed Kapunia Community Borehole Water Project.
- Create a sense of ownership, capacity build and ensure transparency in all activities related to the project including but not limited to planning, implementing, environmental management, operation, monitoring and evaluation of the project by all key stakeholders.

4.4 METHODOLOGY AND CONSULTATION PROCESS

The consultant team recognizes that for the assignment findings to be beneficial to the intended users, all the stakeholders should be actively involved in the planning, implementation and operation of the project. To accomplish this, the consultant adopted a participatory approach in the identification of environmental and social impacts that are related to the project cycle of the entire assignment. Several methods were used to engage stakeholders in the process of capturing their views on the proposed project and data collection. Such data collection approaches and procedures included but not limited to;

4.4.1 Interviewing Key Informants

The environmental and social assessment team interacted with local opinion leaders and wananchi and solicited their views on the various aspects of the proposed project on several occasions. Structured and unstructured interviews were held with such knowledgeable persons. Some of the key informants interviewed were County government officials, education, the clergy at the proposed project site and the locals from the neighboring among others.

4.4.2 Community Consultative Meetings

FGD sessions were held with community members who are the direct beneficiaries of the proposed project. The FGD yielded qualitative information on the perception of key stakeholders' major social and environmental issues of concern. The information gathered, was cross-checked with the existing empirical data, to ascertain its validity and reliability. During these sessions participants discussed in detail issues that are pertinent to the assessment of the socio-economic feasibility of the proposed borehole project.

Figure 4.1: Stakeholder Engagement Meeting.

5. CHAPTER FIVE: PROJECT ALTERNATIVE ANALYSIS

5.1. Introduction

Regulation 18(1) of Legal Notice 101 specifies the basic content of an Environmental Impact Assessment Study / Project Report subsequent to which, subsection (i) requires an analysis of alternatives including project site, design and technologies and reasons for preferring the proposed site. Therefore, this section analyses the Project alternatives in terms of site, technology scale and waste management options. However, under this study the alternative that was considered for the Project was focused on:

1. "No-action" Alternative
2. Relocation Alternative
3. Alternative drilling Technology
4. Alternative water sources
5. Comparative alternative
6. Mitigation measure alternative
7. The Proposed Development as described in the EIA Report

5.1.1 No Action Alternative

This alternative implies that the status quo of the water supply for Kapunia Village and in the project area will be retained. It implies No borehole shall be drilled. Therefore, no negative impacts to the environment shall be experienced. However, the flip side of this is that there will be continuous water problems such as inaccessibility to safe and clean drinking water shall persist for the project proponent and the communities in the surrounding environs.

5.1.2 Relocation Alternative

No other site will be ideal for implementation of the proposed projects, as the hydrological survey team has approved the selected sites as the most suitable for drilling the borehole. Surrounding areas are under private ownership and it would be costly to acquire alternative sites for relocation. The Authorization to drill boreholes will also state that borehole must be drilled at the selected site.

5.1.3 Alternative Drilling Technology

The technology for use in this type of facility is fairly simple and well established. The Down-The-Hole (DTH) rotary drilling machine is one of the best in the industry. It's one major advantage is that it can drill boreholes up to 350m deep producing minimal residues in the process. The other alternative is percussion method that is cumbersome, slow, noisy and very unreliable when the drilling meets major rock formation.

5.1.4 Alternative Water Sources

Surface water sources within the area constrained by the distance. The over 100 households plus their livestock depend on water from water pan that is around 7 km from the site. The water pan is not protected hence water not safe for

human consumption making the villagers prone to water borne diseases. With the proposed borehole, a much deeper aquifer shall be exploited.

5.1.5 Project Development Option

Implementation of the proposed development implies that the project proponent will construct new borehole for Kapunia community. Project implementation is anticipated to improve access to safe and clean drinking water for the villagers, school and surrounding community. Implementation of this option is not the best compared to the "No Project Option" because it will come with both environmental and social economic costs. However, mitigation measures have been proposed to ensure that any negative impacts are managed. Enhancing measures have also been proposed for maximum attainment of positive impacts of the project.

6. CHAPTER 6: POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS AND MITIGATION

6.1. INTRODUCTION

This Chapter presents the assessment of the issues likely to arise as a result of implementation of the proposed project. For each issue, the analysis is based on its nature, the predicted impact, extent, duration, intensity and probability, and the stakeholders and/or values affected. In accordance with best practice, the analysis includes issues relating to the project's environmental and social sustainability. Appropriate Impact Rating has been presented for the situation without mitigation. Allocation of responsibilities, time frame and estimated costs for implementation of these measures are presented in the Environmental Management and Monitoring Plan.

6.2. DEFINITION AND CLASSIFICATION OF ENVIRONMENTAL IMPACT

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

- Positive (beneficial) or negative (adverse);
- Direct or indirect, long-term or short-term in duration, and wide-spread or local in the extent of their effect.
- Impacts are termed cumulative when they add incrementally to existing impacts. In the case of the Project, potential environmental impacts would arise during the construction and operation phases of the Project and at both stages positive and negative impacts would occur.

6.3. IMPACT SIGNIFICANCE

The purpose of this EIA Report is to identify the significant impacts related to the Project under consideration and then to determine the appropriate means to avoid or mitigate those which are negative. Significant impacts are defined, not necessarily in order of importance, as being those which:

- Result in Loss of property and of livelihood.
- Relate to protected areas or to historically and culturally important areas;
- Are of public concern and importance.
- Trigger subsequent secondary impacts.
- Elevate the risk to life threatening circumstances.
- Affect sensitive environmental factors and parameter

6.4. IMPACT SCORING AND RATING CRITERIA

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

Table 6-1: Environment Impact Scoring and Rating Criteria

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

6.5. PHYSICAL / CHEMICAL IMPACTS

6.5.1. Dust Pollution

Dust will be generated during construction activities (vegetation clearing, excavation/drilling and backfilling). This will be a health hazard particularly to the construction workers and the general public. This will impact more the villagers who neighbour the borehole side.

6.5.2. Noise Pollution

Evidently construction works such as drilling and associated activities will generate noise. This will mostly affect the construction workers and the neighbouring homesteads which are within close proximity to proposed project area. However, it must be noted that this will be a temporary problem because the noise will end once construction is completed.

