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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 AND EQUIPPING OF CHEPTAMAS COMMUNITY BOREHOLE IN CHEPTAMAS VILLAGE. WEIWEI LOCATION. WEST POKOT

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

Summary Project Report September 2021

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FACT SHEET

Project Name	Summary Project Report For The Proposed Drilling And Equipping Of Cheptamas Community Borehole In Cheptamas Village, Senetwo Location, West Pokot County.
Assignment Name	Environmental and Social Impact Assessment (ESIA)
Location	Cheptamas Village, Senetwo Location, West Pokot County
GPS Coordinates	Latitude 01.47638 N and Longitude 035.50045 E 1457 M above sea level
Project Description	Drilling and Equipping of Cheptamas 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 • Erecting water kiosk and livestock drinking troughs • Fencing of the borehole site with a gate
Project Coordinator,	Drought Resilience And Sustainable Livelihoods Programme (DRSLP II)
Adress 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 refered to as environmental consultant submits this **Summary Project Report** for the proposed Drilling and equipping of a Borehole for Cheptamas community in Cheptamas 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 Cheptamas Community in Cheptamas 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
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NAIROBI

EXECUTIVE SUMMARY

The Government of Kenya through the **Drought Resilience and Sustainable Livelihood Project [DRSLP II]** intends to drill one production borehole at Cheptamas Village, Kapsokero Sub location, Senetwo Location 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 01.47638 N and Longitude 035.50045 E 1457 M a.s.l**. 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 nad submit 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.

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

FACT SHEET 1
SUBMISSION OF DOCUMENTATION i
EXECUTIVE SUMMARY ii
TABLE OF CONTENTS v
LIST OF TABLES ix
LIST OF FIGURES ix
ABBREVIATIONS x
1. INTRODUCTION AND BACKGROUND INFORMATION 1
1.1. Project background 1
1.2. Project Justification and Rational 1
1.3. Objectives of the EIA 2
1.3.1. General Objective 2
1.3.2. Specific Objectives 2
1.4. Study approach and methodology 3
1.5. EIA Team 3
1.6. Report Structure 4
1.6.1. Purpose of the Report 4
1.6.2. Structure of the Report 4
2. CHAPTER TWO: PROJECT DESCRIPTION 6
2.1. Overview 6
2.2. Project Location 6
2.3. Scope of the Project 7
2.4. Project Design, Development and Works 7
2.4.1. Ground water survey 7
2.4.2. Drilling 8
2.4.3. Water well design 8
2.4.4. Casing and Screens 9
2.4.5. Grouting 10
2.4.6. Plumpness and alignment 10

2.4.7. Boreholes development 10
2.4.8. Pumping Test Data 11
2.4.9. Material Inputs 12
2.4.10. Proposed Project output/Products 13
2.5. Project cost 14
2.5.1. Project Cost 14
3. CHAPTER THREE: BASELINE ENVIRONMENTAL AND SOCIAL CONDITIONS 15
3.1 Introduction 15
3.2 project location 15
3.3 Land ownership 15
3.4 vegetation 15
3.5 Topography 16
3.6 geology and soils 16
3.7 rainfall and climate 16
3.8 Water Resources and Hydrology 16
4 CHAPTER FOUR: STAKEHOLDERS CONSULTATION 17
4.1 Overview 17
4.2 Legal Requirement for Public Participation 17
4.2.1 The Constitution of Kenya 17
4.2.2 Environmental Management and Coordination Act, 1999 and Subsequent Amendments 17
4.2.3 County Government Act 2012 17
4.2.4 International Convention (Aarhus Convention 1998) 18
4.3 Objectives of Public Consultations 18
4.4 Methodology and Consultation Process 18
4.4.1 Interviewing Key Informants 19
4.4.2 Community Consultative Meetings 19
5 CHAPTER FIVE: PROJECT ALTERNATIVE ANALYSIS 20
5.1 Introduction 20
5.1.1 No Action Alternative 20
5.1.2 Relocation Alternative 20
5.1.3 Alternative Drilling Technology 20

5.1.4 Alternative Water Sources 21
5.1.5 Project Development Option 21
6 CHAPTER SIX: POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS AND MITIGATION 22
6.1 Introduction 22
6.2 Definition and Classification of Environmental Impact 22
6.3 Impact Significance 22
6.4 Impact Scoring and Rating Criteria 22
6.5 Physical / Chemical Impacts 23
6.5.2 Dust Pollution 23
6.5.3 Noise Pollution 23
6.5.4 Contamination due to oil spillages 24
6.5.5 Soil Structural Damage 24
6.5.6 Waste management 24
6.5.7 Draw-down effect 24
6.5.8 Impact for the Physical / Chemical factors 24
6.6 Sociological / Cultural Impacts 25
6.6.2 Aesthetic impacts on the landscape 25
6.6.3 Spread of HIV/AIDS 25
6.6.4 Risk of accidents 25
6.6.5 Impact on existing infrastructure 25
6.7 Biological / Ecological Impacts 26
6.7.2 Loss of Vegetation 26
6.8 Economic / Operational impacts 26
6.8.2 Employment opportunities 26
6.8.3 Reliable water supply 27
6.8.4 EMP Monitoring (Protection of the environment) 27
6.9 Anticipated Mitigation Measures / Measures to Strengthen Positive Impacts 27
7 CHAPTER SEVEN: ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN 30
7.1 PREAMBLE 30
7.2 Monitoring and Evaluation 40

