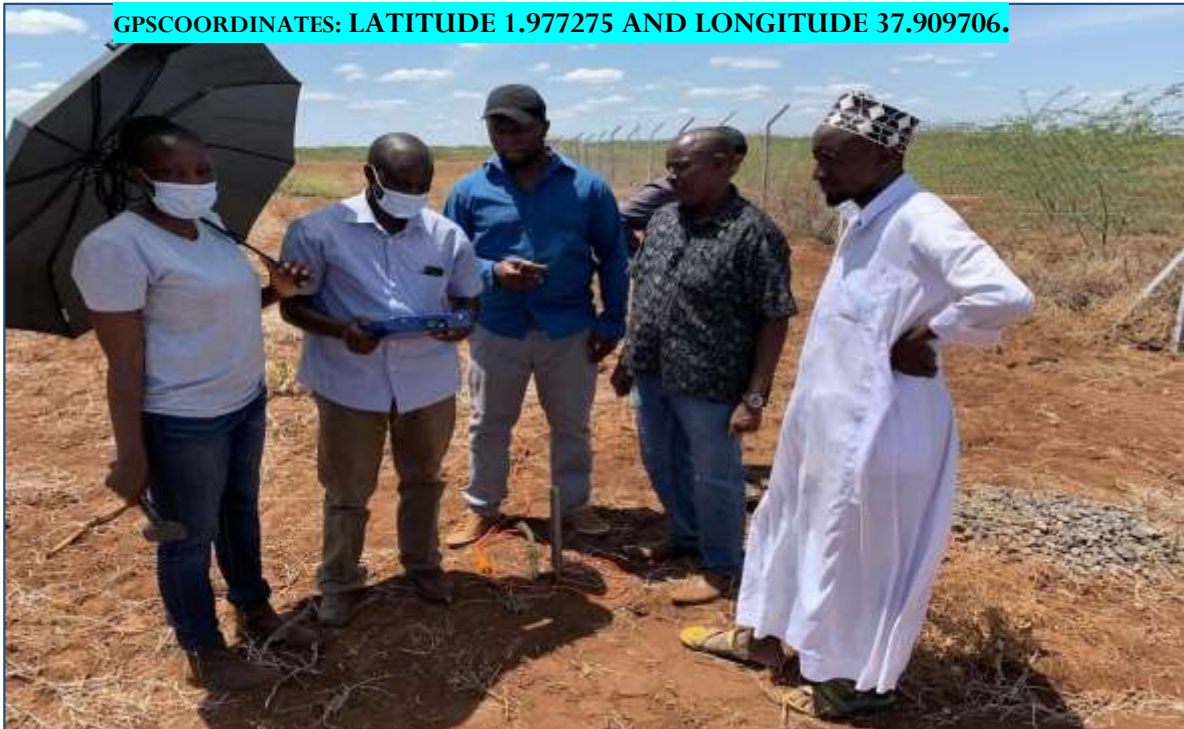




KENYA CLIMATE SMART AGRICULTURE PROJECT, (KCSAP)

SUMMARY PROJECT REPORT FOR THE PROPOSED LOG-LOGO SIRATA II BOREHOLE LOCATED OFF ISIOLO-MARSABIT ROAD WITHIN LOGLOGO LOCATION, LOGLOGO TOWN, AND LAISAMIS SUB COUNTY IN MARSABIT COUNTY.

GPS COORDINATES: LATITUDE 1.977275 AND LONGITUDE 37.909706.



PROPONENT:

**LOG-LOGO SIRATA II BOREHOLE PROJECT MANAGEMENT COMMITTEE
P. O. BOX 10-60500, MARSABIT**

REPORT PREPARED AND SUBMITTED BY:

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CERTIFICATION

The ESIA-SPR Study has been carried out in accordance with the Environmental Management and Coordination Act, 1999 and the Environmental (Impact Assessment and Audit) Regulations,



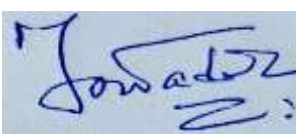

ASSIGNMENT: To carry out an Environmental and Social Impact Assessment and prepare a Summary Project Report for the proposed drilling of a borehole in compliance with the legal requirements.

PROJECT TITLE: Environmental and Social Impact Assessment Summary Project Report for the proposed drilling of a borehole and construction of associated structures and facilities situated in Log-logo town, Log-logo ward, Laisamis sub-county in Marsabit County.

PROPONENT: Log-logo Sirata II Community Project Management Committee.
P.O. BOX 10-60500, Marsabit.

CLIENT: Kenya Climate Smart Agriculture Project
P.O. BOX 384-60500, Marsabit.

PREPARED BY: MUGUN HOLDINGS LIMITED.
NEMA REGISTRATION NUMBER: 8332.

Name	Signature	Date	Stamp
MUGUN HOLDINGS LIMITED		09/04/21	
WATO DENGGE		09/04/21	

Disclaimer:

This Environmental Impact Assessment Summary Project Report is strictly confidential to Kenya Climate Smart Agriculture Project (the Client) and Log-logo Community (the Proponent) and any use of the materials thereof should be strictly in accordance with the agreement between the Proponent and Mugun Holdings Limited (the firm of experts). It is, however, subject to conditions in Legal Notice No. 101 section 4 of the Environmental (Impact Assessment and Audit) Regulation 2003(revised 2019).

ACKNOWLEDGEMENT

The consultants and his team of experts also bid gratitude to the Marsabit KCSAP office for procuring their services to carry Environmental and Social Impact Assessment Summary Project Report for Log-logo Sirata II community Borehole, Log-logo ward, Laisamis sub-county, Marsabit County. We appreciate the support we have received in and out of the field from KCSAP management and staff notably Mr. Ento Juma (CESSCO). We also appreciate all the people whose immense support and guidance from NPCU enabled us produce this report. We categorically recognize people from community (area local leader's the chiefs, ward administrators and community opinion leaders) we consulted and key stakeholders (surveyors, engineers and land physical planner) whose views enabled us carry out this report and provide recommendations that we believe, if are well implemented, will significantly make the project much more environmentally sustainable, socially acceptable and economically viable.

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ACRONYMS AND ABBREVIATION

"	Inch
°C	Degrees Celsius: Unit for temperature
BH	Borehole
Bos	Bills of Quantities
dB	Deci bells
EA	Environmental Audit
EHS	Environment, Health and Safety
EIA	Environmental Impact Assessment
EMCA	Environmental Management and Coordination Act of 1999
EMP	Environmental Management Plan
GDP	Gross Domestic Product
GoK	Government of Kenya
GS/I	Galvanized Steel/ Iron
KCSAP	Kenya Climate Smart Agriculture Project
MoW&I	Ministry of Water and Irrigation
NEAP	National Environmental Action Plan
NEC	National Environment Council
NEDI	North Eastern Development Initiative
NEMA	National Environment Management Authority
OHSO	Occupational Health and Safety Officer
PPE	Personal Protective Equipment
PRSP	Poverty Reduction Strategy Paper
PVC	Poly Vinyl Chloride
SPR	Summary Project Report
S/cm	Micro-Siemens per centimetre: Unit for electrical conductivity
UNEP	United Nations Environment Program
WAB	Water Apportionment Board
WHO	World Health Organization
WRA	Water Resources Authority
WSL	Water struck level

EXECUTIVE SUMMARY

The Government of Kenya (GoK) through the Ministry of Agriculture, Livestock, and Fisheries (MO ALF), State Department of Agriculture is implementing the Kenya Climate Smart Agricultural Project (KCSAP) in Marsabit County. The project is financed by the World Bank. **The Project Development Objective (PDO)** is “*to increase agricultural productivity and build resilience to climate change risks in the targeted smallholder farming and pastoral communities in Kenya, and in the event of an Eligible Crisis or Emergency, to provide an immediate and effective response.*” The objective of the proposed borehole in Log-logo Sirata II is to increase access and availability of water for domestic and livestock consumption, in line with KCSAP PDO as stated above.

The proposed Log-logo Sirata II Borehole project at GPS Coordinates **Latitude 1.977275 and Longitude 37.909706**. The Proposed Borehole is meant to provide sufficient and reliable source of water for supplemental irrigation, livestock and domestic use. Rainfall is very unreliable in the area, therefore, the community proposed the drilling and equipping of the Log-logo Sirata II borehole with a submersible pump driven by solar power in order to address the water scarcity problem in the area. One productive boreholes exist around this place but not within the vicinity of the selected site. This is Sirata I Borehole which is 7km to the North East.

The hydrogeological study for the proposed borehole drilling has already been undertaken. The scope of the proposed sub-project will include the following: drilling of the borehole, installation of a submersible pump, rising main, Elevated water tank (100M³), Construction of pump house, construction of a water kiosk, water tanks and cattle water troughs. From the hydrogeological survey, the proposed borehole will be drilled to a depth of **not less than 250m and to a maximum of 300 m bgl**. A sustainable yield of approximately 12.8-32.0 m³/hour is expected

The proposed sub project construction cost is Kenya Shillings Thirteen Million, (**Ksh 13,000,000**). **The cost for the implementation of Environmental and Social Management and Monitoring Plan (ESMMP) is Kenya Shillings Six Hundred and five Thousand (Ksh 2,095,000/=)** which will be included in the contract sum. The borehole is to supply water within the area for livestock, kitchen gardening (horticulture) and domestic use (1,650 cattle, 7,000 goats and sheep, and 2400 people with 1,320 direct and 1,200 indirect beneficiaries). The daily water demand in the area is estimated to be **70m³/day**. On the basis of geological evidence, from the hydrogeological investigations carried out groundwater prospects for intended purposes (livestock and domestic use) are tenable.

The SPR study was carried out using a number of methods; desk studies and literature review, field visits, observations, one public participation/sensitization by holding forum and consultative meetings with stakeholders. The tools used in collection and recording of data were; questionnaires, interview schedules and checklists. Community public participation was done through Baraza held on 1/03/2021 and attended by 75 people (41 Males and 35 females) (attached in the annexes)

The scope of this ESIA comprised; The baseline environmental and social status of the area; provisions of the relevant environmental laws; description of the proposed sub-project; public participation/sensitizations (community Baraza, stakeholder’s consultative meetings); focus group discussions to identify any adverse environmental and social impacts from the proposed sub-project and the appropriate mitigation measures; and provision of an environmental management plan.

The proposed project has significant positive impacts such as. The negative impacts shall be mitigated as outlined in the ESMMP in this report. Further, the project proponent has committed

to full implementation of the proposed mitigation measures appended in this report and adhere to directions and advice issued by NEMA. In this regard the consultant's team that the project recommends the project for NEMA approval subject to an annual audit. The team further recommends that the report be shared with the selected contractor for preparation and implementation of the contractors specific ESMMP. The CPCU through County Environmental Social Safeguard and Compliance Officer (CESSCO) shall monitor and report on the progress of implementation to relevant authorities.

CHAPTER ONE: INTRODUCTION

1.1 Introduction

This Summary Project report for the proposed Log-logo Sirata II borehole is sponsored by Kenya Climate Smart Agriculture Project. Kenya Climate Smart Agriculture Project objective is “to increase agricultural productivity and build resilience to climate change risks in the targeted smallholder farming and pastoral communities in Kenya, and in the event of an Eligible Crisis or Emergency, to provide immediate and effective response”. The main objective of the proposed borehole development is to increase water availability for both livestock, domestic and small scale irrigation to build community resilience against climate change in line with KCSAP PDO.

1.2 Project Geographical Location

The proposed borehole project is located 3 km off Isiolo-Marsabit Road, North west of Log logo Town, Laisamis Sub County of Marsabit County.

