ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

COMPREHENSIVE PROJECT REPORT

FOR

THE PROPOSED CONTRUCTION OF A SEDIMENTATION BASIN, EXCAVATION AND LAYING OF MAINLINE, SUBMAINS AND LATERALS OF 15.8KMS FOR KIHUYO IRRIGATION WATER PROJECT WITHIN KIGANJO MATHARI WARD, NYERI CENTRAL SUB COUNTY, NYERI COUNTY.

GPS Coordinates

Intake: **–0.373611°, 36.839722°** Tank: **–0.383889°, 36.890278°**

Proponent	**Prepared by**
Kihuyo Water Users Association	**Dickson Kimathi**
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Updated February 2026

Proponent	Kihuyo Irrigation Water Project
Project Name	The proposed construction of a sedimentation basin, excavation and laying of mainline, submains and laterals of 15.8kms for Kihuyo irrigation water project within Kiganjo /Mathari ward, Nyeri Central sub county, Nyeri county.
Location	Administrative: Kihuyo Sub-Location, Kiganjo/Mathari Location, Kiganjo Mathari Ward, Nyeri Central Sub-County, Nyeri County
	GPS Coordinates: Intake: – 0.373611°, 36.839722° Tank: – 0.383889°, 36.890278°
Project Objectives	The primary objective of this project is to **develop sustainable water infrastructure**, specifically a **water pipeline system**, in the Kiganjo/Mathari **Ward**. This infrastructure will serve as a critical solution to water distribution challenges, ensuring that local beneficiaries primarily farmers and resident have reliable access to water for **irrigation purposes**. The specific objectives are to: 1. Complete the construction of the distribution pipeline system, including the Kihuyo mainline and 7 lateral lines, ensuring efficient water supply to agricultural fields across the region. 2. Optimize water, use efficiency by reducing dependency on rain-fed agriculture and ensuring consistent water availability throughout the year. 3. Support climate change adaptation efforts by providing a resilient irrigation system capable of withstanding varying weather patterns and ensuring long-term agricultural sustainability.
Project Components	The scope of works for the Kihuyo Irrigation Project is to provide water for irrigation through water distribution system to the farmers. The works will involve; 1. Excavation of 15.8km pipeline 2. Construction sedimentation tank of 11.2m x 4.6m x 2.8m 3. Laying of mainline, sub mains and lateral pipelines 4. Construction of chambers -washout, air valve and off takes 5. Six metre road crossings-1 major tarmac road and 2 murram roads 6. Pressure testing for all lines

	The project will also include the implementation of control measures such as booster stations to maintain adequate pressure across varying elevations, ensuring that the irrigation system can support the agricultural needs of over 1000 households across the targeted areas. The area irrigation is to be transformed from 0heactares to 100 hectares.	
Total project cost	Kenya Shillings Twenty-Nine Million Two Hundred and seventy-nine Thousand four Hundred and Thirty-Eight Cents Only (KES. 29,279,400.38)	
Target population	533 households registered under Kihuyo Irrigation Water Users Association (design can accommodate 467 more members). It is projected that every farmer will irrigate ¼ of an acre.	
Address of the Proponent	Kihuyo Irrigation Water Project - Kihuyo Town	
	Name Mr. Daniel Gatiu (Chair-person)	**Mobile Phone No:** +254 721 900483
Task	Preparation of an Environment and Social Impact Assessment Comprehensive Project Report	
Date:	Updated February 2026	

CERTIFICATION

This Environmental and Social Impact Assessment (ESIA) Comprehensive Project Report (CPR) for the Kihuyo Irrigation Water Project has been prepared as required in accordance with the Environmental Management and Coordination Act (EMCA), Cap 387, the Environmental Impact Assessment and Audit Regulations, 2003 (LN 101/2003; amended by LN 32/2019), and the relevant provisions of the World Bank Environmental and Social Framework (ESF, 2018).

The project is classified as a Medium Risk Project under EMCA and as Category B (Moderate Risk) under the World Bank ESF.

We, the undersigned, hereby certify that, to the best of our knowledge, the information contained in this report is true, accurate, and complete.

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Date: 28/05/2025

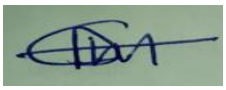
Proponent

For and on behalf of;

Kihuyo Irrigation Water Project

Representative Name: Daniel Gatio

Designation: Chairperson

Signature and Stamp: 

Date: 28/05/2025

DETAILED SUMMARY OF THE PROPONENT

The Kihuyo Irrigation Project was first initiated in 2002, with a preliminary design completed in 2009. Since then, it has aimed to serve farmers in the Kihuyo areas and surrounding villages by providing them with water for irrigation. The proponent has recently converted to an Irrigation Water Users Association, with current membership of 533.