8. CHAPTER EIGHT: CAPACITY DEVELOPMENT FOR ENVIRONMENTAL MANAGEMENT AND MONITORING....42
8.1 Capacity Building....42
8.2 Administration of the ESMP....42
9. CHAPTER NINE: CONCLUSION AND RECOMMENDATIONS....43
9.1. Conclusion....43
9.2. Assessment findings....43
10. CHAPTER TEN: REFERENCES....44
APPENDICES....45
Appendix 1: Environmental screening check list....46
Appendix 2: Community Resolution Form....47
Appendix 3: Attendance Sheets....48
Appendix 4: Filled Questionnaires....49
Appendix 5: Minutes of Meetings....54
Appendix 6: NEMA License for the Lead Expert....58

LIST OF TABLES

Table 1-1: EIA Team 4
Table 2-1: The cost of the project is as follows 14
Table 6-1: Environment Impact Scoring and Rating Criteria 23
Table 6-2: Impact Rating for the Physical / Chemical factors 25
Table 6-3: Impact Rating for the Sociological / Cultural Impacts 26
Table 6-4: Impact Rating for the Biological / Ecological Impacts 26
Table 6-5: Impact Rating for the Economic / Operational Impacts 27
Table 6-6: Recommended Mitigation Measures for Physical /Chemical Impacts 28
Table 6-7: Recommended Mitigation Measures for biological/ecological impacts 28
Table 6-8: Recommended Mitigation Measures for Sociological/Cultural Impacts 29
Table 6-9: Recommended Mitigation Measures for Economic / Operational Impacts 29
Table 6-10: Environmental and Social Management & Monitoring Plan 31

LIST OF FIGURES

Figure 2-2: Borehole components: Source: Living Water International 9
Figure 2-3: Multiple Well Tests Pumping - 12
Figure 4-1: Data Collection (Questionnaire) – Villagers 19
Figure 4-2: Data Collection (Questionnaire) – Farm Neighbors ..... **Error! Bookmark not defined.**

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 Cheptamas 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 GPS coordinates 035.50045 E and 01.47638N with an altitude of 1457 M.a.s.l 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 EMoP
- Preparation of required reports

1.5. EIA TEAM

Environmental scoping and subsequent preparation of the EIA project report 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 Cheptamas 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 (EMoP) 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 Cheptamas Village, Senetwo Sub Location, Senetwo Location purposely for water provision for domestic and livestock use for the community. The project site is on **GPS coordinates 035.50045 E and 01.47638 N with an altitude of 1457 M.a.s.l**