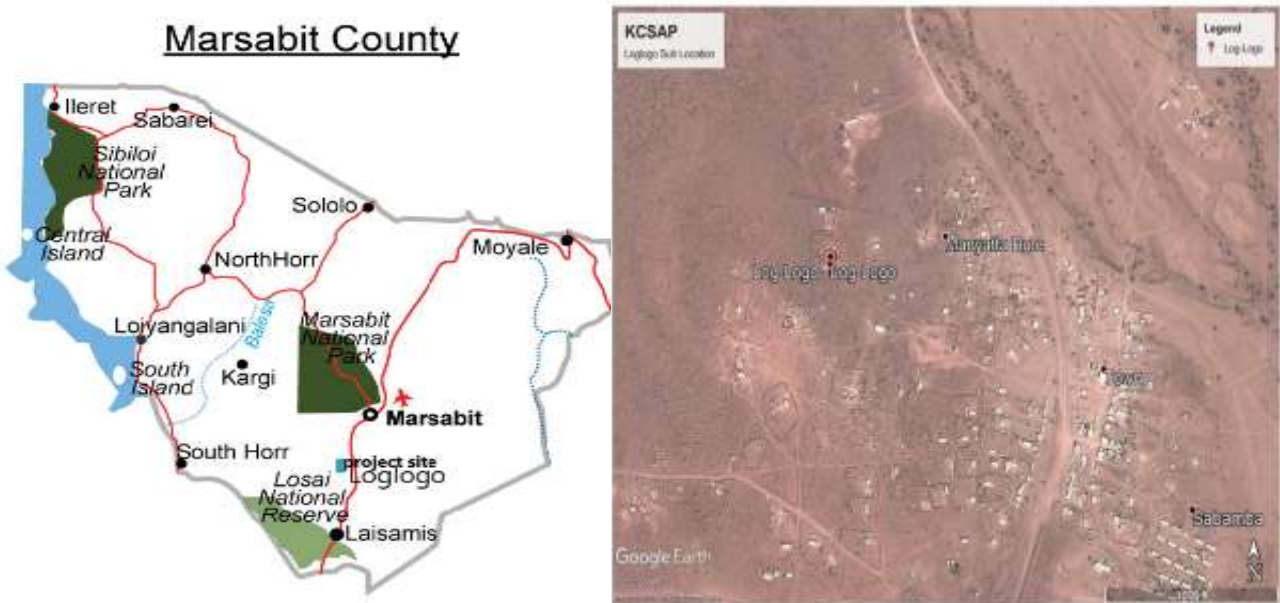


Figure 1: map showing project site

1.3 Project Background

The proposed borehole project is meant to supply water for domestic water supply, livestock use and support small irrigation. This has been prompted by the need to have clean and sufficient water in the area due to the fact that the water from the current water wells at times is unreliable due to increased extraction due to increased population and needs for water and the changing climatic conditions therefore affecting the aquifer recharge.

1.4 The Objective of the Project

The objectives of the proposed Sirata II borehole project in Log logo are:

- To provide a reliable source of adequate and clean water to Log-logo community with a view to augmenting the existing water sources.
- To enhance food and nutrition security through supporting small scale irrigation.
- To reduce distance covered to the water point.
- To provide for livestock usage.
- Improve Livestock production in the area.
- To eliminate water shortages at any point of the year.

1.5 Summary project Report Objective and Terms of Reference (ToR)

In their bid to comply with the Environment Coordination and Management Act (EMCA) of 1999, and the Environmental (Impact Assessment and Audits) Regulations 2003 (revised 2009), an SPR was developed for this project as per the below ToR.

Sustainability of the borehole project should not only be viewed from an engineering point of view, but also an environmental perspective since borehole projects may have inadvertent effects on the natural environment and the adjacent communities i.e. pollution, water quality changes, biodiversity loss, changes in soil properties, changes in productivity, etc. Therefore, for the borehole based water supply scheme to be developed and for it to be successful it must pursue the broad environmental objectives, namely the:

- Carrying out an assessment of the state of the environment in the project area with a view to avoid environmental damage and maintain the proper functioning of ecological systems;
- Identification & prediction of both the positive and negative environmental impacts;
- Prevention or minimization of negative impact on indigenous flora and fauna and on wildlife habitats, in particular by avoiding interference with nature or ecological reserves and other protected areas, both existing and planned for the future;
- Maintenance, or where necessary the improvement of the water quality of rivers, lakes and any other water reserves where it is applicable.
- Formulation of an Environmental Management and Monitoring Plan during project implementation, operation and beyond.

The Terms of Reference (ToR) for the project were developed through a rapid reconnaissance and a meeting between the consultants and mainly the proponent and other stakeholders. The SPR study is to be pursued along the following lines of study:

- Review the literature on the hydro-geology, water quality, climate, vegetation, wildlife, population, economic and social activities as well as the settlement and land use patterns, amongst others so as to form a basis of the ESIA study;
- Assess the current environmental, ecological and socio-economic situation of the project area in particular and as well as the environs with special reference to the current legislative and regulatory frameworks.
- Assess the impacts of the project (positive, negative, primary, secondary) on the natural resources i.e. soils, water, vegetation, wildlife, birds and their habitats as well as the aerial environment.
- Appraise the proposed design as well as the planned operation and maintenance (O&M) of the borehole so as to ensure that it allows for adequate/ additional pollution control or other mitigation measures and procedures to be installed or implemented with minimum difficulty, but with greatest positive impacts.
- Assess the environmental, economic and social impacts of the entire water supply scheme including borehole drilling.
- Assess the economic and social benefits of the project, whilst paying special attention to livelihood and population issues.
- Analyse the alternative water supply development options and recommend as appropriate;
- Suggest and qualify methods of project monitoring and evaluation of impacts (Environmental and Social Management Plans (ESMP)).
- Prepare and submit an ESIA- Summary Project report on the issues outlined above as well as offer recommendations on corrective activities, their costs and the implementation and environmental management timetable as well as the line mechanism for to the promoters of the project and the National Environment Management Authority (NEMA) for consideration and necessary approval.

1.6 Project Justification

The site of the project has been identified with the help of a Hydro-geologist consultant. The proposed borehole is set to serve the log-logo Sirata II community with water for both domestic and livestock consumptions as well as supporting small scale irrigation activities. The area is a recorded water deficit area and therefore in dire need of water. Despite a plethora of Government Policies on water provision for all, and the quest to meet the rising demands of a growing economy, access to sufficient and reliable water is still a big challenge in Kenya. Similarly, the National Vision 2030 has prioritized water provision as the main engine of economic transformation.

1.7 Summary Project Report Approach and Methodology

The study approach and methodology for this exercise were structured such as to cover the requirements under EMCA, 1999 (Revised 2015) as well as the ESIA/Audit regulations as stipulated under the Gazette Notice No. 56 of 13th June 2003.

The Environmental and Social Impact Assessment SPR was carried out through:

- **Desk review of related literature.** The primary materials reviewed included hydro-geological survey report, socio-economic reports, district development reports as well as unpublished material concerning the area. This helped create a baseline for the project.
- **Scoping:** This was done as a preliminary physical assessment and surrounding, it helps to narrow down to the most critical environmental and social issue requiring attention at a later evaluation.
- **Field visit:** Field assessment and with preliminary visits, discussion and documentation, the field visits was intended for evaluation of further information including community interviews, physical observation of the project site and its surrounding.
- **Public Participation and stakeholder consultation:** Consultations with relevant government departments, and with the local community were undertaken, to establish the general opinion with respect to the proposed borehole sub-project.
- **Data analysis and Report Writing:** All data and information collected during the process of assessment was processed and analysed to extract useful information from the filled questionnaires, interview with people on the project site, and prevailing condition on the state of the environment This report has been prepared based on the findings of the environmental and social impact assessment for the proposed Wachu-Rukich borehole project. Then there was tabulation of the findings, review and submission of this reports.

1.8 Cost of the Project

The project cost shall be provided through as per bill of quantities is estimated to be Kenya shilling thirteen -million (Ksh. **13,000,000**).

1.9 Organization of Summary Project Report

This report is organized into seven chapters.

- Chapter one gives the introduction and background information about the project, project justification, justification and methodology of report preparation.
- Chapter two focuses of the nature of the project, including design parameters, location and project cost.
- Chapter three it gives a description of project location.
- Chapter Four presents the outcome of public participation and stakeholder consultation.
- Chapter five identifies the potential positive and negative environmental, social, cultural, economic and political impacts of the proposed project. The chapter further analyses these potential impacts and proposes mitigation measures to minimize the negative impacts and enhance the positive impacts.
- Chapter Six presents the Environmental and Social Management and Monitoring Plan (ESMMP) for the proposed project.
- Chapter Seven give the conclusion and recommendations followed by the references and annexes.

CHAPTER TWO: NATURE OF THE PROJECT

2.2 The proposed sub-project Activities

Groundwater Survey

In compliance with the provisions of the Water Act No. 43 of 2016, Marsabit County Government engaged the services of hydrogeologists to carry out a hydrogeological and geophysical survey aimed at selecting a suitable borehole drilling site at Sirata II village in Log-logo Ward, Laisamis Sub- County. The area is situated in a zone with moderate groundwater potential. The study concludes that on the basis of geological evidence, groundwater prospects for intended purposes are tenable to meet the requirement of the Proponent. The report was one of the documents Water Resources Authority required for processing the permit.

Borehole Drilling Activities

Drilling should be carried out at a diameter of not less than 8", using a rotary type machine. The drilling rig should be able to drill to a depth of at least 250 m, at the specified diameter. The rig and the drilling method adopted must be suitable for drilling through both unconsolidated material, and hard, compact volcanic rocks. ***The proposed borehole is to be drilled to a depth of not less than 250m, to a maximum of 300 m bgl. Sustainable yield of approximately 8.16m³/hr. is expected.*** The general subsurface geology of the area is composed of superficial deposits, Basalts and the Basement System, in that stratigraphic succession. The boreholes in this area have varying yields ranging between **12.8 – 32.0 m³ /hour.** ***The water demand is estimated to be 70m³/day.***

Table 1: Construction summary

GPS Coordinates	Recommended Depth	Construction Requirements	Expected Yield (m ³ /h)
37N 0378742, 0218589: 455m	250	203/153mm	12.8-32.0 m ³ /hour

Drilling additives to be used (e.g. foam or polymer) must be non-toxic and biodegradable. They should have clear labels for ease reading by the supervising team. In no circumstances will bentonic additives considered to be acceptable, as they may plug the aquifer zones and are extremely difficult to remove during development.

Geological rock samples should be collected at 2 metres intervals. Water struck and rest levels should be carefully recorded, as well as water quality and estimates of the yield of individual aquifers encountered.

Great care should be taken that the water quality of the different aquifers is accurately determined. Upon the first strike, drilling fluids should be effectively flushed, and after sufficient time, a water sample should be taken off the air-blown (rotary) yield. On-site analysis using an EC meter, and preferably a portable laboratory, is recommended.

Once the borehole has been drilled, testing will be done in order to:

- Confirm yield, efficiency, and performance;
- Investigate water quality;
- Assess whether abstraction can be sustained in terms of yield and quality; □ Identify potential impacts;
- Characterize the aquifer properties such as transmissivity, hydraulic conductivity, and storage.

Water Well Design

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

The final design should be made by an experienced hydrogeologist.

Casing and Screens

The well should be cased and screened, in order to avoid collapsing and sediment intake. Considering the great depth of the borehole, it is recommended to use mild steel casings and gas slotted screens (which are cheaper than machine slotted screens) of 6" diameter. However, the screens should be well done, with a uniform slot size.

Grouting/Gravel Pack

Grouting is the act of injecting certain substances into the void of earth materials to reduce or eliminate their permeability, consolidate them, or increase their strength. The use of a gravel pack is recommended within the aquifer zone because the aquifer could contain sands or silts which are finer than the screen slot size. A 8" diameter borehole screened at 6" will leave an annular space of approximately 1", which is sufficient to allow the insertion of fine, quartzitic gravel. The grain size of the gravel pack should be within the range of 2 to 5 mm, and granules should be rounded to well-rounded. Over 95% should be siliceous. The gravel pack should be washed down with copious volumes of water to avoid bridging.

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 wellbore 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. The straightness of the wellbore 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.

Well Construction

In installing screen and casing, centralizers at 6 metres intervals should be used to ensure centrality within the borehole. This is particularly important to insert the artificial gravel pack all around the screen. If installed, gravel packed sections should be sealed off at the top and bottom with clay or bentonite seals (2 -3 m).