Kihuyo Irrigation water project abstracts its water from Aberdare Forest (Muringato River) within the Game Reserve by use of a 225 mm diameter pipe and the water flows by gravity to the storage tank. The project has a fully functioning intake, conveyance line and a 225m^3 masonry distribution tank that was funded by the County Government of Nyeri Department of Water. Currently, the water distribution system needs to be installed for farmers to begin farming.

The main food crops grown by the beneficiaries of this project are maize, beans, irish potatoes, water melons and vegetables whereas the major cash crops are avocado, coffee, tea and horticulture. Tea is grown in the upper zone, a section where this project exists next to the Aberdare's and coffee is grown in the lower region.

EXECUTIVE SUMMARY

Introduction

The Kihuyo Irrigation Water Project is a strategic initiative aimed at developing a sustainable water distribution of 15.8 km pipeline system in Kiganjo Mathari Ward, Nyeri County, Kenya. Jointly funded by the World Bank under the National Agricultural Value Chain Development Project (NAVCDP) and Counterpart funding County Government of Nyeri, the project seeks to provide reliable irrigation water to 1000 households, enhancing agricultural productivity and livelihoods. Under the Project, every farmer will irrigate ¼ of acre increasing the area under irrigation from 0 hectares to 100 hectares. Farmers will also receive training on the Farmer Led Irrigation Development (FLID) Technology Innovative Management Practices (TIMPs), enabling them to select the approaches best suited to their individual farming needs.

The main project objectives are to: develop sustainable water infrastructure: develop an efficient and cost-effective hydraulic system to ensure reliable water supply for irrigation. Agricultural Productivity: Increase crop yields and reduce dependence on unpredictable rainfall through controlled water access. Economic Growth: Stimulate local economy by improving agricultural output and creating employment opportunities. Environmental Conservation: Promote sustainable water use and minimize ecological disruption. Key Components of the project include; Construction of a gravity-fed piped irrigation network, including mainlines and lateral distribution lines 15.8km, Utilization of existing infrastructure (intake, storage tank) to optimize resources and Implementation of booster stations to maintain water pressure across varying elevations.

The purpose of this ESIA report is to enable the proponent to meet the legal requirements that prerequisites the developers to conduct ESIA report for projects of such nature and scale and obtain ESIA license (environmental clearance) before commencement of the project. This will help in identifying the impacts and implementation of mitigating actions for the negative ones. This is specified in Environmental Management and Co-ordination Act (EMCA) No. 8 of 1999 (Amendment 2015) and Environmental (Impact Assessment and Audit) regulations, 2003 (Amendment 2019) and the World Bank Environmental and Social Framework (ESF, 2018), including the relevant Environmental and Social Standards (ESSs).The overall objective was to establish the baseline conditions of the proposed site; generate baseline data for monitoring and evaluation of how well the mitigation measures are being implemented; evaluate the existing and the anticipated impacts and propose measures to enhance the positive impacts and measures to decrease the effects of the negative impacts; present

information on the impact of alternatives; and, present results of the ESIA report in such a way that they can guide informed decision-making throughout the proposed project cycle.

Project Description

The proposed Kihuyo Water Project seeks to complete the irrigation infrastructures to ensure access for irrigation water. The irrigation command area is proposed to be 250 acres. At the moment no beneficiary is using the water for irrigation. The project has 533 registered members, however, the design done can accommodate 1000 direct beneficiaries.

The project holds a water abstraction permit allowing abstraction of 246.321m^3/day from Nyameru River which is perennial and flows throughout the seasons. It originates from Aberdare Ranges and drains into Muringato River. The project has an existing intake and a storage tank, however no connection to the farmers has been done. The river intake point (GPS Latitude 0.37389° S, Longitude 36.83976° E) is approximately 12km from the KWS Aberdare National Park (Muringato entrance), along Mathari -Kihuyo - Njegu Road. The tank is located at -0.383889° Longitude 36.890278° latitude.

The project includes the following key components: Excavation of 15.8km pipeline, Construction sedimentation tank of 11.2Mx4.6Mx2.8M, laying of mainline, sub mains and lateral pipelines, Construction of chambers -washout, air valve and off takes, Six-meter Road crossings -1 major tarmac road and 2 murram roads, Pressure testing for all lines. The total estimated cost of the project is Kenya Shillings Twenty-Nine Million Two Hundred and seventy-nine Thousand four Hundred and Thirty-Eight Cents Only (KES. 29,279,400.38).