6.5.3. Contamination due to oil spillages

The use of machinery for drilling and other activities that require mechanical power could result in oil spillages. There is a possibility of soil, surface water and groundwater pollution from litter, fuels and lubricants at the project site. However, the occurrence of these wastes is expected to be minimal. Seepage of hydrocarbon products such as oils, grease and fuel if not carefully handled will result into contamination of water.

6.5.4. Soil Structural Damage

The removal of soil by drilling operations has major impacts of reduced productive potential on parcel proposed for borehole development. Consequent effects of soil loss include:

- Loss of organic matter essential for maintaining soil structure and nutrient supply
- Low water holding capacities and nutrient capacities
- Destruction of habitat for soil fauna and vegetation

Once there is less vegetation cover, the surface soil will be exposed to wind, with a potential problem of fine particles being blown over distance to negatively affect human life.

6.5.5. Waste management

Waste will be generated on site and this will invariably include solid waste and liquid waste. Major solid waste shall be the drilled cuttings. There will also be some solid containers such as cement, bentonite and gravel bags and other packets with materials and equipment to be used during implementation of the project. Other solid waste will be generated from the composite housing of the drilling crew. At the time of assessment, the community had not secured a solid waste collection point. Waste would not only impact the aesthetics of the area but has potential to pollute soil and water resource. Accidental oil and diesel spills would be caused by leaking of drums holding the diesel and oil that are stored on the site. The machines being used at the site could also cause oil spill especially if they are not well maintained

6.5.6. Draw-down effect

It is inevitable that groundwater abstraction from a borehole will result in reduced water levels (drawdown) in the area surrounding area. However, effective management of the abstraction from the borehole allows such drawdowns to be minimized and often reversed through recovery.

6.5.7. Impact for the Physical / Chemical factors

The Impact Rating for the factors is as illustrated in Table 6-2 below.

Table 6-2: Impact Rating for the Physical / Chemical factors

Impact	Impact Rating				
	Severity of Impact	**Spatial Scope of the Impact**	**Duration of Impact**	**Overall Score**	**Impact Rating**
Dust Pollution	-2	-2	-1	-2	Low
Noise Pollution	-2	-2	-1	-2	Low
Contamination due to oil spillages	-1	-1	-1	-1	Very Low
Soil Structural Damage	-2	-2	-1	-2	Low
Waste management	-2	-2	-1	-2	Low
Draw-down effect	-1	-1	-1	-1	Very Low

6.6. SOCIOLOGICAL / CULTURAL IMPACTS

6.6.1. Aesthetic impacts on the landscape

Project activities will likely change the appearance of some parts of the study area especially the excavated area along the length of the pipes, pump station and reservoirs construction areas. This is expected to be a temporary impact because the natural environment has mechanisms to restore itself.

6.6.2. Spread of HIV/AIDS

Normally the introduction of a mobile work force in a community impacts negatively on public health. Sexual relationships that are likely to emerge between the workers and the villagers have the potential impacts to the community.

6.6.3. Risk of accidents

Occupational hazards are likely to occur during drilling if safety precautions such as wearing protective personal equipment and are not followed. Avoidance of such hazards can be aided by regular risk assessment exercises conducted by personnel undertaking the project.

6.6.4. Impact on existing infrastructure

There is possibility to encounter existing infrastructure close to the project site. The field visit identified confirmed very minimal impact on existing infrastructure as this is a very fast land hence no existing structures near the proposed site,

6.6.5. Impact for the Sociological / Cultural Impacts

The Impact Rating for the factors is as illustrated in Table 6-3 below.

Table 6-3: Impact Rating for the Sociological / Cultural Impacts

Impact	Impact Rating				
	Severity of Impact	**Spatial Scope of the Impact**	**Duration of Impact**	**Overall Score**	**Impact Rating**
Aesthetic impacts on the landscape	-2	-2	-1	-2	Low
Spread of HIV/AIDS	-2	-2	-1	-2	Low
Risk of accidents	-3	-3	-1	-1	M
Impact on existing structure	-1	-1	-1	-1	Very Low

6.7. BIOLOGICAL / ECOLOGICAL IMPACTS

6.7.1. Loss of Vegetation

Vegetation cover is an important component of any ecosystem and determines its composition. Clearances of vegetation for at the proposed site will inevitably lead to loss of plant diversity. Although vegetation removal is expected to occur temporarily during the drilling phase and at a localised point (proposed project site), there is still a need to keep vegetation clearance to the minimum possible.

6.7.2. Impact for the Biological / Ecological Impacts

The Impact Rating for the factors is as illustrated in Table 6-4 below.

Table 6-4: Impact Rating for the Biological / Ecological Impacts

Impact	Impact Rating				
	Severity of Impact	**Spatial Scope of the Impact**	**Duration of Impact**	**Overall Score**	**Impact Rating**
Loss of Vegetation	-1	-1	-1	-1	Very Low

6.8. ECONOMIC / OPERATIONAL IMPACTS

6.8.1. Employment opportunities

It is envisaged that local people will benefit from the job opportunities presented by the drilling phase of the project, especially for duties that do not require special professional knowledge. Although this will be short term, it would be helpful as the unemployment rate is high in rural areas. If the project will be expanded further in future, people might be employed to ensure smooth running of the water supply.

6.8.2. Reliable water supply

The most significant factor related to the borehole drilling at Kapunia Community site is the improvement in the accessibility of safe and clean drinking water for domestic purposes and livestock use. Once the project is operational, demand for Kapunia Community and the surrounding community will be assured of a reliable source of water. This could result in commercial and industrial expansion in the project area.

6.8.3. EMP Monitoring (Protection of the environment)

EMP supervision during the construction and operational phases will result in environmental protection and increased awareness on environmental issues.

6.8.4. Impact for the Economic / Operational Impacts

The Impact Rating for the factors is as illustrated in Table 6-5 below.