The remaining annular space should be backfilled with inert material (drill cuttings may be used), and the top three metres grouted with cement to ensure that no surface water at the wellhead can enter the wellbore and thus prevent contamination.

Well Development

Once the screen, gravel pack, seals and backfill have been installed, the well should be developed. All drilling methods cause some plugging of fractures or crevices in rocks. Borehole development is designed to maximize the good yield.

- Repairing the damage done to the aquifer material during drilling and restore the natural hydraulic properties.

In both cable tool (i.e. percussion) and air hammer drilling, the bit action chips and crushes the rock, and mixes it with water and other fine material into thick mud slurry. The pounding of the bit forces this slurry into the openings in the wall of the borehole, thus blocking the pores and impeding the flow of water from the aquifer. A thick "wall cake" may form, especially when clay additives (such as bentonite) are used during drilling or where natural clays occur in the penetrated formations. This cake, if not removed, may virtually plug the borehole, and significantly reduce the discharge. It should be noted that the maximum yield of a formation can only be realized if all the fractures and crevices are unblocked and able to supply water to the well.

Borehole development techniques are applied to break down and remove the impermeable layer of clayey material from the borehole wall. Swabbing, wall- scratching, airlift rawhiding and polyphosphate dosing are all borehole development techniques.

- Altering the characteristics of the aquifer volume in the vicinity of the borehole, by improving hydraulic contact between the aquifer and the hole. This is essentially aquifer development and is also known as aquifer stimulation.

Polyphosphate dosing, hydro fracturing and acidizing are examples of aquifer stimulation techniques.

The development methods to be applied depend on the available equipment, and differ significantly between percussion and rotary drilling (the latter being superior when it comes to efficiency):

Development with a percussion rig: if a cable tool rig has been deployed the available development techniques are relatively simple but less effective than the methods used in modern rotary drilling. The following measures are recommended:

- Backwashing and bailing: using a surge block with rubber flaps slightly smaller than the internal diameter of the hole, start near the top of the water-bearing zones and surge downwards (surging upwards may lead to the surge block sand-locking, which can jeopardize the hole). Bail the borehole clean periodically. Repeat this cycle until no more material is brought up, bailed water is clear and electrical conductivity is stable.

- Polyphosphate dosing: percussion equipment does not include mud pumps and drill pipe, so jetting is impossible. Polyphosphate dosing comprises no more than simply pouring water with dissolved sodium hex metaphosphate and calcium hypochlorite into a pipe, the base of which is located near the bottom of the hole.
- The polyphosphate is allowed to act for 12 hours or overnight.
- Repeat the backwashing and bailing cycle until the water is clear and electrical conductivity stable.

Development Methods

Borehole development methods include over pumping, backwashing, mechanical surging, air development, high-velocity air or water jetting, and a combination of high- velocity water jetting and simultaneous pumping.

Well Testing/Pumping test data

After development and preliminary tests, a step-draw down test, and a 24-hour long-duration well test at a constant discharge rate should be carried out. 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. The pumping test should be conducted for a continuous period of 24 to 72 hours, depending on the type of aquifer. The accuracy of drawdown data taken during a pumping test depends on the following: -

- Maintaining a constant yield during the test.
- Measuring the drawdown carefully in the pumping well and in one or two properly placed observation wells.
- Taking draw down readings at appropriate time intervals.
- Determining changes in barometric pressures; stream levels affect the drawdown data.
- Comparing recovery data with drawdown data taken during the pumping portion of the test.
- Continuing the test for 24hours for a confined aquifer and 72 hours for an unconfined aquifer during constant rate tests level for the borehole must be recorded as well as the intake and the pumping water, levels of the pump during water abstraction.

Pumping Plant

The proposed borehole will be pumped using an electrical solar submersible pumps preferred for its affordability to the community in terms of operation and maintenance. **Other components of the borehole to include;**

- Rising mains
- Storage tank (100M3)
- Pump house
- Water kiosk

The sub-project will be under the management of an elected committee.

Decommissioning phase

Decommissioning phase activities will be divided into the following activities.

- Disconnect the water and electricity supply

- Cap the drilled hole
- Restore the site to original status

2.3 Materials used in Construction and Sub-Project Cost

Material Input

Temporary materials

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 serious 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, into the air, of a surfactant mixed with water. Anionic soap mainly comprising sodium alkyl ether will be 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.

Lubricants and Diesel will be used to run the engines of the drilling machine, mud pump, and generator just within the period of implementing the sub-project.

Permanent Materials

Permanent materials include the items, which will be installed after completing the drilling of the hole. These include:

- ✓ **Casings and Screens -** These will be mild steel pipes. They will be installed in the drilled hole. They are not corrosive hence the least likely to affect the water quality.
- ✓ **Gravel Pack -** The grain size should be in the range of 2 to 5 mm, rounded to well granules, which should be 95% siliceous. The material is locally available where sand deposition has taken place such as at banks of rivers. The gravel pack shall be 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 of sediment and silt free groundwater to the borehole.
- ✓ **Bentonite -** The material is mixed with water and will be 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 will be used for sanitary purposes.
- ✓ **One-meter (1m) steel casing -** This is used for the borehole cap to avoid entry of surface water into the borehole. It will then be fitted with a cap at its top to prevent anybody from throwing foreign material into the hole.
- ✓ **Pipes -** These will be class 'C' steel rising main to be connected to the submersible pump and class C steel pipes to connect the water supply to the storage tank.
- ✓ **Inert material -** The drilled material will be reused by filling a section of the annular space during the borehole Construction.
- ✓ **Dipper line -** It is a 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 water deeper around seasons and whenever such need arises.

CHAPTER THREE: LOCATION OF THE PROJECT

3.1: Introduction

This chapter present information of the project location, the GPS coordinates, proof of land ownership, conformity to environmental management infrastructure and conformity to land use plan and zonal plan.

3.2 Description of the Location of the Project

3.2.1 Project Location

The proposed project site is situated in Log-logo ward, Laisamis Sub County within Marsabit County. It lies within the Survey of Kenya topographic sheets for Laisamis (**Sheet No. 67: Y633 Series**). Its defining coordinates are 37N 0378742 E UTM 0218589 N (**Latitude 1.977275 and Longitude 37.909706**) as shown on figure 3.1 below. The site is specifically located near Log-logo Town.



Figure 2: proposed project site in Google earth map

2.2 Land Ownership

The land on which the borehole project will sit upon belongs to Log-logo community. Area local leaders, chiefs, ward administrators, MCA and community opinion leaders were involved in siting for project site in the area. The community local leaders made an agreement through filling of Community Land Resolution Consent form (**refer to Annex 1**) and freely donated the land for the sub project. The sub-project is owned by the community but implemented

through the Kenya climate-smart programme and managed through a project management committee.

2.1: Proposed Sub-Project Overview

Sub-project Details

Name of the proponent: Log-logo Sirata II water project management committee

Nature of business: Borehole drilling and equipping (water tanks, piping, water troughs, water kiosks)

Date of Assessment: This SPR Assessment was done within the month of March, 2021

Site Address: Sirata II Village, Log-logo Ward, Laisamis Sub-County, Marsabit County

Proposed Sub-Project Ownership

The sub project site land belongs to Community of Log-logo ward and donation is made by the Sirata II Location community. Area local leaders, chiefs, ward administrators, MCA and community opinion leaders were involved in siting for project site in the area. The community local leaders made an agreement through filling of Community Land Resolution Consent form, and willingly donated the land for the sub project. The sub-project is owned by the community but implemented through the Kenya climate-smart programme and managed through a project management committee.

Sub-project Area Description

The sub-project area lies in a sparsely populated area with livestock keeping being the main land use. The area is ASAL and lies within a marginal mixed farming livelihood zone. The nearest reliable water sub-project is more than 7 km away. The area is sparsely distributed with bush, shrubs and a few scattered trees.

According to Hydrogeological survey the proposed site is suitable for borehole development, therefore remains the only project alternative site for the resident of Log-logo ward.

CHAPTER FOUR: PUBLIC PARTICIPATION AND STAKEHOLDER CONSULTATIONS

4.1 Introduction

Public participation is an essential and legislative requirement for environmental authorization. The firm of experts together with KCSAP office undertook the public participation and stakeholder consultation with regard to the proposed drilling of Wachu-Rukich borehole and construction of auxiliary structures. The public consultation was undertaken to obtain information from interested and affected parties (stakeholders), solicit their views and consult on sensitive issues. The output is incorporated in the development of mitigation measures. Different stakeholders were of different opinion regarding the proposed water pan.

Public participation and stakeholders' consultation is a very important aspect of the ESIA process and community development. This brings out the contentious issues and gives a chance to those who may be affected by the proposed project to give their views. The public participation and stakeholder consultation is the best opportunity to interact with the project components and activities hence ownership is assured and finally leading to sustainability of the project.

4.2 Objective of Public Participation and Stakeholders Consultation

The main objective of the consultations with stakeholders was to discuss the proposed project environmental and social implications and to identify alternatives for consideration.

Specifically, the consultations sought to achieve the following objectives:

- To provide information about the proposed sub project and its objectives;
- Build up confidence between the stakeholders and the proponent to minimize the risk of delays in the implementation of the sub project.
- To seek views, concerns and opinions of people in the area concerning the sub project;
- To provide forum for discussions on identified concerns;
- To identify and verify significance of environmental, social and health impacts; and
- To inform the process of developing appropriate mitigation and management options.

4.3 Methodology

Public participation for the proposed Wachu-Rukich community borehole project was conducted through holding a public Baraza bringing together people affected by the project, key relevant department, such as lands, public works, agriculture & livestock, social service, water, and WRA. Other key stakeholders present during consultation forum were ESIA Expert, Hydrogeologist, area local leaders as well as KCSAP staff. The consultations were carried out on March, 2021 in Log-logo town. The technical team conducted free, prior informed consultation and Presentation of the project scope was outlined, after which an open discussion forum followed during which all pertinent issues were raised and agreed upon with all stakeholders and all groups within the community. These included the adult males and females as well as male and female youth from all the communities in the village. A total of 75 participants of 41 males and 34 females attended the consultation meeting. (see attached attendance list, photos and minutes of the meeting).

Consultation was also conducted through admission of questionnaires to the locals to allow for systematic understanding and interaction of the Potentially Affected Persons (PAP's) and



Figure 3: Public participation in Log-log town

the Proponents. A total of 15 questionnaires were administered and were filled in by the stakeholders during the public forum.

Summary of Issues Raised by the Community and Stakeholders and Response

Stakeholder	Issue	Aspect/Concern Raised by Stakeholders	Suggested Mitigation Measure
Ward Administrator	Security	Possibilities of human and wildlife conflicts in the event all the nearby water sources dry the wild animals might be tempting to use the water in the pan, insecurity related to people over the water.	Fencing of the water pan, peace mission sensitization between communities living around the borehole, on peaceful coexistence
Saku Sub county administrator	Employment of locals	Job opportunities for the skilled and unskilled during and the construction of the water pan	Provide opportunities to the available local skills especially the youth, elderly women and widows

Chairman PMC	Water pollution	It was raised because of livestock drinking water directly from the water pan and lack of sanitary facilities at the water pan	Consider fencing of the water pan and having only one entry with a gate.
Area Chief	Increased livestock disease incidences	There was concern over increased disease incidence due to the livestock converging at the drinking points due to mixing of animals.	Suggested measures included sensitization of the community on livestock disease control and prevention and provision of extension, intensify disease and pest surveillance
Community Member	Water demand	Concern was raised whether the water from the borehole would be enough for livestock and domestic use	From Hydrogeological survey assessment report water is sufficient for both livestock and domestic use. Water quality testing will be done. Assured quality expected to be suitable as nearby boreholes Dololo Dokatu had yielded water meeting required quality for human and livestock

The following Recommendation came out clearly during the public participation;

- Hydrogeological investigations had been undertaken in the site for the drilling of the borehole and indicated water would be yielded.
- Dololo Dokatu boreholes located 10km form the proposed Wachu-Rukich boreholes had yielded water safe for both livestock and domestic use.
- Drought being a major hazard in the proposed borehole area would address the community water needs
- Construction of livestock water troughs.
- The issue of water related conflicts was raised.