Policy, Legal and Institutional Framework

The approach and methodology of this study followed Kenyan policy and regulatory frameworks, legislation and related policies and guidance documents such as requirements on public health, safety and welfare of persons employed as well as the general public. It also followed the World Bank Environmental and Social framework (ESF) of the project. It also complies with relevant World Bank Environmental and Social Standards (ESSs) covering environmental and social risk management, labour, community health and safety, land acquisition, biodiversity, cultural heritage, stakeholder engagement and information disclosure, as well as related policies as guidance documents. Key project documents including the hydrogeological survey report, feasibility study and design report were reviewed to assess potential environmental and social impacts and risks.

Stakeholder Engagement and Public Participation

Public and stakeholder consultation process undertaken for the proposed project, emphasizing transparency, community engagement, and mitigation of concerns. The consultations aimed to inform stakeholders, agencies and the community about the project's scope, gather feedback, and address potential impacts through structured methods, including a questionnaire survey (with 40 participants, 15 women and 25 men) and a consultative meeting at Kihuyo Community grounds. This was carried out on 20th May 2025. Key positive impacts highlighted by stakeholders included improved water access, reduced conflicts, employment opportunities, and enhanced livelihoods, while minor concerns such as downstream water reduction and vegetation loss were deemed manageable. Issues like labour distribution, land use, project costs, and environmental conservation were raised and addressed, with commitments to inclusive labor practices, revised Bill of Quantities (BoQs), and stakeholder collaboration. Representatives from local administration, water and irrigation, occupational safety, and agriculture departments provided input, ensuring project sustainability, safety measures, and environmental safeguards. Overall, stakeholders affirmed that the project's benefits significantly outweigh its minimal adverse effects, which can be effectively mitigated through planned interventions. On 17th June 2025 a special stakeholder meeting with Kenya Wildlife Service and the project management. From the above meetings it was evident that the stakeholders were in support of the project implementation.

Potential Environmental and Social Impacts and Mitigation Measures

Environmental and Social Impacts; some Positive Impacts specifically economic benefits include; Creation of employment during construction and operational phases, increased agricultural productivity, leading to higher incomes for farmers and Enhanced market access for agricultural produce. Some of the Social Benefits: Improved food security and nutrition for local communities, reduced conflicts over water resources through equitable distribution and Capacity-building for farmers on efficient water and land management. Some of the Environmental Benefits: Sustainable water uses practices to conserve local water sources and potential for increased vegetation cover, contributing to climate resilience. Negative Impacts and Mitigation Measures during the Construction Phase include: Soil Erosion: Minimized through controlled excavation, back-filling, and vegetation restoration, Dust and Noise Pollution: Mitigated via water spraying, PPE for workers, and restricted working hours, Waste Generation: Managed through recycling, reuse, and proper disposal at designated sites and Occupational Hazards: Addressed with safety training, PPE, and emergency response plans.

During the Operational Phase some impacts many include: Water Pollution: Prevented through community sensitization on water treatment and catchment protection, Water Conflicts: Managed via water rationing plans and efficient irrigation technologies (e.g., drip irrigation) and Social Conflicts: Addressed through stakeholder engagement and grievance redress mechanisms. The IWUA has an existing conflict/grievance committee.

Environmental and Social management and Monitoring Plan

The Kihuyo Water Project's ESMMP, which is a key output of the ESIA, sets out the actions, monitoring, and responsibilities needed to manage environmental and social risks during construction, operation, and decommissioning. It includes two key sub-plans:

- Grievance Redress Mechanism (GRM) to handle complaints from workers and the community, and
- Integrated Pest Management Plan (IPMP) to ensure safe and sustainable pest-control practices in irrigated agriculture.

The estimated costs are KES 625,000 for phase-specific mitigation and monitoring (KES 455,000 for construction phase, KES 310,000 for operation phase, and KES 140,000 for decommissioning phase), KES 70,000 for the GRM, and KES 1,150,000 for the IPMP, totaling KES 2,055,000.

The ESMMP is designed to ensure environmental compliance, promote community participation, and support the long-term sustainability of the water supply system.

Conclusion and Recommendations

This ESIA study concludes that the proposed Kihuyo Water Project is environmentally acceptable and socially viable, provided that the mitigation measures in the ESMMP are fully implemented. The expected benefits, improved irrigation reliability, increased agricultural productivity, and strengthened climate resilience, outweigh the moderate, site-specific risks identified.