Table 6-5: Impact Rating for the Economic / Operational Impacts

Impact	**Impact Rating**				
	Severity of Impact	**Spatial Scope of the Impact**	**Duration of Impact**	**Overall Score**	**Impact Rating**
Employment opportunities	+4	+3	+5	+4	High
Reliable water supply	+4	+3	+4	+4	High
EMP Monitoring (Protection of the environment)	+2	+2	+3	+2	Low

6.9. ANTICIPATED MITIGATION MEASURES / MEASURES TO STRENGTHEN POSITIVE IMPACTS

This section provides a summary of the results, the recommended mitigation measures for the negative impacts and enhancement measures for the positive effects. The drilling contractors will be required to implement these measures in totality in order to ensure that the environment is protected. Most impacts under the economic and operational component are positive. The two significant positive impacts are the provision of environmental information which will result in the better environmental conservation efforts in the project area as well as the improved accessibility to safe and clean water for domestic purposes which was the main aim of the groundwater project. The mitigation measures recommended for the various impacts in each of the four components are given in Table 6-6, Table 6-7, and Table 6-8.

Table 6-6: Recommended Mitigation Measures for Physical /Chemical Impacts

Impact	Mitigation Measure
Dust Pollution	• Visually monitor dust generation from work zones to reduce the impact to the neighbouring school and community • Sprinkle work areas with grey water to suppress
Noise Pollution	• All vehicles and equipment must be monitored and maintained in good working condition • Workers must be provided with earmuffs • Limit working hours from 8.00 am to 5.00 pm to avoid disturbance during resting hours
Oil spillages	• Regular checks and maintenance/service of drilling equipment to minimize potential oil leakage and spills
Waste generation	• The site personnel are encouraged to adhere to environmental health and safety policies in place to minimize littering and generation of other forms of waste • Project proponents to liaise with drilling Contractors to ensure proper disposal of waste generated
Fire Hazards	Use of flammables (candle lights, uncontrolled cigarette smoking) with potential for starting fires should be avoided where possible • Fire to be used only when staff is on site • Flammable fuels to be kept away from open flames • Fire extinguisher to be installed on site
Loss of Soil	• As minimum clearance space as possible is recommended to minimize losses of soil removal/loss during site clearing for drilling
Change of Soil Chemistry	• Drilled soil material should be kept in one place to minimize lateral spread and downstream pollution. This will reduce the potential problem of soil salinity and acidity

Table 6-7: Recommended Mitigation Measures for biological/ecological impacts

Impact	Mitigation Measures
Loss of vegetation	• Heavy drilling machinery should only be on one site; where they are most needed • Vegetation removal should be limited to site of operation only

Table 6-8: Recommended Mitigation Measures for Sociological/Cultural Impacts

Impact	Mitigation Measures
Loss of aesthetic appeal	• Minimise the project's footprint on the local environment
Risk of accidents	• Drilling contractor to undertake regular risk assessment exercises conducted by personnel undertaking the project
Archeological Impacts	• Drilling contractor to monitor excavation and drilling activities and notify the relevant agency for any findings
Spread of HIV/AIDS	• Introduction of Relevant Contractor employees to the community and client • Promotion of HIV/AIDS awareness campaigns • Strengthen public education on HIV/AIDS related programmes that • Introduction of an HIV/AIDS workplace programmes which will ensure availability of HIV/AIDS related commodities and IEC materials.

Table 6-9: Recommended Mitigation Measures for Economic / Operational Impacts

Impact	Mitigation Measure / Measures to Strengthen the Impacts
Employment Opportunities	• Manpower sourced locally as much as is possible especially in the semiskilled and unskilled categories
Reliable Water Supply	• To embark on water conservation programmes e.g. water harvesting
Environmental Protection	• Ensure that the EMP is complied with

7. CHAPTER SEVEN: ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN

7.1. PURPOSE AND OBJECTIVES OF ESMMP

The specific objectives of the ESMMP are to:

- Serve as a commitment and reference for the contractor to implement the ESMMP including conditions of approval from NEMA.
- Serve as a guiding document for the environmental and social monitoring activities for the supervising consultant, contractor and the client management including requisite progress reports.
- Provide detailed specifications for the management and mitigation of activities that have the potential to impact negatively on the environment.
- Provide instructions to relevant Project personnel regarding procedures for protecting the environment and minimizing environmental effects, thereby supporting the Project goal of minimal or zero incidents.
- Document environmental concerns and appropriate protection measures; while ensuring that corrective actions are completed in a timely manner.

7.2. AUDITING OF ESMMP

The contractor shall conduct regular audits to the ESMMP to ensure that the system for implementation of the ESMMP is operating effectively. The audit shall check that a procedure is in place to ensure that:

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

7.3. MANAGEMENT RESPONSIBILITY OF ESMMP

In order to ensure the sound development and effective implementation of the ESMMP, it will be necessary to identify and define the responsibilities and authority of the various persons and Organizations which will be involved in the project. The following entities should be involved in the implementation of this ESMMP:

- Contractor;
- Consultant;
- Kapunia Community Committee

8.3.1 National Environment Management Authority (NEMA)

The responsibility of NEMA is to exercise general supervision and co-ordination over all matters relating to the environment and to be the principal instrument of Government of Kenya in the implementation of all policies relating to the environment.

8.3.2 The Contractor

The persons/firms contracted to drill and equip the proposed borehole will be required to comply with the requirements of the ESMMP within this report. To ensure strict compliance environmental specifications of this ESMMP should form part of the contract documents.

8.3.3 Consultant

The sourced consultant will have to ensure that the proposed ESMMP is up to date and is being used by the contractor. Periodic audits of the ESMMP will have to be done to ensure that its performance is as expected.

8.3.4 Kapunia Community Committee

The select committee will be called upon where necessary during Project implementation to provide the necessary permits and advisory services to the Project implementers. The Project once commissioned will be operated by the Kapunia Community.

7.4. EMERGENCY PROCEDURE DURING CONSTRUCTION AND OPERATION PHASE OF THE PROJECT

An emergency situation means unforeseen happening resulting in serious or fatal injury to employed persons or the neighboring communities. In the event of an emergency during construction, the workers shall: -

- Alert other persons exposed to danger;
- Inform the OSHA coordinator;
- Do a quick assessment on the nature of emergency;
- Call for ambulance.

When emergency is over, the OSHA coordinator shall notify the workers by putting a message: "ALL CLEAR". In the event of such an emergency during operation the workers shall:

a) Alert other persons exposed to danger;
b) Ring the nearest police station and ambulance service

The proponent has already put measures to respond to emergencies like alarms and a fire assembly point there are also trained staff can assist in case of emergency.