No objection to the sub-project was raised during the consultation with the community and the stakeholders.

CHAPTER FIVE: POTENTIAL IMPACTS AND MITIGATION MEASURES

5.0 Introduction

The implementation of the project is expected to bring about impacts that have both positive/beneficial and negative aspects. The negative impacts will be largely minimum and mostly experienced during the project construction phase, while the positive impacts will be immense and will be experienced during all phases of project implementation.

5.1 Anticipated Positive Impacts during Construction Phase

5.1.1 Creation of temporal employment

During the construction stage of the proposed sub-project, there will be direct and indirect employment opportunities for both professionals and unskilled workers.

5.1.2 Injection of money into the local and national economy

A substantial sum of the sub-project money shall be released into the local economy due to the construction activities. This money will be informed of payments for skilled and unskilled labour; purchases of construction materials; and payments for local provisions including fuel, foods, and accommodation.

5.1.3 Improved businesses

There will be temporary establishment of business that will benefit the community in supplying of the materials necessary in the sub project as described above. Also the mama uji will get an income by feeding the workers in the sub project.

5.1.4 Skills transfer

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

5.1.5 Improved access

The sub project area is a rural setting where roads are not well maintained, with the introduction of the investment, the roads will regularly be maintained to ease access to the water tanks, water kiosks, and the water pumping area.

5.2 Anticipated Negative Environmental and Social Impacts

5.2.1 Soil Compaction and Erosion

As machines and people move on the ground the soil is compacted. Compaction has the undesired effect of hindering air and water penetration beneath the soil surface and thus limiting aerobic activities of soil-dwelling organisms. This may have negative consequences on soil productivity on a localized scale. Compaction also enhances run-off during the rainy season resulting in soil erosion.

Mitigation measures

- a) Strictly control construction vehicles to ensure that they operate judiciously and over designated areas to reduce soil compaction.
- b) Rip off any compacted areas after construction to allow aeration of the soil and ease the infiltration of water into the soil.

5.2.2 Groundwater pollution

Poor water quality could be of great concern to human and animal health. The water that seeps into the ground may be contaminated to some degree and eventually affect the quality of the groundwater and indeed, borehole water. Percolation of water from sanitary systems i.e. toilets and refuse disposal sites pose a serious threat to the preservation of groundwater quality. The protection of groundwater quality depends on the well design and the methods and materials used to construct the well. Some of the deficiencies in well construction are: -

- a) Insufficient or substandard well casing
- b) Inadequate seal between the well casing and the borehole
- c) Poor welding of casing joints
- d) Lack of sanitary protection at the wellhead.
- e) Use of well pits.

Mitigation measures

- a) Groundwater quality must be safeguarded by correct spatial planning and protection of surface waters since these are strictly linked to groundwater resources.
- b) Ensure that all potential sources of pollution are eliminated for example by ensuring that sanitary facilities are constructed according to public health requirements
- c) The proponent will adhere to the regulations set by the Water Act 2016 Management and development on the amounts to be extracted from a borehole and the number of pumping hours. This helps to reduce wastage and misuse of this resource.
- d) Use water-based drilling fluid
- e) Case the well as it passes through the water table
- f) Proper housekeeping within and around the rig will be observed before, during and after drilling, while proper clean-up procedures will be undertaken in case of drilling fluid and oil spills.

5.2.3 Risk of Noise and vibrations

Noise is unavoidable during the *construction period*. The drilling works and incoming vehicles to deliver drilling and construction materials and communication among workers will most likely result in noise emissions. The noise could impact negatively on the workers during the construction phase. Noise can also be a nuisance to the local community if construction works begin too early in the day and continue into the night.

The noise generated during any construction is best described as part of a normal occupational hazard that workers in the construction industry face. Noise levels from construction activities exceeding **60 Db (A)** at the construction campsite have a negative impact on the environment. The effects of noise include:

- a) Noise interferes with communication and can lead to tinnitus (ringing in the ears).
- b) Nuisance.
- c) Fatigue and tiredness, reduced efficiency, low morale, and severe and permanent loss of hearing which may persist for several hours due to prolonged exposure to noise.
- d) Deterioration of the environment within the sub-project site and the surrounding areas through vibrations produced by heavy construction machinery.
- e) The weakening of adjacent buildings resulting in cracking of their walls by vibrations.

Mitigation measures

- a) Adhere to the EMCA (Noise & Excessive Vibration Pollution Control Regulations, 2009) maximum permissible noise levels for silent zones, places of worship, residential
- b) (indoor/outdoor), mixed residential; and commercial Minimize noise at the site and in the surrounding areas through:
 - a) Properly servicing and maintaining and tuning drilling machinery such as generators and other heavy-duty equipment to reduce noise generation; and
 - b) Minimize the impacts of temporary drilling noise and vibration by: Planning the drilling work to take place only during the weekends at day time when the neighbours are also at work.

5.2.4 Risk of oil Spillage/Hazardous wastes

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 or during regular maintenance. 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 in the contamination of water thus rendering it unsuitable for both domestic and animal use. During the dry season spilled fuel, oils and lubricants could result in fire risks.

Mitigation measures

The following mitigation measures should be adopted to limit the impact of hazardous substances on- site.

- i. Make sure that the drilling workforce is aware of the procedures to be followed for dealing with spills and leaks;
- ii. Make sure that spills are immediately removed along with all contaminated material and disposed of at an approved hazardous landfill site;
- iii. Make sure that all contaminated material is stored in a banded area before being disposed of;
- iv. Make sure that a suitable spill kit is available on site, to be applied to all contaminated areas that will absorb / breakdown the spills. The number of such materials shall be able to handle the total volume of the hydrocarbon stored on-site; and
- v. Ensure that all diesel and oil drums are stored in a banded area with the respective tags like “Danger” or its pictorial representation.
- vi. Care to be observed when transporting diesel and oil to, from and within the site. It is recommended that if possible, this be done using qualified oil transporters
- vii. Repairing and maintenance and greasing of vehicles and construction plants must be carried out off the site (petrol station or garage) to avoid fuels and lubricants spill at the sub-project site and contamination of the water.

5.2.5 Dust Emissions/Air Quality

The drilling process is expected to cause a lot of dust emissions due to vehicles and trucks driving to and from the site along the rough road leading to the site. Limited dust would be generated by the actual drilling activities. Stockpiles arising from the drilled area could also cause dust emissions if blown away by the wind. Smoke will be generated from the vehicles and the drilling equipment. The magnitude will, however, depend on the condition of the machines and the vehicles during the drilling period.

Mitigation measures

The following mitigation measures can be adopted to reduce the degradation of air quality by the drilling activities.

- i. Provide dust masks to people visiting the site and have extra ones for site visitors
- ii. Stockpiles of the earth should be watered if dry to minimize dust from blowing
- iii. All fuel-powered equipment including the generator will be serviced and maintained in optimal working conditions to mitigate against exhaust emissions.
- iv. Workers and any other people at the site should wear face masks at all times to avoid carbon monoxide poisoning

5.2.6 Solid and Liquid Waste Generation

The major solid waste will be the drilled cuttings. There will be some solid containers such as cement, bentonite and gravel bags and other packets with materials and equipment to be used during the implementation of the sub-project. Other solid waste will be generated from the composite housing of the drilling crew. At the time of the assessment

Mitigation measures

The following mitigation measures have been proposed.

- i. Any remaining waste (paper or polythene containers, cement, bentonite and gravel bags, excavation debris, remaining gravel pack, etc.) should be disposed of according to the NEMA's Waste Management Regulations of 2006.
- ii. Some of the drilled materials will be used in the borehole construction by back-filling the annular space. All excavated material from the draining channel will be used to refill it.
- iii. The contractor to be advised to provide waste bins and be collected by the county waste collectors.
- iv. Do not secure a solid waste disposal site within a radius of 50M of the proposed borehole site.

5.2.7 Removal of vegetation

Before the drilling and installation of the boreholes, pipeline works and construction of water kiosks and elevated steel tanks, clearing of part of the existing vegetation cover will be done. This disturbance may cause changes in the natural community ecosystem or lead to invasion by non-native plant species. Loss of plant communities may also result in soil erosion and/or compaction. The loose soil material may also be washed down into the lower areas (streams and valleys).

Mitigation measures

- i). Ensure proper demarcation and delineation of the sub-project area to be affected by construction works;
- ii). It is recommended that indigenous trees or other fast-growing trees be planted in strategic locations where the vegetation cover will be cleared as part of landscaping initiatives;
- iii). Sub-project implementation plans will be developed such that section excavated are worked on and completed before moving to other areas;
- iv). Re-vegetation of exposed areas around the site will be carried out rapidly in order to mitigate against the erosion of soil through surface water runoff and wind erosion; and
- v). Identify and restrict the movement of vehicles to areas of disturbance

5.2.8 Risk of accidents and health and safety concerns

During construction activities, it is expected that the construction workers may encounter occupational health hazards as a result of coming into contact and handling hazardous waste e.g. engine oil and grease. Because of the clearing of access roads and water pipelines, setting up and operating the drilling machines, workers will be exposed to the risk of accidents and

injuries. Such injuries can result from loading and unloading truck-mounted drill rig, transportation of the drill rig, hand tools and cuts from sharp objects, slips and fall hazards, among others. We recommend that necessary safety precautions like defensive driving and putting up signage's be taken by the truck drivers and workers to minimize accidents. The public is also potential exposure to risks of safety from the excavated trenches waiting for pipe laying, access to the work areas by unauthorized members of public and potential road safety risks from trucks and vehicles accessing the site.

Mitigation measures

Ensure compliance with occupational health and safety act, 2007 as indicated below

- i). Ensure that the trenches created are covered before leaving the site
- ii) Ensure workers are provided with first aid kits;
- iii). Ensure all equipment are inspected before use for appropriate safeguards and that the machine operators are trained on machine safety;
- iv). Ensure the working hours are controlled and that employees are not allowed to extend the working hours beyond an acceptable limit for purposes of gaining extra pay;
- v). Ensure appropriate road safety signage are strategically placed and drivers adhere to the requirements of such signage (on speed limits, hoarding at or near school among others);
- vi). Provide adequate manual labor to meet the requirements of the tasks,
- vii). Provide appropriate barriers along the excavated trenches. All construction sites shall be isolated from the children, public and their livestock. This will be done through temporary fencing and fixing appropriate safety signage and information;
- viii). Involve the local people for enhanced ownership and management; and
- ix). Upon completion and commissioning of the works, public safety in regard to water quality will be important. Security to be ensured for the borehole and storage tanks. The involvement of the local community will be enhanced through training and sensitization.
- x). The site should be fenced off from people, children and animals
- xi). Provision of suitable PPEs and procuring insurance for workers and machinery/ vehicles
- xii). The working on the school compound to be limited to very early in the morning, after classes and only weekends and holidays

5.2.9 Risk of HIV/AIDS

The sub-project will attract new people to the sub-project area, and this can lead to several repercussions leading to the spread of the virus. An influx of new people to the sub-project area especially construction workers can affect the number of new cases of HIV because they often interfere with an otherwise stable situation, but the contrary can also happen where the newcomers find themselves at higher risk.

Mitigation measures

- i). Programs will be developed and integrated into the sub-project implementation for sensitizing the local community and sub-project workers on HIV/AIDS and/or other sexually transmitted diseases (STDs);
- ii). Review the construction activities to integrate with the HIV/AIDS campaigns.
- iii). Develop appropriate training and awareness materials for Information, Education, and Communication (IEC) on HIV/AIDS; and iv). Identify other players (local CBOs, NGOs, and government organizations) on HIV/AIDS for enhanced collaboration.
- v). The contractor shall be tasked through the ESMP to comply with the Code of conduct for workers which outlaws sexual relations with underage children

The transition phase from construction to operation

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

- i. Remove any wastes from the site.
- ii. Rehabilitate any areas adversely affected by the construction through spillages of pollutants: liquids, chemicals, cement, and paint among others at the site and any other areas disturbed as a result of the construction outside the site.
- iii. Plant grasses and ornamental trees at the site.
- iv. Put up fencing around the site for protection from intruders and unauthorized persons and ensure privacy.