Key recommendations include:

- Enforce full implementation of the ESMMP and subplans (GRM, and IPMP) throughout the project cycle;
- Strengthen capacity of the Registered Water Users and the Project Management Committee on safeguards and sustainable irrigation management;
- Install master meters for effective monitoring of water abstraction and equitable distribution;

- Conduct annual Environmental and Social Audits during operation to verify compliance and guide continuous improvement.

Overall, the project is recommended for approval by the National Environment Management Authority (NEMA) and the World Bank, subject to adherence to the prescribed mitigation and monitoring measures.

ABBREVIATION AND ACRONYMS

BoQ	Bill of Quantities
CAIO	County Agricultural Infrastructure Officer (CAIO)
CGN	County Government of Nyeri
CESCO	County Environment and Social Compliance Officer
CoC	Code of Conduct
CFP	Chance Find Plan
CIDP	County Integrated Development Project
CPCU	County Project Coordinating Unit
CPRO	County Procurement Officer
CSS GMO	County Social Safeguards and Gender Mainstreaming Officer
DOSHS	Directorate of Occupational Safety and Health Services
EHS	Environmental Health and Safety
EMCA	Environmental Management and Coordination Act
ESIA	Environmental and Social Impact Assessment
ESMP	Environment and Social Management Plan
ERP	Emergency Response Plan
ESS	Environmental and Social Standards
FLID	Farmer-Led Irrigation Development
FPO	Farmer Producer Organization
GBV	Gender-Based Violence
GI	Galvanized Iron

GCM	Grievance Management Committee
GRM	Grievance Redress Mechanism
IPMP	Integrated Pest Management Plan
ISWM	Integrated Solid Waste Management
IWUA	Irrigation Water Users Association
KFS	Kenya Forest Service
KMD	Kenya Meteorological Department
KNBS	Kenya National Bureau of Statistics
KWS	Kenya Wildlife Service
LCB	Land Control Board
NIA	National Irrigation Authority
NAVCDP	National Agricultural Value Chain Development Project
NEMA	National Environment Management Authority
NGAO	National Government Administration Officers
NMK	National Museums of Kenya
PIC	Project Implementation Committee
PIN	Piped Irrigation Network
PMC	Project Management committee
PPE	Personal Protective Equipment
PVC	Polyvinyl Chloride
SEAH	Sexual Exploitation Abuse & Harassment
SEP	Stakeholder Engagement Plan
TIMPS	Technologies Innovations and Management Practices

DEFINITION OF TERMS

1. agriculture" means cultivation of land and the use of land for any purpose of husbandry and food production
2. charges", in relation to the use of water from a water resource, includes fees, levies and premiums of any kind
3. easement" means the right to occupy so much of the land of another as may be necessary for or incidental to the construction or maintenance of works authorized, or the exercise of rights conferred by a permit;
4. Pollution", in relation to a water resource, means any direct or indirect alteration of the physical, thermal. chemical or biological properties of the water resource so as to make it- (a) less fit for any beneficial purpose for which it is or is reasonably be expected to be used; or (b) harmful or potentially harmful to- (i) the welfare, health or safety of human beings; (ii) any aquatic or non-aquatic life or property; or (iii) the environment:
5. "Water resource" means any lake, pond, swamp, marsh, stream, watercourse, estuary, aquifer, artesian basin or other body of flowing or standing water

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CHAPTER 1: INTRODUCTION

1.1 Sub project brief/background information

The Kihuyo Irrigation Project was first initiated in 2002, with a preliminary design completed in 2009.The project is not a new investment and has an existing intake in Muringato Forest Block with a pipeline connecting to a 225m^3 masonry tank that is along the forest fence. . The community project has already registered as an Irrigation Water Users Association (IWUA) (Annex 6). The project has a current membership of 533 beneficiaries project operates in 7 zones namely; Kamichugu, Kiahiti B, Kihuyo, Karia, Mainganiro, Gichagi and Thare-ini. The major economic activity in the area of the project is farming. Crops that are mostly farmed are mainly Tea Farming, Coffee Farming, Horticulture, Dairy Farming, Beekeeping, and Food Crops. Dairy farming is also practiced on a small scale and milk sold to nearby milk dairies. Sheep are also reared and sold for meat supply.