Table 6-10: Environmental and Social Management & Monitoring Plan

Environmental impact	Recommended mitigation/enhancement measures	Responsible party	Anticipated Impacts	Performance Monitoring Indicator	Estimated cost (KES)
Air Quality	• Reduce speed for vehicles visiting the site • Provide dust masks to people at the site • Continuously water the site during the drilling process	Contractor	Dust emissions Smoke emissions Obnoxious gases: SOx, NOx, CH4, CO_2	Presence of dust on plants around the site and access roads Public complains	30,000
Soil Erosion	• Contain drill waste or dispose in nonerodable area • Remove soil overburdens after drilling	Contractor	Siltation of water sources	Stockpiled soil overburdens	10,000
Noise & Vibration Management	• No drilling at night • Provide ear muffs to drilling staff for a duration of more than 8 hrs;	Contractor	• Health effects such as tinnitus and fatigue • Public nuisance	Public complains Presence of PPE (particularly ear muffs)	10,000
Excessive vibration	Drill at day time only	Contractor	Public nuisance	Public complains Drilling at late hours of the evening	100,000
Ecosystem disturbance	• Minimize clearance of existing natural vegetation at the site • Plant vegetation with water conservation/purification abilities like bamboo around the borehole.	Contractor	Changes in natural habitats	Extinction of local vegetation No. of trees planted to conserve the catchment	50,000

Environmental impact	Recommended mitigation/enhancement measures	Responsible party	Anticipated Impacts	Performance Monitoring Indicator	Estimated cost (KES)
Water Quality	• Protect the borehole apron from polluted water. • Establish a database on water quality monitoring records • Ensure regular disinfection of the water. • Regularly conduct water quality analysis to ascertain quality • Properly gravel pack and seal the borehole to avoid any contamination from shallow sub-surface water	Contractor	• Poor/fluctuating water quality • Health complications associated with contaminated water	Water quality records Availability of water disinfection agents	50,000
Waste management	• Spill kit will be maintained on site when chemicals or fuels are stored on site. • Spillages of chemicals will be cleaned up immediately	Contractor	Accidental oil spills Contamination of water Fire hazards	Reports of contamination Bunded areas for storage of hazardous substance	50,000
Ground water management	• Ensure withdrawals are reliable from groundwater resources especially during dry seasons • Enhance accountability of water supplied by installing a master water meter to monitor quantities of water abstracted • Borehole to be fitted with an airline for monitoring of the water levels • The maximum groundwater abstraction permitted from the borehole is limited to the authorized volume per	Contractor	Over-abstraction Conflicting water demands Contamination of water	Yield from the borehole A master meter at the borehole Contaminated water No, of alternative sources of water	10,000

Environmental impact	Recommended mitigation/enhancement measures	Responsible party	Anticipated Impacts	Performance Monitoring Indicator	Estimated cost (KES)
	day for the domestic/industrial use only subject to availability from 60% of the tested yield for a maximum abstraction period not exceeding ten (10) hours per day • Explore alternative sources of water such rain water harvesting • Adhere to the regulations set by the WRA and on the amounts to be extracted from a borehole and the number of pumping hours.				
Drill waste pollution management	• Segregate wastes into biodegradable and non-biodegradable • Avoid accumulation of solid wastes to uncontrolled levels • Ensure the collection and disposal of the wastes is done regularly and appropriately.	Contractor/ Proponent	Creation of habitats for pathogens and rodents	Solid waste collection point(s) Public complains Solid wastes at borehole	25,000
Geologic risks	• Temporary casings may is installed during drilling • Drilling be done in the presence and supervision of a hydro-geologist • Avoid heavy compaction activities around the proposed site • Carry out a hydrogeological survey to determine the suitability of the area for the drilling of a borehole • Ensure the borehole is drilled to a minimum finished diameter of 8". The borehole should then be lined with	Contractor	Land subsidence Environmental degradation Loss of property and life	Sinking of ground around the proposed borehole site Hydrological survey report	250,000

Environmental impact	Recommended mitigation/enhancement measures	Responsible party	Anticipated Impacts	Performance Monitoring Indicator	Estimated cost (KES)
	appropriate 6" casings				
SEA by project workers against community members	Develop and implement a SEA Action Plan with an Accountability and Response Framework as part of the construction ESMP in accordance with the World Bank's Good Practice Note for Addressing Gender-based Violence in Investment Project Financing involving Major Civil Works (Sept 2018)	Contractor, Supervising Engineer, Consultant Social Worker and Consultant GBV Expert	Weekly audits to confirm compliance with SEA Action Plan	Number of cases of SEA	50,000
GBV/SH	• Develop a human resources policy against sexual harassment • Develop a Code of Conduct • Create awareness on the dangers associated with GBV/SH and the need to take precautions against them • Establish a GRM	Contractor and Consultant Social Worker	Weekly audits to confirm compliance with policies against sexual harassment and Code of Conduct	Number of cases of GBV/SH	70,000
Child abuse and/or child labour	• Comply with all relevant local legislation on protection of children against exploitation • Develop and implement a Children Protection Strategy • Ensure all staff and workers sign, contracts which clearly defines what is and is not acceptable behaviour • Do not hire underage at the site as provided by Child Rights Act (Amendment Bill) 2014	Contractor, Supervising Engineer, Consultant Social Worker and Stakeholder Engagement Expert	Monthly audits to confirm compliance with child protection measures outlined in the project documents	Number of cases of child abuse	50,000

Environmental impact	Recommended mitigation/enhancement measures	Responsible party	Anticipated Impacts	Performance Monitoring Indicator	Estimated cost (KES)
Risk of spread of COVID-19	• Put in place measures to prevent and manage the spread of the COVID-19 • Develop SOPs for managing the spread of COVID-19 • Provide and enforce and use of appropriate PPE by project personnel	Contractor, Supervising Engineer, Stakeholder Engagement Expert	Weekly audits to confirm compliance with Government of Kenya directives for prevention of the spread of COVID-19	Number of reported cases of COVID-19 from among construction staff and people interacting with the construction staff	230,000
Risk of increased HIV/AIDS and STIs	• Sensitize workers and community members on HIV/AIDS and STIs, • Ensure periodic HIV/AIDS and STIs, and other communicable diseases awareness workshops for project staff and workers	Contractor and Consultant Social Worker	Monthly sensitization meetings	Rate at which dispensed condoms are used/picked	100,000
Sub-total for construction phase					**1,085,000**