B. Operation Phase

5.3 Anticipated Positive Impacts

5.3.1 Increased access to water

The current water sources rapidly deplete during the dry season. Consequently, the community members have to travel increasingly far distances in search of water. This wastes a lot of time that could have been used for other productive purposes. It is expected that the construction of boreholes will greatly improve access to water in the area.

5.3.2 Permanent employment opportunities

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

5.3.3 Improved nutrition and food security

The proposed borehole sub-project is developed to supply water for irrigation and livestock. Reduced livestock distance in search of water will lead to improved livestock health and productivity in terms of milk and meat. Farmers will also be able to engage in smallholder irrigation and growth of a variety of crops. The outcome shall be improved nutrition and food security in the community in the sub-project context.

5.3.4 Increased participation of women in socio-economic development

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

5.3.5 Improved Health and sanitation

Positive environmental impact on the community in terms of accessibility to quality water and reduction in waterborne diseases. Increased supply of clean water to the community members will contribute to improved hygiene standards in the project area.

5.3.6 Reduced travel times to water points

From our discussions with community members, most families spend almost 2 hours to one hour in search of water. It is expected that the construction of the borehole will lead to

significant time savings due to reduced distances to water points. It is expected that the same will improve the economic and social status of women and children since there will be more time for other activities for example for farming.

5.4 Negative Impacts

5.4.1 Groundwater depletion/Lowering of the water table

This may result from the excessive abstraction of the water from the borehole i.e. beyond the permitted limit. This may result in the lowering of the water table.

Mitigation measures

On completion of the drilling and other related works.

- a) The borehole should be installed with a Master Meter and an Airline/Piezometer to monitor groundwater abstraction and to facilitate regular measurements of the static water level in the borehole, respectively
- b) The maximum groundwater abstraction permitted from the borehole is limited to the authorized volume per day for the domestic/irrigation use only subject to availability from 60% of the tested yield for a maximum abstraction period not exceeding ten (10) hours per day
- c) Install auto-shut water taps to reduce water wastage

5.4.2 Risk of water-borne diseases

Water spillage around the taps during operation may provide a breeding ground for vectors of waterborne diseases such as mosquitos. This may come about as a result of poor management of sanitation and waste water.

Mitigation measures

- i). The waste water drainage channel be constructed to lead water away from the pump pad;
- ii). The waste water may be used for small gardening initiatives by the communities or directed to soak pits;
- iii). Ensure that any stagnant water is drained
 - iv). Conduct continuous maintenance of the borehole, pipework, tank and water kiosk; and
 - v). Conduct water sampling at least every 3 months for water monitoring record base on this facility
- vi). Sensitize communities on the need to use treated mosquito nets and to clear bushes around water areas
- vii). Sensitize communities on proper sanitation and hygiene

5.4.3 Change in Settlement patterns

The construction of the borehole is likely to encourage permanent settlements leading to livestock and human concentration near the water points. A large concentration of domestic animals may result in heavy grazing and accompanying vegetation changes in the vicinity of the boreholes.

Mitigation measures

Since that the area is already adjudicated land and land ownership is already determined, the community need to be sensitized during their social gatherings on importance of not selling their land to the influx population.

This is further solved through the distributed watering points and water troughs in the sub project area.

5.4.4 Risk of soil erosion

There are possibilities of soil erosion occurring during the operation of the boreholes which may become serious when the topsoil is left bare and agents of erosion become active. Soil erosion is a serious environmental problem which should be controlled. Lost soil due to erosion is normally deposited elsewhere, and the location of the deposition could alter downstream hydrology and increase flooding. It may also interfere with water quality directly through increasing turbidity levels, siltation and indirectly from contaminants carried with or attached to eroded soil particles. The proposed sub-project is expected to have minimal risk of erosion as the area to be disturbed is quite small.

Mitigation measures

- i). Regularly check and maintain pipes to avoid burst pipes and leakages which can lead to massive water losses (and so revenue) as well as soil loss;
- ii). Apply soil erosion control measures such as levelling the sub-project site to reduce runoff; and
- iii). Ensure compacted areas are ripped off to reduce run-off.

5.4.5 Inadequate sub project Management

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

Mitigation measures

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

C. Decommissioning Phase

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

5.5 Social Economic Aspects

Implementation of the proposed borehole sub-project will ease the water problems in the target community. The following social conflicts are expected to arise as a result of the implementation of the sub-project. All activities related to the sub-project will be carried out within a land agreed upon between the proponent and the community members. The sub-project will thus improve the social-economic aspects of potential consumers.

5.5.1 Conflict over scarce water commodity

There is possibility of community conflicting on the use of this resource here some farmers might have more animals than others for this resource therefore causing conflict.

Proposed mitigation

- i) The management committee to provide enough watering troughs at strategic points
- ii) Training of the management committee and the community on sustainable use of water

5.5.2 Increase to exposure to communicable diseases including HIV/AIDS

a. Health Impact-Increase in incidences of HIV/AIDS and STIs

The influx of people may bring communicable diseases to the project area, including sexually transmitted diseases (STDs), or the incoming workers may be exposed to diseases to which they have low resistance. This can result in an additional burden on local health resources. Local health and rescue facilities may also be overwhelmed and/or ill-equipped to address the industrial accidents that can occur in a large construction site.

Proposed **mitigation measure** for this is.

- Contractor to sensitize workers and community members on HIV/AIDS Awareness other communicable diseases to be instituted and implemented as part of the Contractor's Health and Safety Management Plan to be enforced by the Supervising Engineer.
- This will involve periodic HIV/AIDS and other communicable diseases Awareness Workshops for Contractor's Staff.
- Controlled access to Contractor's Workforce Camps by outsiders.
- Contractor to provide standard quality condoms at the construction site during the construction period.

b. Health Impact – Spread of COVID-19

During project execution (civil works and operation of the project), large numbers of workers will be required to assemble together in meetings, toolbox talks and even at work sites; varied number of workforce including suppliers of material and services are also expected to come in from various places in the country which may be COVID-19 hot spots; and interaction of workers with the project host community will happen as workers find accommodation close to work sites, and/or return to their homes after works. The potential for the spread of any infectious disease like COVID-19 by projects is high.

The proposed **Mitigation Measures** against spread of COVID-19

The Contractors will develop SOPs for managing the spread of Covid-19 during project execution and submit them for the approval of the Supervision Engineer and the Client before mobilizing to site. The SOPs shall be in line with the World Bank guidance on COVID-19, Ministry of Health Directives and site-specific project conditions;

- (i) Mandatory provision and use of appropriate Personal Protective Equipment (PPE) shall be required for all project personnel including workers and visitors;
- (ii) Avoid concentration of more than 15 workers at one location. Where there are two or more people gathered, maintain social distancing of at least 2 meters;
- (iii) All workers and visitors accessing worksites every day or attending meetings shall be subjected to rapid Covid-19 screening which may include temperature check and other vital signs;
- (iv) The project shall put in place means to support rapid testing of suspected workers for covid-19;
- (v) Install handwashing facilities with adequate running water and soap, or sanitizing facilities at entrance to work sites including consultation venues and meetings and ensure they are used;
- (vi) Ensure routine sanitization of shared social facilities and other communal places routinely including wiping of workstations, door knobs, hand rails etc.;

5.5.3 Sexual Exploitation and Abuse (SEA)

Women and girls are in most cases prone to SEA in most communities especially when they are towards accessing of resources; for example, when they are looking for job opportunities.

Proposed mitigation

- i. The contractor to Develop and implement an SEA action plan with an Accountability and Response Framework as part of the contract as contained in the ESMP. The SEA action plan will follow guidance on the World Bank's Good Practice Note for Addressing Gender-based Violence in Investment Project Financing.
- ii. The SEA action plan will include how the project will ensure necessary steps are in place for:
 - The community: including development of confidential community based complaints mechanisms discrete from the standard GRM; mainstreaming of PSEA awareness-raising in all community engagement activities; community-level IEC materials; regular community outreach to women and girls about social risks and their PSEA-related rights;
 - Management and Coordination: including integration of SEA in job descriptions, employments contracts, performance appraisal systems, etc.; development of contract policies related to SEA, including whistle-blower protection and investigation and disciplinary procedures; training for all project management; management of coordination mechanism for case oversight, investigations and disciplinary procedures; supervision of dedicated PSEA focal points in the project and trained community liaison officers.

5.5.4. Gender-based violence at community level

There is possibility of discrimination on how opportunities are distributed among the community members if care is not taken

Proposed Mitigation

The contractor will implement provisions that ensure that gender-based violence at the community level is not triggered by the Project, including:

- effective and on-going community engagement and consultation, particularly with women and girls;
- Review of specific project components that are known to heighten GBV risk at the community level, e.g. employment schemes for women; community level water management, representation or economic activities etc.
- Specific plan for mitigating these known risks, e.g. sensitization around gender-equitable approaches to compensation and employment; etc. ii. The contractor will ensure adequate referral mechanisms are in place if a case of GBV at the community level is reported related to project implementation

5.5.5 Outbreak of Livestock Diseases

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

- Regular disease surveillance by the veterinary department and community
- Monitoring of the livestock by the community/farmers
- Sensitization of the community on disease spread, monitoring and control

- a livestock disease management plan be put in place by the veterinary department to ensure disease incidences are promptly responded to and addressed.

CHAPTER SIX: ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN

6.1 Introduction

This chapter presents the Environmental and Social Management Plan (ESM &MP) that will be implemented by the proponent to prevent or reduce significant negative impacts to acceptable levels. This plan will be fully followed throughout the sub-project life cycle.

- The purpose of the Environmental and Social Management Plan (ESMP) for the proposed borehole Sub-project is to provide mitigation measures for the significant negative environmental and social impacts. The objectives of the ESMP are:
- To clearly show how the sub-project will manage the negative impacts while enhancing the positive ones to ensure a sub-project that is economically, socially, and environmentally sustainable.
- To provide evidence of practical and achievable plans for the management of the proposed sub-project.
- To provide the Proponent and the relevant Lead Agencies with a framework to confirm compliance with relevant laws and regulations; and

6.2 Monitoring

The ESMP implementation and performance shall be monitored continually; performance, conformance and non-conformance audit will be applied in order to adapt the plan by adopting effective corrections whenever needed. ***An environmental audit will be conducted on an annual basis as required by NEMA.*** The environmental and social issues included within the mitigation measures will be monitored and supervised by the project beneficiaries, chosen contractor, engineering team and the KCSAP County Environment and Social Safeguards Compliance Officer (CESSCO) and the Projects Monitoring and Evaluation Officer.

The monitoring system will provide technical assistance and supervision when needed, early detection of conditions related to mitigation measures, follows up on mitigation results, and provides information of the project progress. The KCSAP Project Coordinating Unit in Marsabit will comply with the provisions of any other environmental and safeguard requirement provided by legislation and conditions of the main funding agency (WB).