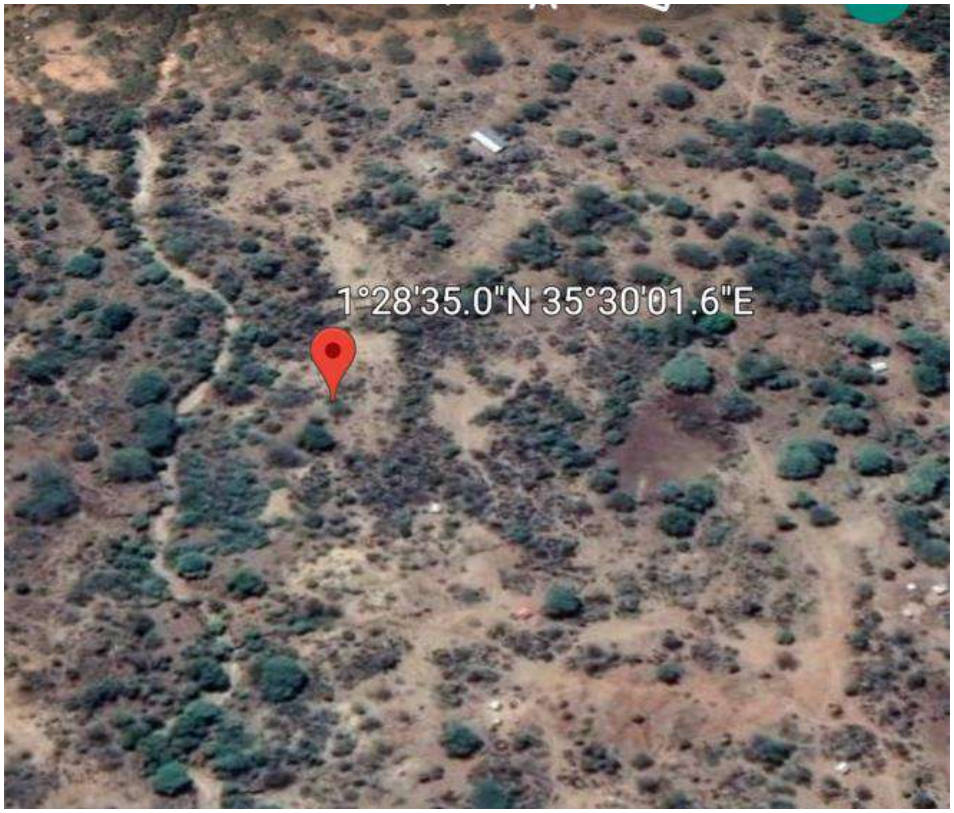


Figure 2.2 Google Earth location of the proposed borehole site

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 120 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

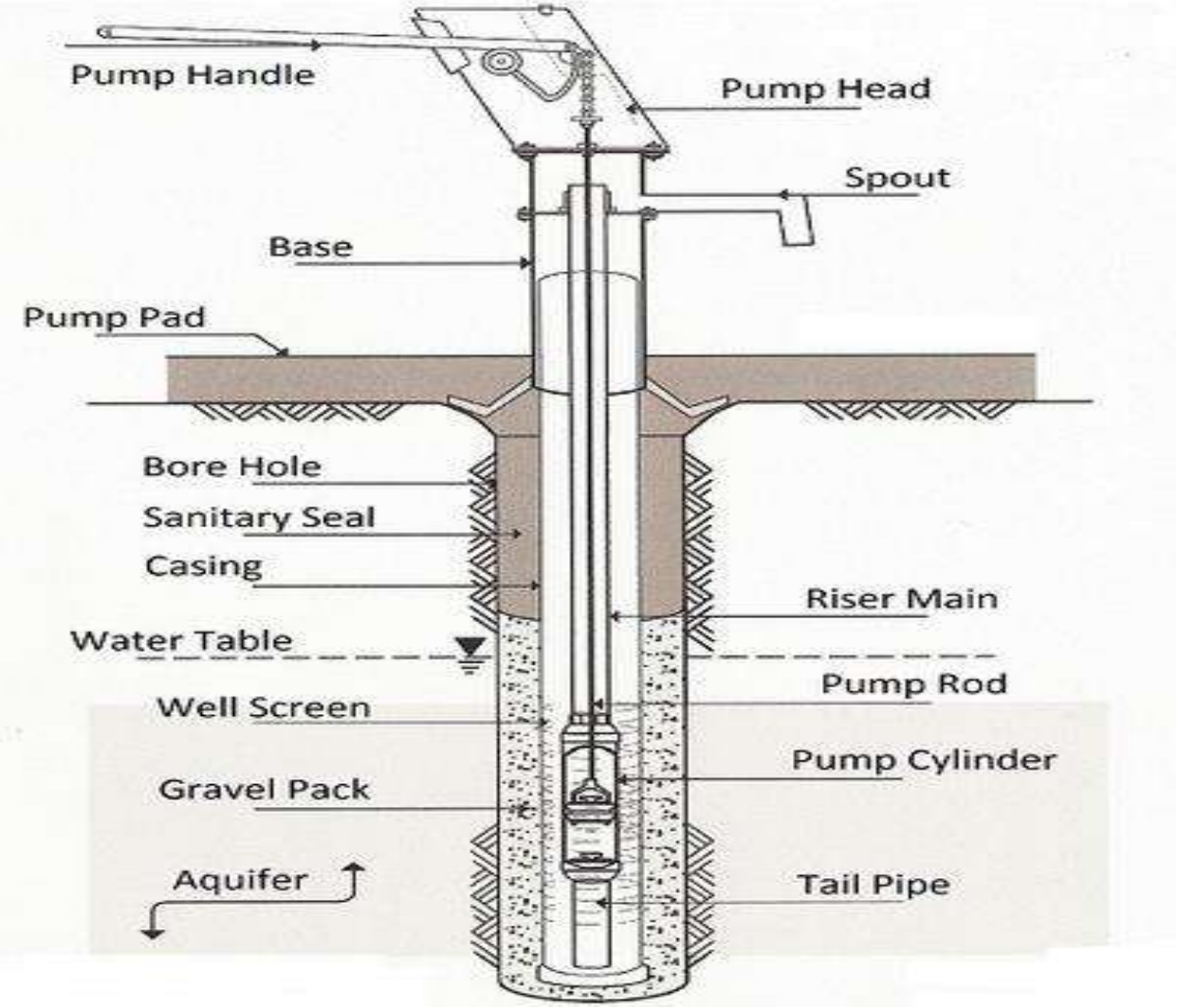


Figure 2-1: Borehole components: Source: Living Water International

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 well's 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. Boreholes 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.