Table 6.2: Proposed environmental management plan for the implementation and operation phase of the proposed borehole

Impact	Action Required/Mitigation Measure	Responsibility	Time frame	Cost
Reduced and or depletion of aquifer storage	Abstraction water equivalent borehole yield based on pumping test	The community	Continuous	Routine Work
Aquifer compaction and	Abstraction water equivalent to aquifer yield based on recovery test especially during the	The community	Continuous	Routine work
Subsidence	dry season to avoid depletion of ground water, possible compaction of aquifer and land subsidence			
Ground water contamination	Protect the borehole from surface contaminants	Contractor, the community	During drilling and construction of borehole	800,000
Loss of vegetation, habitat, degradation & loss of income	Rehabilitation through planting of grass trees around water points and general environment greening to restore flora and fauna and habitat	Contractor, community	1 year	40,000
Oil and fuel spill	Equipment maintenance be done away from site Scoop affected soils and dispose away from water source in case of oil spill	Contractor	1 month	Routine work
Site accidents	Provide written instructions on how to avoid and respond to accidents. Safety gears should be given as necessary	Engineer/supervisor and contractor	Once	Negligible
	□ Leaving the site as clean as possible	Contractor	Always	Routine
	□ Provide a well-stocked onsite first aid box	Contractor	Once	10,000
Total cost Environmental Impacts operation phase of the proposed borehole				**850,000**

Social and health impacts during the operation phase					
Potential Negative social Impacts	**Mitigation Measures**	**Responsibility**	**Frequency/Timing**	**Verifiable Indicators**	**Cost**
Sexual Exploitation and Abuse by project workers against community members	Engagement with the community: including development of confidential community-based complaints mechanisms discrete from the standard grievance redress mechanism (GRM);	The community leaders and County Dept. of Social Service	Throughout operation period	Incidences Sexual Exploitation and Abuse Reports	20,000
Gender based violence and sexual harassment (GBV/SH)	Implement provisions that ensure that GBV at the community level is not triggered by the project	County Dept. of Social Service and the community leaders	Operation period	Reported cases of GBV Number of sensitization meetings	10,000
Risks of spread of COVID-19 at	develop a SOPs for managing the spread of COVID-19 in line with	Community members and	Throughout the project cycle	Number of Reported cases Number of PPEs provided	80,000
work sites	MoH and WB Guidelines Provide PPEs	Committee/ County Dept. of health			
Risk of Increased incidences of HIV/AIDS and STIs	sensitize workers and community members on HIV/AIDS awareness and other communicable diseases	The community/County Dept. of Health	Throughout the project cycle	Number of awareness creation meetings and list of participants	10,000
OHS	Provide PPEs (b) Provide equipped first aid kits and other facilities and services	Community leaders/County Dept. of Public Health		Number of accidents/incidences recorded, number of warning signs installed and their intervals	110,000

Grievance Redress Mechanisms	Establish a grievance redress mechanism targeting communities and other project stakeholders but not applicable to commercial and employee-employee relationships, and which will allow stakeholders to easily put forth their concerns relating to the project, implementation and have them addressed in a prompt and respectful manner;	Community leaders County Dept. of Social Service	Throughout the project cycle	GRM Register Number of GRM issues raised	50,000
Total cost for ESMMP Social and health impacts during the operation phase					**330,000**
Total cost for ESMMP during construction and operation phase					**2,235,000**

8. CAPACITY DEVELOPMENT FOR ENVIRONMENTAL MANAGEMENT AND MONITORING

8.1 Capacity Building

Capacity building during the project will be conducted for project staff/ construction workers and the local community. The contractor is responsible for ensuring that workers are provided HSE training as stipulated in OSHA 2007. A training register should be kept on site for all training conducted as proof for auditing purposes. Training of the construction work-force will include the following content as a minimum;

- The significance of the site HSE policy
- The pertinent HSE issues of the project activities;
- Roles and responsibilities towards conforming with the ESMP and the HSE policy and procedures
- Potential consequences of departure from specified operating procedures
- Corrective measures to be undertaken as a consequence of non-compliance The contractor in-collaboration with the proponent will conduct community sensitization on various social issues that include;
- COVID-19 transmission, prevention and PPE requirements
- HIV/ AIDS awareness (i.e. transmission, prevention, counselling, treatment)
- Prevention and treatment of other sexually transmitted infections
- Environmental conservation and ecosystem protection
- Access and safety around the project construction site

8.2 Administration of the ESMP

The ESMP will be administered by the four (4) different institutions (i.e. County Government of West Pokot (Ministry of public works), DRSLP II and the Contractor). The role of NEMA will be to review audits, issue compliance/conditions for compliance and conduct visits where they deem necessary to ensure that the impacts envisaged under the ESMP are being managed effectively. In order to guarantee the effective implementation of the ESMP, each institution will need to take cognizance of the responsibilities and authority and the various persons/institutions play their roles as per the ESMP and the existing laws and regulations

9. CHAPTER NINE: CONCLUSION AND RECOMMENDATIONS

9.1. CONCLUSION

The primary objective of the proposed project is to enhance access to a stable water supply for the proponent. The hydro-geological survey carried out revealed that the hydro-geological conditions within the proposed project site are favorable for the drilling of the borehole. The proposed borehole will run to a depth of approximately 130 to 150 meters so as to penetrate fully into the water bearing Series; to generate the authorized volume per day in order to meet the demand.

The proposed drilling activity being considered is going to have a very insignificant negative impact to the community and on the surrounding environment. The minor impacts arising are easy to mitigate if the proposed strategies in the management plan are adhered to effectively. Some of the positive impacts that will accrue as a result of the implementation of this project will include availability of reliable and safe water for domestic use, improved efficiency and reduced dependency on other sources of water. Groundwater from the proposed borehole is expected to be fresh. However, on completion of drilling works, a water sample should be referred to a competent laboratory for physical, chemical and bacteriological analysis before water is availed for use.

9.2. ASSESSMENT FINDINGS

Generally, the proposed Kapunia community borehole will have a positive impact to the local people's access to safe water both for domestic and livestock use and improving sanitation. The EIA study team proposes the implementation of the project with the anticipated positive impacts enhanced and negative impacts being mitigated. The following recommendations should be put into consideration for sustainability of the project.