Environmental and Social Management, and Monitoring Plan (ESMP)

Table 3: Environmental and Social Management and Monitoring Plan

Potential Environmental/Social impacts	Proposed Mitigation	Indicator	Responsible Individual/Institution	Means of Verification	Time Frame	Estimated Cost
	A. CONSTRUCTION PHASE					
1. Soil Compaction and erosion	<p>a. Strictly control construction vehicles to ensure that they operate judiciously and over designated areas to reduce soil compaction.</p> <p>b. Rip off any compacted areas after construction to allow aeration of the soil and ease the infiltration of water into the soil.</p>	<p>a) No. of designated routes used.</p> <p>b) No. of sites rehabilitated.</p>	Contractor	Site rehabilitation Reports	3months	80,000/=
2. Groundwater pollution	<p>a. Ensure that all potential sources of pollution are eliminated.</p> <p>b. Adhere to the regulations set by the Water Act 2016 Management and development on the amounts to be extracted from a borehole and the number of pumping hours.</p> <p>c. Use water-based drilling fluid</p> <p>d. Proper a soak pit for safe disposal of drilling foam.</p> <p>e. Case the well as it passes through the water table.</p>	<p>a. Distance of sanitation facilities from the borehole. b) No and Type of drilling fluid</p> <p>c. No. of soak pit.</p>	Contractor NEMA WRA Dep. of Lands	water quality analysis Reports	2months	150,000

<p>3.Noise and vibrations</p>	<p>i) Avoid noise above 80db at the sub project site especially during the night.</p> <p>j) Properly servicing and maintaining and tuning drilling machinery such as generators and other heavy-duty equipment to reduce noise generation; and</p> <p>iii). Minimize the impacts of temporary drilling noise and vibration by:</p> <ul style="list-style-type: none"> • Planning the drilling work to take place only during the day when the neighbours are also at work. • Maintaining reasonable working hours so as to reduce the number of complaints concerning noise from the workers and neighbours. • Operating shorter shift periods for workers who come in direct contact with high concentrations of noise or other hazards. • Posting notices at the construction site informing the public of the construction activities, time, and day. 	<ul style="list-style-type: none"> • The noise level <p>Frequency of vehicle/ machine servicing e.g. once a quarter, a fortnight, etc.</p> <ul style="list-style-type: none"> • Time scheduled for drilling • number of shifts each individual is allocated • No of posters • Number of workers provided with the PPEs <p>Number of machine operators with ear plugs</p>	<p>Supervising engineer, PMC Contractor</p>	<p>Vehicle maintenance Records</p> <p>GRM/Complainants Records</p> <p>Reports</p> <p>Notice posted</p>	<p>Ambient air quality Reports</p>	<p>1 month</p>	<p>50,000</p>
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4.Oil spillage/Hazardous wastes	i) Vehicle/machinery servicing not to be done in the construction area. ii) Immediate scooping of any spillage during construction and safely disposing off. iii) Servicing of vehicle at a designated place equip with a sump to contain any spills	a. No. of designated storage for fuels and grease b. Presence of designated yards and servicing bays at site c. No. of oil sump at servicing yard	Contractor		1 month		0
5. Dust emissions	i) Provision of suitable PPE/C ii) Drivers to avoid unnecessary speeding near settlements in the project areas. iii) apply waters sprays and mist by trucks as dust suppression measures on loose soils and stockpiles	a. Water sprays and mists b. No. of suitable PPE c. No. of drivers trained/advised	Contractor	Air quality reports Training Reports	2 months		20,000/=

<p>6. Solid and liquid waste generation</p>	<p>i) provision of waste bins/ skips; sensitizing workers and communities on waste management, engaging licensed waste handler to regularly empty the bins and dispose the wastes; ensuring recycling through waste sorting and separation; providing sanitation facilities are a good distance from the borehole to reduce the risk of water contamination; et cetera.</p> <p>ii)ii) Some of the drilled materials will be used in the borehole construction by back-filling the annular space. All excavated material from the draining channel will be used to refill it. Drilling crew to be encouraged to dump their personal wastes in designated covered wastebaskets.</p> <p>iii)iii) Do not secure a solid waste disposal site within a radius of 50M of the proposed borehole site.</p>	<p>Number waste of baskets/ receptacles</p>	<p>Contractor NEMA WRA, CPCU</p>	<p>Waste receptacles installed</p> <p>Sanitation facilities built</p>	<p>2 months</p>	<p>50,000/=</p>
<p>7. Removal of vegetation</p>	<p>i) Ensure proper demarcation and delineation of the sub-project area to be affected by construction works.</p> <p>ii) It is recommended that indigenous trees or other fast-growing trees be planted in strategic locations where the vegetation cover will be cleared as part of landscaping initiatives.</p> <p>iii) Sub-project implementation plans will be developed such that section excavated are worked on and completed before moving to other areas.</p> <p>iv) Re-vegetation of exposed areas around the site will be carried out rapidly in order to mitigate against the erosion of soil through surface water runoff and wind erosion.</p>	<p>a) No. of indigenous trees planted</p> <p>b) No. of sites revegetated / Area of excavated sites revegetated</p> <p>c) No. of restricted sites</p>	<p>Contractor CPCU</p>	<p>Trees planted Reports</p>	<p>7 months</p>	<p>60,000/=</p>

8.Accidents and health and safety concerns	<ul style="list-style-type: none"> i) Ensure that the trenches created are covered before leaving the site ii) Ensure workers are provided with first aid kits; iii) Ensure all equipment are inspected before use for appropriate safeguards iv) Ensure the machine operators are trained on machine safety; v) Ensure the working hours are controlled and that employees are not allowed to extend the working hours beyond an acceptable limit for purposes of gaining extra pay; vi) Ensure appropriate road safety signage are strategically placed and drivers adhere to the requirements of such signage vii) Provide appropriate barriers along the excavated trenches. All construction sites shall be isolated from children, public and livestock. This will be done through temporary fencing and fixing appropriate safety signage and information; involved the local people for enhanced ownership and management; and viii) Upon completion and commissioning of the works, public safety in regard to water quality will be important. Security 	<ul style="list-style-type: none"> a) Length of trenches filled b) No. of workers provided with PPEs c) No. of inspections conducted d) No. of trainings on machine operation safety and first aid e) The time schedule of activities. f) Number of signage installed g) Number of people employed h) Sites fenced and number of sensitization meetings 	Contractor PMC Community and CPCU	Inspection Reports First Aid Kits Public Health Records Training Reports Safety Signs Minutes	5 months	50,000/=
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9.Risk of HIV/AIDS	<ul style="list-style-type: none"> a. Develop and integrate into the sub-project implementation Programs for sensitizing the local community and workers on HIV/AIDS and/or other sexually transmitted diseases (STDs). b. Develop appropriate training and awareness materials for Information, Education, and Communication (IEC) on HIV/AIDS. 	<ul style="list-style-type: none"> a) Number of sensitization meeting b) Number of materials developed c) Number of partners identified 	Contractor CPCU PMC	Minutes	4 months	160,000/
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	c. Identify other players (local CBOs, NGOs, and government organizations) on HIV/AIDS for enhanced collaboration			Training Reports		
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10.Spread of COVID-19 amongst workers And during Public Participation	<p>a. The Contractors to develop a SOPs for managing the spread of Covid-19 during project execution in line with the World Bank guidance on COVID-19, Ministry of Health Directives, and site-specific project conditions.</p> <p>b. Mandatory provision and use of appropriate Personal Protective Equipment (PPE) for all project personnel.</p> <p>c. Avoid concentrating of more than 15 workers at one location. Where there are two or more people gathered, maintain social distancing at least 2 meters.</p> <p>d. The project shall put in place means to support rapid testing of suspected workers for covid-19.</p> <p>e. Install handwashing facilities with adequate running water and soap</p>	Availability of SOP(s), Training material, PPE, sanitizing facilities, installed handwashing equipment etc.	Supervising Eng. & Contractor, PMC, Public Health	<p>Training Reports</p> <p>PPEs provided</p> <p>Handwashing equipment's installed</p>	5 months	50,000/=
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B. Operation Phase						
1.Lowering of the water table	<p>i) The borehole should be installed with a Master Meter and an Airline/Piezometer to monitor groundwater abstraction and to facilitate regular measurements of the static water level in the borehole, respectively.</p> <p>ii) The maximum groundwater abstraction permitted from the borehole is limited to the authorized volume per day for the domestic/irrigation use only subject to availability from 60% of the tested yield for a maximum abstraction period not exceeding ten (10) hours per day.</p> <p>iii)Install auto-shut water taps to reduce water wastage.</p>	<p>a) Number of type of water taps installed</p> <p>b) Number of the type of water meter installed</p> <p>c) Volume of water abstracted per day</p>	PMC WRA CPCU	Water taps installed	12 months	40,000/=
2.Waterborne diseases	<p>i) The wastewater drainage channel be constructed to lead water away from the pump pad.</p> <p>ii) The wastewater may be used for small gardening initiatives by the communities or directed to soak pits.</p> <p>iii) Sensitize the community on the use of mosquito nets</p> <p>iv) Conduct continuous maintenance of the borehole, pipework, tank, and water kiosk</p> <p>v) Conduct water sampling at least every 3 months for water monitoring record base on this facility.</p> <p>vi)</p>	<p>-No of households with mosquito nets</p> <p>-No of people trained on health and safety and use of mosquito nets</p> <p>-Incidences of water-borne diseases</p> <p>-No of households practicing safety</p> <p>-No of times water sampling is done</p>	PMC Community Public Health	Mosquito Nets provided Health Records Training Reports water sampling Records	12 months	75,000/=
3.Change in Settlement patterns	Sensitization of the community on expected social changes Decentralize livestock watering points	No of community sensitizations No. of livestock watering points	Dep. of lands	Minutes Water troughs installed	12 months	120,000/

4.Soil erosion	<p>a. Regularly check and maintain pipes to avoid burst pipes and leakages which can lead to massive water losses (and so revenue) as well as soil loss.</p> <p>b. Apply soil erosion control measures such as leveling the sub-project site to reduce runoff</p> <p>c. Ensure compacted areas are ripped off to reduce runoff.</p> <p>d. Planting of indigenous trees</p> <p>e. Establishment of pasture farms</p> <p>f. Sensitize communities on soil and water conservation measures</p>	<ul style="list-style-type: none"> •No of leaking pipes Frequency of inspection and maintenance •Area of the site levelled and ripped off •No of trees planted •No of pasture established 	Contractor Proponent PMC	Trees planted reports	12 months	200,000/ =
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5.Inadequate sub project Management	<p>i) The sub-project proponent will train the community members on proper operation, management, and maintenance of the borehole to ensure sustainability; and</p> <p>ii) The proponent will consult on reasonable water tariffs to sustain the water supply.</p>	<ul style="list-style-type: none"> •No of trainings done on operations, management and maintenance of borehole •The amount of money charged per 20litre container or collected per month/ Number of beneficiaries paying the water fees 	PMC CPCU Contractor	PMC established Sales Reports Training Reports	6 months	165,000/
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6.Spread of communicable diseases, STIs and HIV/AIDS	<p>I Sensitize workers and the surrounding communities on awareness, prevention and management of HIV/AIDS and sexual health and rights through staff training, awareness campaigns, multimedia and workshops or during community Barazas.</p> <p>ii. Use existing clinics to provide VCT services to construction crew and provision of ARVs for vulnerable community members</p> <p>iii Ensure safety of women and girls in provision of VCT services.</p>	<ul style="list-style-type: none"> •No of persons attending VCT •no of trainings •No of clinics providing VCT and ARVs 	PMC Contractor public Health	Public Health Records VCT centres installed	12months	50,000/=
7.Sexual Exploitation and Abuse (SEA)	<p>i. The SEA action plan will include how the project will ensure necessary steps are in place for:</p> <ul style="list-style-type: none"> • Prevention of SEA: including CoCs (combined oral contraceptives) and ongoing sensitization of staff on responsibilities related to the CoC and consequences of non-compliance; project-level IEC materials; <p>Response to SEA: including survivor-centered coordinated multi-sectoral referral and assistance to complainants according to standard operating procedures; staff reporting mechanisms; written procedures related to case oversight, investigation and disciplinary procedures at the project level, including confidential data management</p>	SEA Action Plan Code of Conduct Number of staff trainings SEA FP Community Liaison trained in PSEA IEC materials for workers' sites and community	PMC CPCU Contractor	Minutes Reports GRM reports Awareness Reports	12 months	150,000/

	<p>Engagement with the community: including development of confidential community-based complaints mechanisms discrete from the standard GRM; mainstreaming of PSEA awareness-raising in all community engagement activities; community-level IEC materials; regular community outreach to women and girls about social risks and their PSEA-related rights;</p> <p>Management and Coordination: including integration of SEA in job descriptions, employments contracts, performance appraisal systems, etc.; development of contract policies related to SEA, including whistleblower protection and investigation and disciplinary procedures; training for all project management; management of coordination mechanism for case oversight, investigations and disciplinary procedures; supervision of dedicated PSEA focal points in the project and trained community liaison officers.</p> <p>I. Develop and implement an SEA action plan with an Accountability and Response Framework as part of the ESMP. The SEA action plan will follow guidance on the World Bank's</p>	<p>-Discrete SEA reporting pathway</p> <p>-Relevant policies, e.g. investigations and discipline whistleblower protection</p> <p>-Monthly SEA coordination meetings</p>	<p>PMC</p> <p>CPCU</p> <p>GBV expert</p>	<p>GRM Records</p> <p>Minutes</p>		
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<p>9. Outbreak of Livestock Diseases</p>	<ul style="list-style-type: none"> Regular disease surveillance by the veterinary department and community Monitoring of the livestock by the community/farmers Sensitization of the community on disease spread, monitoring and control livestock disease management plan be put in place by the veterinary department to ensure disease incidences are promptly responded to and addressed 	<ul style="list-style-type: none"> Number of disease surveillance conducted No of Sensitization meetings held A livestock disease management plan put in place 	<p>Livestock and Veterinary Dept. Community PMC CPCU</p>	<p>Vaccination Reports</p> <p>Minutes</p>	<p>12 months</p>	<p>185,000/ =</p>
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				Training Reports		
	TOTAL COST					1,380,000

CHAPTER SEVEN: CONCLUSION AND RECOMMENDATIONS

7.1 Conclusion

An Environmental and Social Management Plan provided in chapter Six charts the path for sustainable sub-project implementation. The plan provides strategies and activities that need to be implemented so as to alleviate the negative impacts. The negative impacts such as noise pollution, soil erosion, loss of vegetation most is minimal, and possible mitigation can be realised through implementation of the above ESMP. Implementation timelines, responsibilities and cost estimates are also provided where applicable.