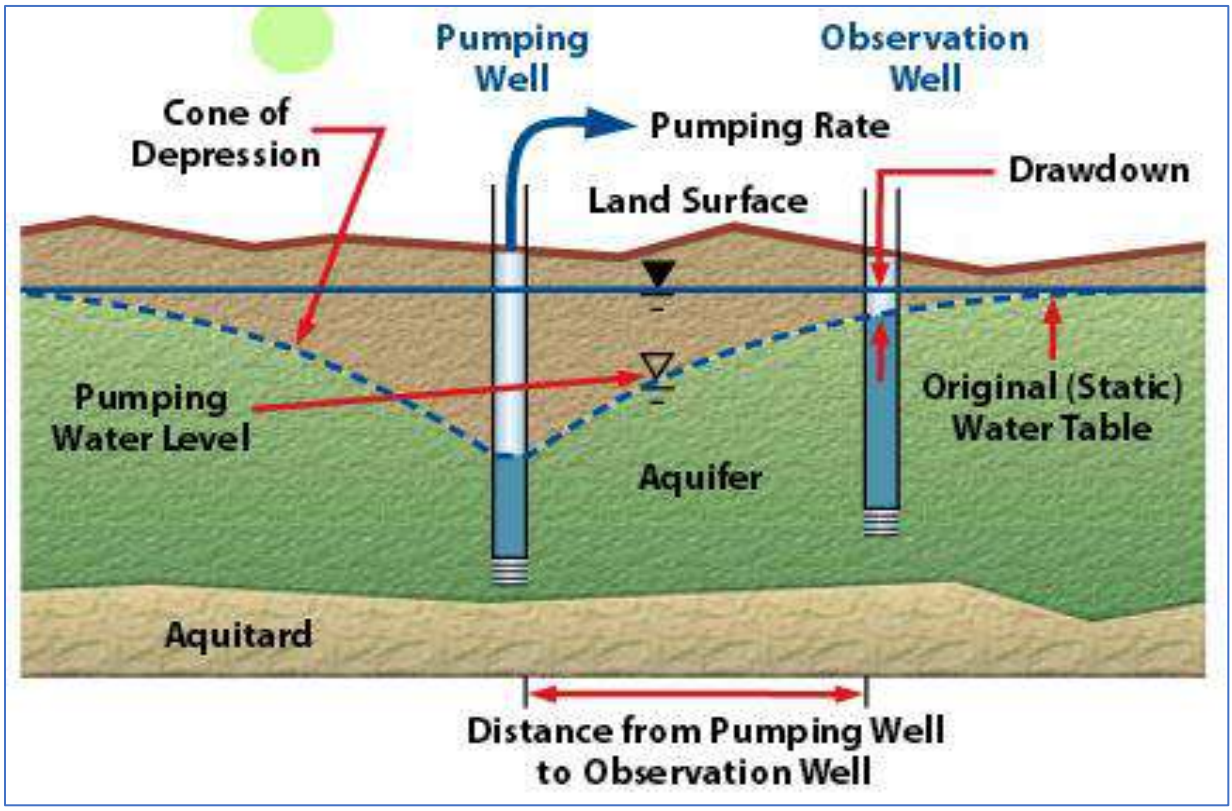


Figure 2-2: Multiple Well Tests Pumping - Source: Guide to conducting Well Pumping Tests, Water Stewardship Information Series

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

2.5.1. 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 PROJECT LOCATION

The project is located in Cheptamas Village, Kapsokero Sub Location, Chepararia ward, Pokot South Sub County in West Pokot County. Administratively, the County is sub-divided into five sub-counties, namely Pokot Central, Pokot South, Pokot North, West Pokot and Kipkomo. It is further subdivided into 16 wards, 20 divisions, 65 locations and 224 sub-locations.

A geographical satellite image of the project location showing the proposed project site is shown in figure 2.2 below. The project is accessed via an earth road connecting the project site in Cheptamas Village to the main road (Sigor- Wei Wei road).

3.3 LAND OWNERSHIP

The proposed project will be located in land donated by the villagers within Cheptamas village. There are no environmentally sensitive areas within the project location. The surrounding to the project mostly comprise natural vegetation characterized by few trees, farmlands, grasslands and shrubs. The proposed project is thus keeping with the surrounding environment as it is in line with the physical planning zonation. Community resolution forms are appended to this report (Appendix i).

3.4 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. Notably, the dominant vegetation include 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.

3.5 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.

3.6 GEOLOGY AND SOILS

The Western parts of Chepararia Ward have 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.