- The project proponent to ensure full implementation of EMP and EMP proposals during implementation stage.
- Immediately after the borehole has been drilled and before commissioning for use, the water should be subjected to drinking water quality test according to the provisions of *Water Quality Management Regulations, 2006 (Legal Notice No. 120).*
- The borehole should be fitted with a master water meter to monitor groundwater abstraction, and an airline for monitoring of the water levels.
- In the event that the project proponent for whatever reason decides to decommission the project, a decommissioning and site rehabilitation plan should be prepared. The plan should be prepared in a participatory way by an expert registered by NEMA and submitted to NEMA for approval before commencement of the decommissioning process.

10. CHAPTER TEN: REFERENCES

1) Hydro-Geological & Geophysical survey report for one production borehole within Kapunia Community borehole, ground water resource investigation Report 06- Nov-2020

2) Republic of Kenya, Section 7(1) of Environmental (Impact, Audit and Strategic Assessment) (Amendment) Regulations, 2019, legal notice No. 32

3) Republic of Kenya, Environmental Management and Coordination Act (EMCA,1999) 4) Republic of Kenya, Water Act (2016), Government Printer, Nairobi

APPENDICES

Appendix 1: Environmental screening check list

Appendix 2: Community Resolution Form

Appendix 3: Attendance Sheets

Appendix 4: Filled Questionnaires

Appendix 5: Minutes of Meetings

Appendix 6: Experts NEMA licenses

APPENDIX 1: ENVIRONMENTAL SCREENING CHECK LIST

APPENDIX 2: COMMUNITY RESOLUTION FORM

COMMUNITY RESOLUTION FORMS – DROUGHT RESILIENCE AND SUSTAINABLE LIVELIHOODS PROGRAMME (DRSLP)

Community Resolution on Identification/Selection of structure sites i.e.
......KAPUNIA SH-K......

We, the beneficiaries of ......KAPUNIA...... Have discussed and agreed that ......KAPUNIA......will be the site for the ......BORE HOLE...... in ......Sub county, ...MASOL...... Ward, ...MASOL...... Location, ...PORKOT CENTRAL...... Sub-location.

We, on behalf of the beneficiaries (beneficiaries' representatives) confirm the above information be true.

(names of three (NO) Beneficiaries' representatives)

S/NO.	NAME	ID/NO.	SIGNATURE
	[illegible]	[illegible]	
	[illegible]	[illegible]	
	[illegible]	[illegible]	
	[illegible]	[illegible]	

Witnessed By: ......[illegible] ID [illegible]......

Chief office (Stamped)

ASST. CHIEF TIKIT SUB LOCATION P.O. BOX 1, KAPENGURIA.

NAME	P/NO.	DESIGNATION	SIGNATURE
[illegible]	[illegible]	for Asst. Chief	

CDA'S OFFICE (Stamped)

NAME	P/NO.	DESIGNATION	SIGNATURE
Thomas N. Wasike	[illegible]	CDA	

08 SEP 2021

County Government (Stamped)

(County Executive for Agriculture and Irrigation)

NAME	ID/NO.	SIGNATURE
Geoffrey Lipale	13260617	

COUNTY EXECUTIVE COMMITTEE MEMBER
POKOT COUNTY
08 SEP 2021
MINISTRY OF AGRICULTURE, IRRIGATION, FISHERIES & PASTORAL ECONOMY
P.O. Box 223 - 30600, KAPENGURIA

(NB: Please add any other relevant information)

APPENDIX 3: ATTENDANCE SHEETS

MINISTRY OF AGRICULTURE, LIVESTOCK, FISHERIES AND COOPERATIVES
STATE DEPARTMENT FOR CROP DEVELOPMENT AND AGRICULTURAL RESEARCH
DROUGHT RESILIENCE AND SUSTAINABLE LIVELIHOODS PROGRAMME (DRSLP)

Government of Kenya (GoK) | LIST OF PARTICIPANTS | African Development Bank (AfDB)

ACTIVITY: ESIA Public Participation Meeting for the proposed Kapuria Community Borehole at Kapuria Village, Tikit Sub-location Mnagei Ward, Pokot Central Sub County

DATE: 4/9/2021

S/NO	NAME	GENDER	ORGANIZATION/DEPLOYMENT	PHONE NO. AND E-MAIL ADDRESS
	Samwel Nakori	M	DOP	0740528201 [illegible]@gmail.com
	Michael Ni Lomerizio	M	Farmer	078162232-94
	Kachoria Tolongole	M	Farmer	
	John Lomongoria	M	Farmer	
	Pokai Longuraluck	M	Farmer	

ASST. CHIEF, TIKIT SUB LOCATION, P.O. BOX 1, KAPENGURIA

S/NO	NAME	GENDER	ORGANIZATION/DEPLOYMENT	PHONE NO. AND E-MAIL ADDRESS
	Longolerol	M	farmer	
	Krop Longolerol	M	Farmer	
	Komukakirio	M	farmer	
	Apulo Poriot	M	Farmer	
	Lotwala Losiki	M	Farmer	
	Cherellinga Nguarareng	M	Farmer	0110485170S
	Longuraluck	M	Farmer	
	Amerenguria Lokima	M	Farmer	0112601446
	Cheporeto Longirot	M	Farmer	
	Loupot Lotow Lokedingole	M	Farmer	07[illegible]66616710
	Todosiwo Kipul	M	Farmer	
	Ruben Matos	M	Farmer	0711115620
	David K. Sontany	M	M.O.A - SCAO	0724437256

APPENDIX 4: FILLED QUESTIONNAIRES

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT QUESTIONNAIRE

PROPOSED Kapunia Borehole AT Kapunis Village

Pursuant to the provisions of the Environmental Management and Coordination Act Cap. 387 Environmental Impact Assessment (EIA) and Audit (EA) Regulation 2003, Public Health Act and Legal Supplement 2003, a social site assessment for EIA is being conducted on the proposed project

RESPONDENT

Name: [illegible] NASOKI

County: WEST POKOT

Sub County: POKOT CENTRAL

Ward: MASOL

Mobile No.: 0740588201

(Please note that these details are required for the purposes of authenticity in relation to the proposed project)