7.2 Recommendation

It is recommended that the Proponent, contractor and all the stakeholders mentioned in the ESMP implement the recommendations in the environmental and social management plan. This is to ensure that the potentially affected environment is well managed and that accidents are prevented in the course of sub-project implementation. The Proponent is expected to comply with the relevant legal and policy requirements with regard to sub-project implementation. During the operation of the borehole, it is necessary that environmental regulations be strictly adhered to. The performance of the borehole will also be monitored against the recommended mitigation measures to ensure sustainability.

7.3 Overall Opinion

The construction of the borehole will have a far-reaching impact on the community in terms of accessibility to quality water. The sub-project area has water challenges that continue to stifle socio-economic development and threaten livelihoods. It is for this reason that the community members are very supportive of the sub-project. It was also established that all the identified negative impacts will be effectively mitigated through the full implementation of the ESMP. It is therefore, recommended that upon fulfilment of all other legal obligations identified in this report the Proponent be issued with the ESIA SPR license from NEMA.

References

- 1.** Environmental Management and Co-Ordination Act, Cap 387-
 - 2.** The Environmental Management and Coordination (Strategic Assessment, Integrated Impact Assessment and Environmental Audit) Regulations, 2018
 - 3.** The Environmental Management and Co-Ordination Act, 1999 No 8 of 1999 Date of Commencement: 14th January 2000.
 - 4.** The Community Land Act No. 27 Of 2016
 - 5.** The Forest Conservation and Management Act, 2016 No. 34 Of 2016 NAIROBI, 7th September 2016
 - 6.** The Occupational Safety and Health Act No. 15 Of 2007
 - 7.** The Physical and Land Use Planning Act, 2019 No. 13 Of 2019 5th August 2019 Printed and Published by the Government Printer, Nairobi
 - 8.** Climate Change Act No. 11 Of 2016
 - 9.** The Water Act (*No. 43 Of 2016*) The National Water Harvesting and Storage Regulations, 2019
 - 10.** The Environmental Management and Co-Ordination (Amendment) Act 2015 NAIROBI, 3rd June, 2015 Republic of Kenya Printed and Published by the Government Printer, Nairobi
 - 11.** The Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009
 - 12.** Energy Act Chapter 314 Revised Edition 2012 [2006] Published by The National Council for Law Reporting
 - 13.** Republic of Kenya, Kenya Climate Smart Agriculture Strategy-2017-2026 Government Of The Republic of Kenya, 2017
 - 14.** The Environment Management and Coordination (Air Quality) Regulations, 2014
 - 15.** The Environment Management and Coordination (Water Quality) Regulations, 2006
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Annex 1: Practising Licence for Lead Expert

FORM 7

(r.15(2))



**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/13928

Application Reference No: NEMA/EIA/EL/18297

M/S **Mugun Holdings Limited**
(individual or firm) of address

P.O.Box 33170-30100, Eldoret

is licensed to practice in the

capacity of a (Lead Expert/Associate Expert/Firm of Experts) **Firm of Experts**
registration number **8332**

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

Issued Date: **2/8/2021**

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

Signature.....

(Seal)

**Director General
The National Environment Management
Authority**




ANNEX 2 : SKETCH MAP SHOWING PROJECT SITE



Annex 3: Acknowledgement Letter

MINISTRY OF STATE FOR INTERIOR AND COORDINATION OF NATIONAL GOVERNMENT

Telegrams: "K.S." LAGAIAS
Telephone: Lagaias 020 4022394
Fax 020 4015145
Mobile: 0725785449
Email: kinkoman@gmail.com



OFFICE OF THE CHIEF
LOGOLOGO LOCATION
P.O. Box 230
MARSABIT

Ref: _____ Date: 05/08/2020

TO WHOM IT MAY CONCERN

REF: LOGOLOGO COMMUNITY LAND

This is to confirm that the allocated for borehole drilling supported by Kenya Climate Smart Agriculture Project is a Community Trust Land. Therefore no member shall require any form of composition.

The aforementioned borehole shall be used by community members for crop agriculture, livestock and domestic use.

I acknowledge that the above information is true to best of knowledge

KONKOMAN K. ABUBAKAR
CHIEF
LOGOLOGO LOCATION

KONKOMAN K. ABUBAKAR
CHIEF
LOGOLOGO LOCATION
DATE: 20/8

Annex 4: Project Management Committee for The Project

S/No.	Name	Gender	Contact	Organization	Designation
1.	Naitamay Lengima	F	0717184564	Sirata II-PMC	Chairlady
2.	Mohamed Kidenye	M	0724277370	Sirata II-PMC	Secretary
3.	Pauline Sereh	F	0726635012	Sirata II-PMC	Treasurer
4.	Salah Ngurusi	M	0792042434	Sirata II-PMC	V/Chair
5.	Abdalla Kochale	M	0723131820	Sirata II-PMC	Member
6.	Makai Kochale	F	0740216916	Sirata II-PMC	Member
7.	Hussein Segelan	M	0708732649	Sirata II-PMC	Member
8.	Boru Kanyumbi	M	0702410976	Sirata II-PMC	Member
9.	Pauline Dokhole	F	0725310277	Sirata II-PMC	Member
10.	Nchodor Lewagat	F	0727204186	Sirata II-PMC	Member
11.	Benedict Kena	M	0700807831	Sirata II-PMC	Member
12.	Namarei Ahatho	F	0117630686	Sirata II-PMC	Member

Appendix 5: Community Land Resolution and Agreement Form.



COUNTY DEPARTMENT OF AGRICULTURE LIVESTOCK AND FISHERIES

KENYA CLIMATE SMART AGRICULTURE PROJECT (KCSAP)

COMMUNITY LAND RESOLUTION AND AGREEMENT FORM

ITEM	DESCRIPTION
PROJECT NAME	LOG-LOGO COMMUNITY BOREHOLE SIRATA II
COMPONENT 1:	UPSCALING CLIMATE SMART AGRICULTURAL PROJECT
ACTIVITY CODE:	
OUTPUT 1.2:	
NAME OF INVESTMENT	DRILLING OF BOREHOLE AND CONSTRUCTION OF AUXILIARY STRUCTURES
PROJECT LOCATION:	LOG-LOGO WARD, LAISAMU SUB-COUNTY MARSABIT COUNTY
GPS COORDINATES	EASTING-0378742. NORTHING-0218589 ALTITUDE 455.
ESTIMATED COST OF THE INVESTMENTS	13,000,000 K
SOURCE OF FUNDING	IDA
FINANCIAL YEAR	2020/2021

TERMS OF THE AGREEMENT

1. We the resident/users of the investments area (specify) LOK-LOKO, SIAPATA discussed and agreed that, LOK-LOKO, SIAPATA shall be site of the proposed BOREHOLE FOR SUPPORT IRRIGATION and that:
2. We all aware of the **Kenya Climate Smart Agriculture Project** and this proposed sub-project LOK-LOKO, SIAPATA COMMUNITY, BOREHOLE DRILLING
3. We all aware that the land set aside for the investment is community land and no one is claiming individual ownership because it belongs to all of us and negative impacts on particular individuals using the land will be addressed by the community, and no alternative claims will be made later on the land
4. We all have no problem with the site of the investment and its conversion to public land.
5. We have all agreed unanimously that the project implementation should continue.
6. We will allow other neighbouring and cross-border communities access to the investment as agreed between elders of both communities.
7. We all shall strive to peacefully resolve any conflicts with other communities concerning the investment and that we would strive to peacefully co-exist and resolve any conflict arising out of the investment facility following due process provided by the laws of Kenya.
8. The land to be donated was identified in consultation with all residents and users of the land;
9. We all understand the likely impacts of proposed activities on donated land.
10. We all understand that the community could have refused this investment.
11. We all agreed to this investment and donation of the land without coercion, manipulation, or pressure on the parts of public or tradition authorities.
12. We all agreed that we not require any monetary or non-monetary benefits or incentives as a condition for the donation.
13. The land being donated will not reduce the remaining land area to a level below that required to maintain the livelihoods of occupiers and users of land at current levels and will not require the relocation of any household.
14. If any structure will be moved or any access to land be limited as a result of the sub-project, the individual affected will be compensated so their livelihood will be affected.
15. The land is free of encumbrances or encroachment and is not claimed by any individual and its ownership is not contested.

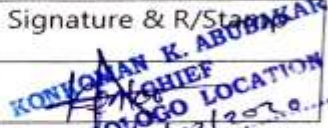
We have been designated by the community of (LOG-LOGO WARD IN
THE PRESENCE OF AREA LEADERS)

Confirm the above information to be true and that we have resolved to abide by ALL terms of this agreement. (Please attach minutes of community meeting, where the community agreed to the use and conversion of this land for this purpose).

S/No.	Name	Village/Location	ID/No.	Signature
1.	BENEDICT KENA KHOMA	Rongai	28035611	
2.	HABIBA OSMAN	Sambambis	25732031	
3.	ABDALLA KOCHALLU	ONGELI		
4.	MOHAMED KIDENGE	SAMBAMBA	9559321	
5.				