3.7 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

3.8 WATER RESOURCES AND HYDROLOGY

The county has three main catchment zones; the Turkwel, Kerio and Nzoia catchments. The Kerio and Turkwel catchments are channelled towards Lake Turkana while the Nzoia catchment drains its waters into Lake Victoria. This community that has around 72 households currently depend on water from River Wei-Wei that is over 5km away hence this proposed borehole will greatly save the villagers the distance covered to get water and the same will be utilized for other economic activities. Cheptamas ECD school will also benefit from clean and safe water from this borehole.

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 Cheptamas 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 Cheptamas 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 Cheptamas 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, Cheptamas 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 Cheptamas 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 Cheptamas 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: Data Collection (Questionnaire) – Villagers

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 Cheptamas 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. Villagers scope water from the seasonal rivers. The river is seasonal hence water availability goes to low in the dry season. 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 Cheptamas 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 SIX: 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

6.5.2 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.

6.5.3 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.

6.5.4 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.

6.5.5 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.

6.5.6 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

6.5.7 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.

6.5.8 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

6.6.2 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.

6.6.3 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.

6.6.4 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.

6.6.5 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,

6.6.6 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

6.7.2 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.

6.7.3 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	-2	-2	-1	-2	Low

6.8 ECONOMIC / OPERATIONAL IMPACTS

6.8.2 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.

6.8.3 Reliable water supply

The most significant factor related to the borehole drilling at Cheptamas 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 Cheptamas 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.

6.8.4 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.

6.8.5 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 PREAMBLE

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

The ESMMP should be availed to contractor who will be awarded the tender for construction by the proponent. The contractor should follow the ESMP as stated and submit a quarterly mitigation progress report to the proponent to ensure that the proposed mitigation is followed to the latter.

Table 7-1: Environmental and Social Management & Monitoring Plan

Impact	Mitigation Measure	Responsibilities	Time Frame	Costs
Physical/Chemical Impacts				
Dust Pollution	• Visually monitor dust generation from work zones to reduce the impact to neighbouring school and households. • Sprinkle work areas with grey water to suppress	Drilling Contractor	During drilling phase, borehole design and development stage	KES 5,000.00
Noise Pollution	• All vehicles and equipment must be monitored and maintained in good working condition • Workers must be provided with earmuffs • Limit working hours to eight to five to avoid disturbance during resting night hours	Drilling Contractor	During drilling phase, borehole design and development stage	KES 10,000.00
Oil spillages	• Regular checks and maintenance/service of drilling equipment to minimize potential oil leakage and spills	Drilling Contractor	During drilling phase, borehole design and development stage	KES 35,000.00
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	Drilling Contractor	During drilling phase, borehole design and development stage	KES 10,000.00

Impact	Mitigation Measure	Responsibilities	Time Frame	Costs
	• 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	Drilling Contractor	During drilling phase, borehole design and development stage	KES 35,000.00
Loss of Soil	• As minimum clearance space as possible is recommended to minimize losses of soil removal/loss during site clearing for drilling	Drilling Contractor	During drilling phase, borehole design and development stage	KES 45,000.00
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	Drilling Contractor	During drilling phase, borehole design and development stage	KES 10,000.00
Biodiversity				

Impact	Mitigation Measure	Responsibilities	Time Frame	Costs
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	Drilling Contractor	During drilling phase, borehole design and development stage	KES 40,000.00
Sociological/Cultural Impacts				
Loss of aesthetic appeal	• Minimise the project's footprint on the local environment	Drilling Contractor	During drilling phase, borehole design and development stage	KES 20,000.00
Risk of accidents	• Drilling contractor to undertake regular risk assessment exercises conducted by personnel undertaking the project	Drilling Contractor	During drilling phase, borehole design and development stage	KES 15,000.00
Archeological Impacts	• Drilling contractor to monitor excavation and drilling activities and notify the relevant agency for any findings	Drilling Contractor	During drilling phase, borehole design and development stage	KES 10,000.00
Spread of HIV/AIDS	• Introduction of Relevant Contractor employees. • 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	Drilling Contractor	During drilling phase, borehole design and development stage	KES 100,000.00

Impact	Mitigation Measure	Responsibilities	Time Frame	Costs
	availability of HIV/AIDS related commodities and IEC materials.			
Economic / Operational Impacts				
Employment Opportunities	• Manpower sourced locally as much as is possible especially in the semiskilled and unskilled categories	Drilling contractor and Project Proponents	During drilling phase, borehole design and development stage and operation	KES 150,000.00
Reliable Water Supply	• To embark on water conservation programmes e.g. water harvesting	Client, WRA, the Surrounding Community	Operation	KES 20,000.00
Environmental Protection	• Ensure that the EMP is complied with		Operation	KES 1,500.00
		TOTAL COST		KES 506,500

Environmental Monitoring Plan (EMoP)