1. Do you support the proposed project in the area? Yes (✓) No ( )
2. Do you think the proposed project is suitable and compatible with the surrounding developments? Yes (✓) No ( )
3. Within this area, are there similar projects? Yes ( ) No (✓)
4. What are some of the positive environmental and socio-economic impacts you can attach to this project? *(suggest enhancement measures for the identified impacts)*
   (i) During Construction Phase
   - Jobs for unskilled villagers
   - Market for raw materials

   (ii) During Operation Phase
   - Access to safe and clean water at point near for the villages
5. What are some of the negative environmental and socio-economic impacts you can attach to this project? *(suggest mitigation measures for the identified impacts)*
   (i) During Construction Phase
   Noise & Dust

   (ii) During Operation Phase

6. In your general opinion should the proposed project be implemented / allowed to proceed? Tick one: Yes (✓) No ( )
7. Any other comments/suggestions you would like to make in relation to this proposed project.
   I welcome you to this place and fully support the project

Signature: [signature] Date: ASST. CHIEF, [illegible] SUB LOCATION, [illegible]

THANK YOU FOR YOUR RESPONSE

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT QUESTIONNAIRE

PROPOSED Kapunia Borehole AT Kapunia Village

Pursuant to the provisions of the Environmental Management and Coordination Act Cap 387 Environmental Impact Assessment (EIA) and Audit (EA) Regulation 2003, Public Health Act and Legal Supplement 2003, a social site assessment for EIA is being conducted on the proposed project.

RESPONDENT

Name: John Longuawal

County: West Pokot

Sub County: Pokot Central

Ward: [illegible]

Mobile No: ……

(Please note that these details are required for the purposes of authenticity in relation to the proposed project)

1. Do you support the proposed project in the area? Yes (✓) No ( )
2. Do you think the proposed project is suitable and compatible with the surrounding developments?

   Yes (✓) No ( )

3. Within this area, are there similar projects? Yes ( ) No (✓)
4. What are some of the positive environmental and socio-economic impacts you can attach to this project? *(suggest enhancement measures for the identified impacts)*

   (i) During Construction Phase

   Job creation

   (ii) During Operation Phase

   - Water for us and our livestock
   - Less diseases

5. What are some of the negative environmental and socio-economic impacts you can attach to this project? *(suggest mitigation measures for the identified impacts)*

   (i) During Construction Phase

   None

   (ii) During Operation Phase

6. In your general opinion should the proposed project be implemented / allowed to proceed? Tick one:

   Yes (✓) No ( )

7. Any other comments/suggestions you would like to make in relation to this proposed project.

   Support

Signature ……… **Date** 4/5/21

THANK YOU FOR YOUR RESPONSE!

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT QUESTIONNAIRE

PROPOSED ...Kapoin... Borehole AT... Kapoin... Village

Pursuant to the provisions of the Environmental Management and Coordination Act Cap 387 Environmental Impact Assessment (EIA) and Audit (EA) Regulation 2003, Public Health Act and Legal Supplement 2003, a social site assessment for EIA is being conducted on the proposed project

RESPONDENT

Name... [illegible] Lomorionz...

County... West Pokot...

Sub County... Pokot Central...

Ward... [illegible]...

Mobile No. ... [illegible]...

(Please note that these details are required for the purposes of authenticity in relation to the proposed project)

1. Do you support the proposed project in the area? Yes (✓) No ( )
2. Do you think the proposed project is suitable and compatible with the surrounding development?

   Yes (✓) No ( )
3. Within this area, are there similar projects? Yes ( ) No (✓)
4. What are some of the positive environmental and socio-economic impacts you can attach to this project? *(suggest enhancement measures for the identified impacts)*

   (i) During Construction Phase

   - Roads improved
   - Jobs created

   (ii) During Operation Phase

   - Clean water
   - improve food production

5. What are some of the negative environmental and socio-economic impacts you can attach to this project? *(suggest mitigation measures for the identified impacts)*

   (i) During Construction Phase

   Noise & Dust

   (ii) During Operation Phase

   ... Nil ...

6. In your general opinion should the proposed project be implemented / allowed to proceed? Tick one

   Yes (✓) No ( )
7. Any other comments/suggestions you would like to make in relation to this proposed project.

   ... Support ...

Signature... [signature] Date... 4/9/2[illegible]

THANK YOU FOR YOUR RESPONSE

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT QUESTIONNAIRE

PROPOSED ... AT ...

Pursuant to the provisions of the Environmental Management and Coordination Act Cap 387 Environmental Impact Assessment (EIA) and Audit (EA) Regulation 2003, Public Health Act and Legal Supplement 2003, a social site assessment for EIA is being conducted on the proposed project

RESPONDENT

Name: ...

County: ...

Sub County: ...

Ward: ...

Mobile No: ...

(Please note that these details are required for the purposes of authenticity in relation to the proposed project)

1. Do you support the proposed project in the area? Yes (✓) No ( )
2. Do you think the proposed project is suitable and compatible with the surrounding developments?
   Yes (✓) No ( )
3. Within this area, are there similar projects? Yes ( ) No (✓)
4. What are some of the positive environmental and socio-economic impacts you can attach to this project? *(suggest enhancement measures for the identified impacts)*
   (i) During Construction Phase
   ...
   (ii) During Operation Phase
   ...
5. What are some of the negative environmental and socio-economic impacts you can attach to this project? *(suggest mitigation measures for the identified impacts)*
   (i) During Construction Phase
   ...
   (ii) During Operation Phase
   ...
6. In your general opinion should the proposed project be implemented / allowed to proceed? Tick one
   Yes (✓) No ( )
7. Any other comments/suggestions you would like to make in relation to this proposed project.
   ...

Signature ... Date ...