Witnessed on this 05th Day of AUGUST..... in the Year...2020.....: by:

1. Area Chief

Name	ID/No.	Signature & R/Stamp
KONKOLAN K ABUBAKAR	22334006	 KONKOLAN K. ABUBAKAR CHIEF LOGOLOGO LOCATION

Date: 05/08/2020

2. Ward Administrator

Appendix 6: Public Participation Attendance Lists

LOGO LOGO

KENYA CLIMATE SMART AGRICULTURE PROJECT

LOG-LOGO BOREHOLE Logologo

Public participation & Stakeholders Consultation - Log-Logo Town

Attendance Lists - Community Members

KONKOMAI K. ASUBAKAR
CHIEF
LOGOLOGO LOCATION
Date: 03/08/2020
[Signature]

10/03/2021

S/No	BENEFICIARY NAME	ID NO	PHONE	GENDER	WARD	LOCATION	VILLAGE
1	NARELE LEADO	21377346	0719374723	F	Logologo	Logologo	LBAROK
2	NANINGOLE KASULA	12753164	0792334037	F	Logologo	Logologo	LBAROK
3	LITALAN LEKASULA	12752489	0719372172	M	Logologo	Logologo	LBAROK
4	NGARU KARIGYO	26046239	0715610553	M	Logologo	Logologo	LBAROK
5	ILPIELMAN RASHAYO	23404064	0704225533	M	Logologo	Logologo	LBAROK
6	LKIPYAN LEADO	12753101	0703964311	M	Logologo	Logologo	LBAROK
7	NARENU LEKASULA	25871975	0702434341	F	Logologo	Logologo	LBAROK
8	MOVED LEKANTWAN	12752476	0702331387	M	Logologo	Logologo	LBAROK
9	HALOYA LERAPO	26045741	0704763937	F	Logologo	Logologo	LBAROK
10	TOROSO LAKASULA	0024334	0906024140	M	Logologo	Logologo	LBAROK
11	UMULO ESIMKELI	9205734	0700461536	M	Logologo	Logologo	LBAROK
12	LEITAN LEADO	9558210	0702436657	M	Logologo	Logologo	LBAROK
13	SARTHMAN LEKUTAN	27414244	0706413925	F	Logologo	Logologo	LBAROK
14	TUMEN LEAMIRO	12753157	0712753167	M	Logologo	Logologo	LBAROK

LOGO LOGO

DEPARTMENT OF GRICULTURE LIVESTOCK AND FISHERIES

KENYA CLIMATE SMART AGRICULTURE PROJECT

Public Participation & Stakeholder Consultation-Log-Logo Sirata II Community Borehole

Attendance List Community Members

10/03/2021

S/No	BENEFICIARY NAME	ID NO	PHONE	SEX	WARD	LOCATION	VILLAGE	REMARKS
1	MENNA OALGITHRE	26072196	0715013244	F	Logologo	Logologo	LEARUK	second above
2	LPIREYAN LERADAYO	0596950	0701192374	M	Logologo	Logologo	LBAROK	"
3	LEESA NOLASS	20352478	0707297300	F	Logologo	Logologo	LBAROK	"
4	NANDIRO TUNADO	12753112	0700949306	F	Logologo	Logologo	LBAROK	"
5	NEGOSIWE NANGINDU	0212937	0710555451	F	Logologo	Logologo	LBAROK	"
6	NAITVEE ARUWATELORWA	11356620	0762151559	M	Logologo	Logologo	LBAROK	"
7	NDURWA LEADO	28003766	0723753729	F	Logologo	Logologo	LBAROK	"
8	LUDUWA TURUWA	23021529	0705806651	M	Logologo	Logologo	LBAROK	"
9	NTUNANO TAPU	82632301	0711792533	F	Logologo	Logologo	LBAROK	"
10	ABDILATI ILITAN	12752071	070911420	M	Logologo	Logologo	LBAROK	"
11	NANDIRU ARABUYA	26052511	0712553335	F	Logologo	Logologo	LBAROK	"
12	ABDIRAMAN LEANO	9247777	0748259109	M	Logologo	Logologo	LBAROK	"
13	LINTI LEJALE	6150553	0745440615	M	Logologo	Logologo	LBAROK	"
14	SHI LEAMAN	37969732	0111860223	F	Logologo	Logologo	LEARUK	"
15	NTILALON KASULA	30929711	0743556672	F	Logologo	Logologo	LBAROK	"
16	SUTALIA LEAMIRO	11346590	0717053616	M	Logologo	Logologo	LBAROK	"

DEPARTMENT OF AGRICULTURE LIVESTOCK AND FISHERIES

KENYA CLIMATE SMART AGRICULTURE PROJECT

Public Participation & Stakeholders Consultation - Log-logo town
Attendance lists. 10/03/2021

NO	BENEFICIARY NAME	ID NO	PHONE	M/F	WARD	LOCATION	VILLAGE	REMARKS
1	WANTILO MURICHAN	12752509	0757754471	M	Logololo	Logololo	MANYATTA JUU EAST	above sign
2	LESUNWA LEPARERU	12752262	0700394272	M	Logololo	Logololo	MANYATTA JUU EAST	
3	LIPUNYWA LBALANGA	25063799	0727549574	M	Logololo	Logololo	MANYATTA JUU EAST	
4	ADATO LEKELIA	21093066	077410584	M	Logololo	Logololo	MANYATTA JUU EAST	
5	SHUGHULI LEKANT	26016985	0700718374	M	Logololo	Logololo	MANYATTA JUU EAST	
6	MPARUTA LEPUR	29204531	0702167679	F	Logololo	Logololo	MANYATTA JUU EAST	
7	LEKURE LECHIPAN	21576745	0701622278	M	Logololo	Logololo	MANYATTA JUU EAST	
8	HIDARO LWAIT LEKAMWA	11386563	0706024100	F	Logololo	Logololo	MANYATTA JUU EAST	
9	NAISE LECHIPAN	24400401	0704340913	F	Logololo	Logololo	MANYATTA JUU EAST	
10	LENGOTEI BAGA TO	27355605	0795726177	M	Logololo	Logololo	MANYATTA JUU EAST	
11	FADDA LABARAKWE	25056473	0722231827	M	Logololo	Logololo	MANYATTA JUU EAST	
12	PAULINA OGOM	24077923	0798716505	F	Logololo	Logololo	MANYATTA JUU EAST	
13	NTESEKWA NATUMAKI	20362630	0727392506	F	Logololo	Logololo	LOGO	
14	ABDIKAR KHATAN	20366761	0716919397	M	Logololo	Logololo	MANYATTA JUU WEST	
15	DIBO LEKKE	0025189	0700177193	M	Logololo	Logololo	MANYATTA JUU WEST	
16	JOSEPH BASOLE	0033894	0729664251	M	Logololo	Logololo	MANYATTA JUU WEST	

PUBLIC PARTICIPATION ATTENDANCE LIST - LOGOLOLO SIRATA II BOREHOLE SUB-PROJECT



KENYA CLIMATE SMART AGRICULTURE PROJECT

ATTENDANCE LIST

ACTIVITY: LOGOLOLO SIRATA II COMMUNITY BOREHOLE - PPC - PUBLIC PARTICIPATION
DATE: 10/03/2021 BARAZA

No	Name	P/No/Id No	Gender	Organization	Designation Position	Phone No.	No. of Days		
							Day 1	Day 2	Day 3
1	Natony Lengina		F	Sirata II proc chair		0717194504			
2	Mohamed Kudonye		M		Secretary	0724271570			
3	Paulina Senoh		F		Treasurer	0726625002			
4	Sabah ngumai		M		Chair	0792042434			
5	Abelita Kochale		M		Member	072313182			
6	Makai Kochale		F			0740210916			
7	Hussein Sogalan		M			0108732649			
8	Boni Kanyurabi		M			0702910920			
9	Pauline Dawhale		F			0785310277			
10	Nevher Lewingat		F			0727304186			
11	Benedict Wani Khom		M			0700302311			
12	Namwai Abulha Tuniga		F			0710630080			
13	Nalele Gudo	2157746	F			0719379223			

Public Participation & Stakeholders Consultation- Log-logo Town

10/03/2021

Attendance Lists

NO	BENEFICIARY NAME	ID NO	PHONE	M/F	WARD	LOCATION	VILLAGE	REM
1	LALAMBA KHOFAN	31743609	0723412697	M	Loholoho	Loholoho	MARTI	
2	KURETO SANCHIE	25063463	072711140	F	Loholoho	Loholoho	MARTI	
3	LOITOGOI CHABARA	24400409	0701264475	M	Loholoho	Loholoho	MARTI	
4	LIUDWAGA OGIOW	27810891	0709727912	M	Loholoho	Loholoho	MARTI	
5	LIPIKEN LEXIDENTE	9559152	0727027507	M	Loholoho	Loholoho	MARTI	
6	MOSAR NAIKASA	2407773	0795846320	M	Loholoho	Loholoho	MARTI	
7	NACHANAM BAGAJI	23400663	0704096178	F	Loholoho	Loholoho	MARTI SAALE	
8	LEHUTA ALBERTO LOINBO	20875082	0745801695	M	Loholoho	Loholoho	MARTI SAALE	
9	BELEIGA ARSORIO	26293094	0717523657	F	Loholoho	Loholoho	MARTI SAALE	
10	GATEO MOKIA	1255481	0703620005	F	Loholoho	Loholoho	ODHOLA	
11	MEGOLE MOGA	8150783	0797746738	M	Loholoho	Loholoho	ODHOLA	
12	LADOTA KOKKALA	8150437	0792065497	M	Loholoho	Loholoho	ODHOLA	
13	APANE MOOGA	8150179	0702983139	M	Loholoho	Loholoho	ODHOLA	
14	REKON LELERAO	8150793	07091095360	M	Loholoho	Loholoho	ODHOLA	
15	RAGE MOGA	26114660	0708189757	M	Loholoho	Loholoho	ODHOLA	
16	HOROHOTA LEDAYO	11382636	070912385	F	Loholoho	Loholoho	ODHOLA	



ATTENDANCE LIST

ACTIVITY: CITIZEN PARTICIPATION MEETING - LOG-LOGO SIYATA II COMMUNITY

DATE: 10/03/2021

S.NO	NAME	P/NO/ID NO	GENDER	ORGANIZATION	DESIGNATION POSITION	EMAIL	PHONE NO.	SIGNATURE
1	ABDULMUNIM ILCHAGI	12753071	M	Community	Member		0707831420	[Signature]
2	LEESA NILAGE	20552093	F	Community	Member		0709889300	[Signature]
3	MWANGI TIMOJO	12762116	F	Community	Member		07039449305	[Signature]
4	MUTERU LEMBO	26114203	M	Community	Member		0705252248	[Signature]
5	LIZARDINE LOLO	0628546	M	Community	Member		0795044131	[Signature]
6	Amurkar Kankara		M	Interior	Chief	Amurkar@gmail.com	0726795449	[Signature]
7	Somo Kachale		M	LOE	Ward Admin	somokachale@gmail.com	0724836737	[Signature]
8	Estro Juma M.	26148914	M	DAIF	CESSCO-KCSAP	estrojuma@gmail.com	0700250266	[Signature]
9	WATO JENGE			KCSAP-Daif	CPC	watodenge@gmail.com	0727462971	[Signature]
10	OLUBA POGI	07027068	M	Ward Admin	SCED	olubapogi@gmail.com	0714589980	[Signature]



**KENYA CLIMATE SMART AGRICULTURE
PROJECT (KCSAP)**

HYDROGEOLOGICAL ASSESSMENT REPORT

FOR

LOGLOGO COMMUNITY BOREHOLE

SPONSORED BY;

**KENYA CLIMATE SMART AGRICULTURE PROJECT,
P.O. BOX 384 – 60500,
MARSABIT.**

LOCATION;

LOGLOGO AREA – MARSABIT COUNTY

Compiled and Reviewed by:

**MICHAEL M. NGOTHO and ANN J. KAPKIAL,
P.O BOX 49720 – 00100,
NAIROBI.**

(Hydrogeologists, Ministry Of Water, Sanitation and Irrigation)

Date: 07th August, 2020

Appendix 8: WRA Payment Receipt for Permit Request



WATER RESOURCES AUTHORITY

Sub Regional Manager,
Water Resources Authority,
North Ewaso Laggas (Marsabit) Sub – Region,
P.O. BOX 207 – 60500, MARSABIT

Tel: 06922102122
Cell: 0725092449

Email: marsabitwrma@gmail.com

WRMA/ENNCA/MBT/PERMIT/VOLI/ (145)

8th March 2021

The Project Coordinator
Kenya Climate Smart Agriculture Project
P.O Box 8073 - 00200
NAIROBI.

RE: Application for Groundwater Permit for Proposed Loglogo and Wachu Rukich Sites

I refer to your application on the above mentioned subject seeking borehole construction Authorization from this office.

This is to inform you that the proposed 2No. Boreholes fall under Class C as per the Water Resource Management Rules 2007, Water Resources Allocation Threshold for Classification of permits (WI/15/1)

You are therefore requested to make payments as stipulated below, per borehole site.

- Assessment fees Kshs. 20,000.00 (x2)
- Permit fees Kshs 25,000.00 (x2)

Total Kshs. 90,000.00

A handwritten signature in blue ink, appearing to read 'Hussein W. Guyo', is written over a faint circular watermark of the WRA logo.

Hussein W. Guyo
Sub Regional Manager

ANNEX 8: PHOTOS



Photo of Public Participation Meetings in Log-Logo town

Photo: Hydrogeologist, CESSCO, and Community Reps at project site during Hydrogeological survey