Impact	Location	Monitoring Technique	Frequency	Threshold /Standard Acceptable Results	Monitoring Agency	Recommended action if threshold are exceeded	Reporting Authority
Physical/Chemical Impacts							
Dust Pollution	Construction site	Visually monitor dust generation from project site Inspect work zones to ensure	Daily	Workers provided with masks Dusty site areas sprayed with water	Cheptamas Community, Environmentalist at the County, Community Representatives	Penalty system	NEMA in West Pokot County

Impact	Location	Monitoring Technique	Frequency	Threshold /Standard Acceptable Results	Monitoring Agency	Recommended action if threshold are exceeded	Reporting Authority
		adequate dust controls are being used such as regular watering of project site					
Noise Pollution	Construction site	Conduct investigative noise monitoring in response to specific complaints	Daily	All vehicles and equipment must be monitored and maintained in good working condition Workers must be provided with earmuffs Limit working hours to eight to five to avoid disturbance during resting night hours	Cheptamas Community, Environmentalist at the County, Community Representatives	Penalty system	NEMA in West Pokot County

Impact	Location	Monitoring Technique	Frequency	Threshold /Standard Acceptable Results	Monitoring Agency	Recommended action if threshold are exceeded	Reporting Authority
Oil spillages	Construction site	Inspect project vehicles and drilling equipment to ensure no leaks are occurring	Daily	Regular checks and maintenance/service of drilling equipment to minimize potential oil leakage and spills	Cheptamas Community, Environmentalist at the County, Community Representatives	Penalty system	NEMA in West Pokot County
Waste generation	Construction site	Inspect site to monitor for any unauthorized waste disposal activities Inspect waste receptacles to ensure that they are not overfilled and are collected on time	Daily	Waste disposed of at designated dumping areas Waste containers with lids available at contractor camp site	Cheptamas Community, Environmentalist at the County, Community Representatives	Penalty system	NEMA in West Pokot County
Loss of Soil	Construction site	Observation	At the end of construction	Soil levelled	Cheptamas Community, Environmentalist at the	Penalty system	NEMA in West Pokot County

Impact	Location	Monitoring Technique	Frequency	Threshold /Standard Acceptable Results	Monitoring Agency	Recommended action if threshold are exceeded	Reporting Authority
					County, Community Representatives		
Biodiversity							
Loss of vegetation	Construction site	Observation	Daily	Alternative are for positioning the machinery	Cheptamas Community, Environmentalist at the County, Community Representatives	Penalty system	NEMA in West Pokot County
Sociological/Cultural Impacts							
Loss of aesthetic appeal	Construction Site and surrounding areas	Observe the construction site and Surrounding area for undesirable visual impacts and untidy areas.	Daily	Minimal visual impact	Cheptamas Community, Environmentalist at the County, Community Representatives	Penalty system	NEMA in West Pokot County
Risk of accidents	Construction site	Observation	Daily	Workers provide with protective clothing	Cheptamas Community, Environmentalist at the County, Community Representatives	Penalty system	NEMA in West Pokot County
Spread of HIV/AIDS	In the project area	Observation of meetings being	Daily	Awareness meetings held	Cheptamas Community, Environmentalist at the	Enhanced education	Nearest Health Centre

Impact	Location	Monitoring Technique	Frequency	Threshold /Standard Acceptable Results	Monitoring Agency	Recommended action if threshold are exceeded	Reporting Authority
		held on HIV/AIDS and health issues awareness Observation of availability of condoms in places where workers can access them		Condoms availed	County, Community Representatives		
Economic / Operational Impacts							
Employment Opportunities	In the project Area	Count of employees, check of employees register	Daily	Most employees obtained from the project locality.	Cheptamas Community, Environmentalist at the County, Community Representatives	Enhanced education	Sub-county Government
Reliable Water Supply (Operation)	In the project area	Observation	Weekly	Reliability to accessibility to water Reduced water borne diseases	Cheptamas Community, Environmentalist at the County, Community Representatives	Enhanced education	Sub-county Water office

Impact	Location	Monitoring Technique	Frequency	Threshold /Standard Acceptable Results	Monitoring Agency	Recommended action if threshold are exceeded	Reporting Authority
Environmental Protection	In the project area	Ensure adherence to the EMP	Daily	Impacts minimised or avoided	Cheptamas Community, Environmentalist at the County, Community Representatives	Enhanced education	NEMA in West Pokot County

7.2 Monitoring and Evaluation

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

7.2.1 Internal Monitoring

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

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

The Ministry of public works, DRSLP II and the Contractor' project teams will include environmental and social experts who will direct and oversee ESMMP activities directly at the site. Monitoring will be a systematic assessment of the activities in relation to the specified criteria of the condition of approval. The negative measures raised should be mitigated with the measures indicated in the ESMMP.