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT QUESTIONNAIRE

PROPOSED Kapsowa Institute AT Kapsowa Village

Pursuant to the provisions of the Environmental Management and Coordination Act Cap 387 Environmental Impact Assessment (EIA) and Audit (EA) Regulation 2003, Public Health Act and Legal Supplement 2003, a social site assessment for EIA is being conducted on the proposed project

RESPONDENT

Name: Peter Langat

County: West Pokot

Sub County: Pokot Central

Ward: Kiwawa

Mobile No:

(Please note that these details are required for the purposes of authenticity in relation to the proposed project)

1. Do you support the proposed project in the area? Yes (✓) No ( )
2. Do you think the proposed project is suitable and compatible with the surrounding developments?
   Yes (✓) No ( )
3. Within this area, are there similar projects? Yes ( ) No (✓)
4. What are some of the positive environmental and socio-economic impacts you can attach to this project? *(suggest enhancement measures for the identified impacts)*
   (i) During Construction Phase
   Jobs created during construction
   (ii) During Operation Phase
   Safe water
   Improved sanitation
5. What are some of the negative environmental and socio-economic impacts you can attach to this project? *(suggest mitigation measures for the identified impacts)*
   (i) During Construction Phase
   Noise
   (ii) During Operation Phase

6. In your general opinion should the proposed project be implemented / allowed to proceed? Tick one.
   Yes (✓) No ( )
7. Any other comments/suggestions you would like to make in relation to this proposed project.
   Welcome Project

Signature Peter Date 4/5/22

THANK YOU FOR YOUR RESPONSE

APPENDIX 5: MINUTES OF MEETINGS

MINUTES OF THE EIA PUBLIC MEETING FOR SENSITIZATION AND
AWARENESS FOR THE PROPOSED DRILLING AND EQUIPPING OF
KAPUNIA COMMUNITY BOREHOLE IN KAPUNIA VILLAGE, NYANG'ATIA SUB-LOCATION, MASOL LOCATION, MASOL WARD, WEST POKOT COUNTY

Agenda

1. **Opening remarks**
2. **Team & Project Introduction**
3. **Concerns, comments and questions from community members**

Min 01/06/2021: Opening Remarks

The meeting was called to order by the area Ass. Chief at 3.58 pm and was opened by a word of prayer by one of the villagers. The Ass. Chief later introduced the MOA team leader Mr David Sontany and the EIA team. David then gave brief introductory comments and later handed the meeting to the EIA consultants. The figure below shows a section of members of the public who were in attendance.

Figure 11-1: A public participation baraza chaired by EIA Experts in proposed borehole site in Kapunia Village

Min 02/06/2021: Team & Project Introduction

The Lead Expert introduced the project and the ESIA study of the proposed drilling and equipping of the Community Borehole to the Village members, elaborating its objectives and the role of communities and leaders in the project.

The legal requirement that development projects are subject to Environmental and Social Impact Assessment was outlined sighting different examples for classes of projects with low, medium and high risks. The consultant explained that the proposed project would have both positive and negative impacts on the surroundings and on the community and welcomed them to voice their concerns, comments and questions.

Min 03/06/2021: Concerns, comments and questions from the community members

Project Awareness

The consultant explained to the community where the proposed project area stood but it was evident that almost all the residents were familiar with where the proposed borehole would be put up. Those who were not aware about the project site were given the option of visiting the location with the MOA team and the consultants later after the meeting. After elaboration from the consultant, it was certain that all the members understood what the project was all about.

Anticipated project benefits

The consultant later asked the community to give their positive expectations about the new rehabilitated project. The community appreciated that the project would boost the level of development in the area by ensuring an adequate supply of water to the community and provided employment opportunities. The need for regular maintenance was also reduced since the borehole would be solar-powered.

The main impact that the community was also aware of is that of the availability and accessibility of water. All residents were happy about this new development and promised full support to the project. The positive impacts as discussed during the project meeting included;

1. The project would boost water availability to the community
2. Accessibility of water at the borehole would reduce the distance traveled to far places in search of water
3. The local residents would benefit from cheap labour from unskilled jobs during the project construction phase. Employment of youths, women and the elderly either directly or indirectly to the project
4. The availability of water would boost food production through irrigation and other farming practices.

5. Plenty of water would improve health and sanitation since it would be possible for the residents and school kids to wash their hands and this would also be in adherence to the Public health act; 242 legal notice 54 of April 2020, on COVID 19 regulations.
6. The proponent will also engage the residents in tree planting activity as a way of compensation for lost trees during the borehole.
7. The availability of more food/produce as a result of irrigation will make the prices reduce hence making food more affordable.

Anticipated negative impacts

Noise resulting from the construction of the borehole would result into Environmental pollution. Moreover, diseases and injuries would be caused by dusts and flying rock fragments emanating from the project sites during construction. Excavation activities would cause open pits that pose a safety hazard especially at night.

Some of the key negative issues and their mitigations discussed included;

Impact	**Mitigation Measures**
• Spread of Covid19	• Adhere to the Public health act; 242 legal notice 54 of April 2020, on COVID 19 regulations thorough provision of social distancing of at least 1m and wearing PPEs.
• Chemical Waste generation and disposal	• Safe use of agrochemicals in the farm. • Training on mitigation of chemical hazards.
• Lorries degrading roads during rainy seasons	• Road maintenance by the community. • Community to liaise with county government to upgrade and maintain feeder roads.
• Solid waste generation and disposal	• Prepare/segregate a dumping site.
• Liquid waste generation at the wash area	• Septic tank incorporation into the design. • Soak pits design to be implemented by the community in conjunction with their political leaders.

• Air pollution	**During Construction** • Fencing the construction site, • Provision of masks to construction workers • Water sprinkling to avoid dusk
• Noise Pollution	• Provision of person protective equipment, • Works done between 8 am and 5 pm
• Child labour	• The contractor to be under strict instructions on labour laws
• Increase in theft issues	• The contractor should employ a security guard and involve the community leaders and local administration.
• Increase resource use conflicts	• Conflict resolution committee already in place.
• Drug and Substance abuse, Corona virus spread and HIV/AIDs, family brake up and early pregnancies.	• Chief's barazas for awareness and sensitization. • MoH corona virus prevention guidelines • Awareness and training for women and children.

Min 04/06/2021: A.O.B

There being no other business the meeting ended at 4.58pm.

APPENDIX 6: NEMA LICENSE FOR THE LEAD EXPERT

FORM 7 (r.15(2))

nema

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY(NEMA)

THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT

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

License No : NEMA/EIA/ERPL/15065

Application Reference No. NEMA/EIA/EL/19719

M/S **Boaz Kiprato Bett**
(individual or firm) of address

P.O. Box 20171-00100 Uasin Gishu

is licensed to practice in the

capacity of a (Lead Expert/Associate Expert/Firm of Experts) **Lead Expert**
registration number **6994**

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

Issued Date: **5/17/2021**

Expiry Date: **12/31/2021**

Signature.....

(Seal)
Director General
The National Environment Management Authority

P.T.O.

ISO 9001: 2015 Certified