7.2.2 External Monitoring

An independent consultant will be hired by the proponent to conduct annual environmental audit to ensure that the environment is protected in line with the EMCA regulations. NEMA holds the overall responsibility licensing the project and conducting periodic visits to ensure that environmental guidelines are being observed during implementation of the project. NEMA will therefore review the audits submitted in line with ESMMP and issue environmental compliance or recommend corrective actions based on submitted audits and their field verifications.

7.2.3 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 ESMMP 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

7.2.4 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), DRLSP 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 ESMMP are being managed effectively. In order to guarantee the effective implementation of the ESMMP, each institution will need to take cognizance of the responsibilities and authority. The various persons/institutions play their roles as per the ESMP and the existing laws and regulations.

8. CHAPTER EIGHT: 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
- 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 build resilience for food and nutrition security in the horn of Africa-Kenya through provision of clean water for both domestic and livestock use. 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 150 metres 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 Cheptamas 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 EMoP 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 Cheptamas 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. ....CHEPTAMA S.H.G...........

We, the beneficiaries of ....CHEPTAMAS.......... Have discussed and agreed that ....CHEPTAMAS..........will be the site for the ....BORE ......HOLE.................. in ...POROR CENTER....Sub county. ....WEI WEI...................... Ward. ...WEIWEI...... Location. ....PTOKOY............. 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
	CHEBOR MERCY	[illegible]	[signature]
	WILSON [illegible]	[illegible]	[signature]
	[illegible] ASPANGANG	[illegible]	[signature]
	[illegible] [illegible]	[illegible]	[signature]

Witnessed By: ...[illegible] – 0717985848...........

Chief office (Stamped)

NAME	P/NO.	DESIGNATION	SIGNATURE
[illegible] KAOSIER	[illegible]	ASST CHIEF	[signature]

CDA'S OFFICE (Stamped)

NAME	P/NO.	DESIGNATION	SIGNATURE
THOMAS N. WACHO	1997021733	CDA	[signature]

County Government (Stamped)

(County Executive for Agriculture and Irrigation)

NAME	ID/NO.	SIGNATURE
GEOFFREY LIPALE	1326061 2	[signature]

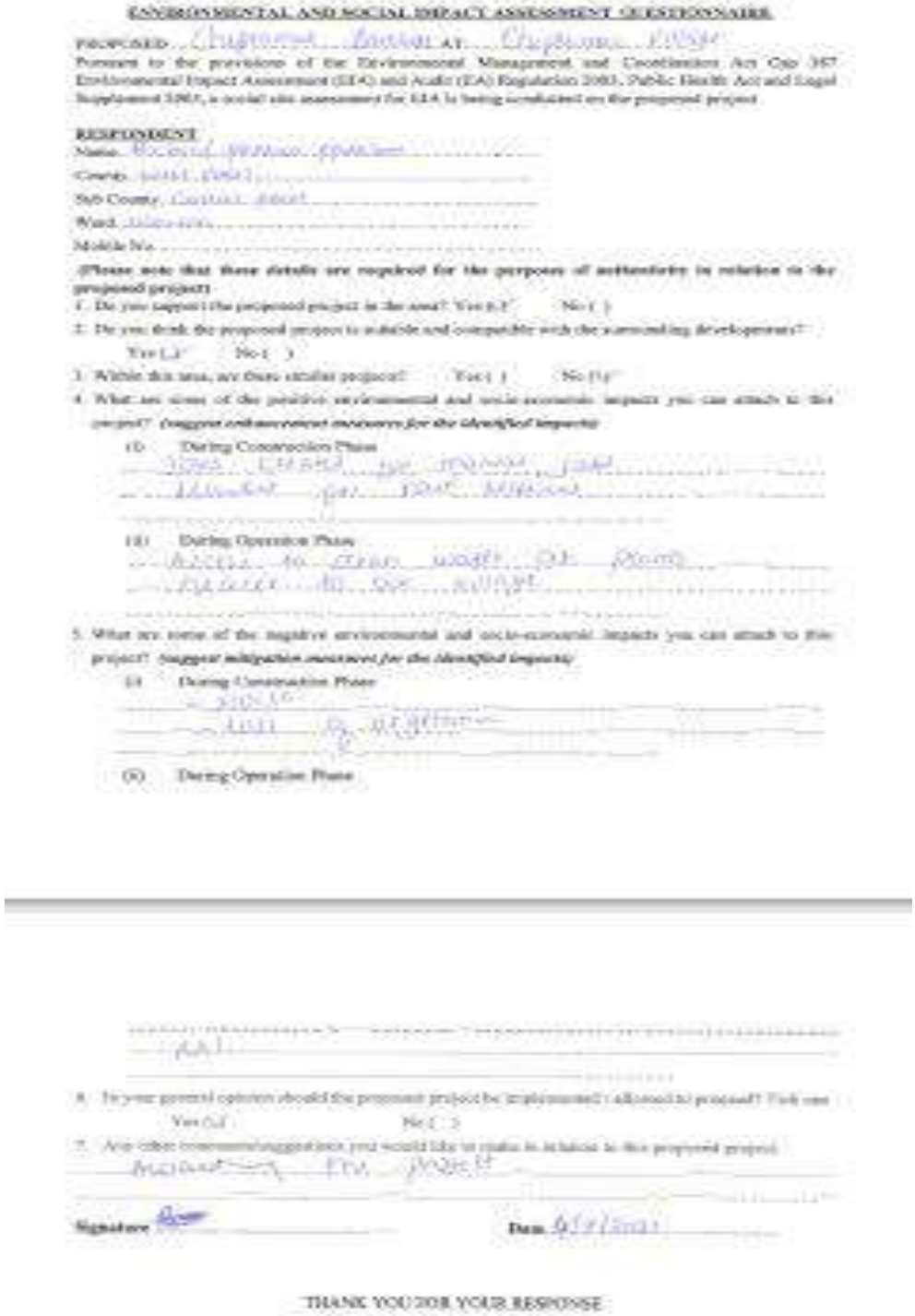
(NB: Please add any other relevant information)

COUNTY EXECUTIVE COMMITTEE MEMBER ... COUNTY
08 SEP 2021
MINISTRY OF AGRICULTURE IRRIGATION, FISHERIES & PASTORAL ECONOMY
P. O. Box 22? - ?, KAPENGURIA

APPENDIX 3: ATTENDANCE SHEETS

S/NO	NAME	GENDER	ORGANIZATION/DEPLOYMENT	PHONE NO. AND E-MAIL ADDRESS
	[illegible]	M	[illegible]	
	[illegible]	M	[illegible]	0795[illegible]36
	[illegible]	M	[illegible]	
	[illegible]	F		
	[illegible]	F	—	
	[illegible]	F		
	[illegible]	F		
	[illegible]	F		
	[illegible]	F		0786[illegible]
	[illegible]	M	[illegible]	0705[illegible]
	[illegible]	M	[illegible]	0722[illegible]
	[illegible]	F	[illegible]	0702[illegible]
	[illegible]	F	[illegible]	
	DAVID KISONTANY	M	MOA-SCAO	0724437256

APPENDIX 4: FILLED QUESTIONNAIRES



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 recommendations/suggestions you would like to make in relation to this proposed project

Signature ... Date ...

THANK YOU FOR YOUR RESPONSE

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT QUESTIONNAIRE

PROPOSED [illegible] AT [illegible]

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]

County: [illegible]

Sub County: [illegible]

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 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
   Market for raw material
   (ii) During Operation Phase
   [illegible]
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
   [illegible]
   (ii) During Operation Phase
   [illegible]
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: [illegible] Date: [illegible]

THANK YOU FOR YOUR RESPONSE

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT QUESTIONNAIRE

PROPOSED: [illegible] AT: [illegible]

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 ESIA is being conducted on the proposed project

RESPONDENT

Name: [illegible]

County: [illegible]

Sub County: [illegible]

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 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
   - Roads made, [illegible]
   (ii) During Operation Phase
   [illegible]
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
   [illegible]
   (ii) During Operation Phase
   [illegible]
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:
   [illegible]

Signature: [illegible] **Date:** [illegible]

THANK YOU FOR YOUR RESPONSE

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT QUESTIONNAIRE

PROPOSED [illegible]

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

RESPONDENT

Name [illegible]

County [illegible]

Sub County [illegible]

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 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
   [illegible]
   (ii) During Operation Phase
   [illegible]
5. What are some of the negative environmental and socio-economic impacts you can attach to the project? *(Suggest mitigation measures for the identified impacts)*
   (i) During Construction Phase
   [illegible]
   (ii) During Operation Phase
   [illegible]
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.
   [illegible]

Signature [illegible] Date [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) Regulations 2003, Public Health Act and Legal Supplement 2003, a social site assessment for EIA is being conducted on the proposed project.

RESPONDENCE

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 mitigation 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 the proposed project.
   ...

Signature ... Date ...

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 CHEPTAMAS COMMUNITY BOREHOLE IN CHEPTAMAS VILLAGE, KAPSOKERO SUB-LOCATION, SENETWO LOCATION, WEST POKOT COUNTY

Agenda

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

Min 01/01/2021: Opening Remarks

The meeting was called to order by village Elder Lokapelo Apelapus at 12.06 pm and was opened by a word of prayer by one of the villagers. Lokapelo later introduced the MOA team lead by Mr David Sontany and EIA team. He took the community though the project and later handed over the meeting to the 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 Cheptamas Village

Min 02/01/2021: Team & Project Introduction

The Lead Expert introduced the project and the ESIA study of the proposed drilling and equipping of Cheptamas Community Borehole in Cheptamas Village to the 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 03/01/2021: 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 04/01/2021: A.O.B

There being no other business the meeting ended at 12.58 pm.

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 Kiprutо 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