1.2 Sub project objective

The objectives of the proposed investment include;

1. The primary objective of this project is to **develop sustainable water infrastructure**, specifically a **water pipeline system**, in the **Kiganjo/Mathari Ward**. This infrastructure will serve as a critical solution to water distribution challenges, ensuring that local beneficiaries primarily farmers and resident have reliable access to water for **irrigation purposes**.
2. To enhance agricultural productivity by ensuring a reliable and consistent water supply for crops, thereby reducing farmers dependence on unpredictable rainfall patterns. By providing controlled access to water, the project enables year-round farming operations, which significantly increases crop yields and allows for greater agricultural diversity.

   The specific objectives are as follows;

   1. To complete the construction of the distribution pipeline system, including the Kihuyo mainline and seven lateral lines, ensuring efficient water supply to agricultural fields across the region.
   2. To provide a reliable source of irrigation water to 533 members and have a potential to reach 1000 members in Kihuyo and surrounding villages, enhancing agricultural productivity and food security.

3. To optimize water, use efficiency by reducing dependency on rainfed agriculture and ensuring consistent water availability throughout the year.
4. To improve the livelihoods of local farmers by increasing crop yields, promoting sustainable farming practices, and enhancing economic stability in the region.
5. To support climate change adaptation efforts by providing a resilient irrigation system capable of withstanding varying weather patterns and ensuring long-term agricultural sustainability.

1.3 Sub project justification

The proposed Kihuyo Irrigation Project is of paramount importance for addressing the persistent agricultural challenges faced by farmers in Nyeri County, particularly those in Kiganjo/Mathari Ward. The region's farmers have long struggled with unreliable rainfall patterns, leading to frequent crop failures and food insecurity. While Phase I of the project established critical infrastructure, including the intake system, conveyance pipeline, and a masonry tank, the lack of a functioning distribution system remains a significant barrier to realizing the full potential of the irrigation network. Without the distribution pipeline, the stored water cannot be effectively utilized for irrigation, leaving farmers dependent on unpredictable rain-fed agriculture. The expansion of the irrigation system to include the distribution pipelines is essential to ensure a consistent, reliable water supply for over 533 registered households and accommodate 467 more farmers (to make 1000 as per the design limit) in the seven zones. This project will significantly improve agricultural productivity, providing a sustainable solution to the region's water scarcity issues and enhancing the livelihoods of local farmers.

Implementing the distribution system will have far-reaching positive impacts on the community, regional food security, and the overall economy. By enabling farmers to access irrigation water throughout the year, the project will not only increase crop yields but also reduce the vulnerability of local agriculture to climate change, particularly droughts and erratic rainfall. This will contribute to greater food security, enhanced income generation, and improved economic stability for households in the region. Additionally, the project aligns with national priorities to improve agricultural productivity, boost rural development, and mitigate the effects of climate change. The requested financial and technical support is crucial for completing the distribution system, which will serve as a foundation for sustainable agricultural practices, supporting both subsistence and

commercial farming. The successful implementation of this project will thus play a key role in promoting long-term economic growth and resilience in Nyeri County.

1.4 Rationale for Undertaking the ESIA

The proposed project was subjected to environmental and social screening to determine the appropriate level of assessment, in accordance with the EMCA (Cap 387) and the Environmental (Impact Assessment and Audit) Regulations, 2003 (Legal Notice No. 101), as amended by Legal Notice No. 32 of 2019.

The screening results indicated that the project falls under the category of water resources and infrastructure. In accordance with Legal Notice No. 31, Legislative Supplement No. 16, published in the Kenya Gazette Supplement No. 62 of 30th April 2019, the project is classified as a medium-risk activity, and therefore requires an Environmental and Social Impact Assessment (ESIA) - Comprehensive Project Report.

- Under the World Bank ESF, the project is categorized as a Moderate Risk operation. The project triggers 8 ESSs namely:
- ESS1: Assessment and Management of Environmental and Social Risks and Impacts
- ESS2: Labor and Working Conditions
- ESS3: Resource Efficiency and Pollution Prevention
- ESS4: Community Health and Safety
- ESS5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement
- ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources
- ESS8: Cultural Heritage
- ESS10: Stakeholder Engagement and Information Disclosure

Based on this risk classification and the nature, scale, and location of the proposed activities, preparation of a CPR was deemed sufficient to meet national regulatory requirements and World Bank ESF due diligence. The CPR provides an adequate level of analysis to identify potential environmental and social risks and impacts and to define appropriate mitigation and monitoring measures to be implemented throughout the project cycle.

1.5 Objectives of the ESIA

- Ensure compliance with national environmental policies and legislation and the World Bank Environmental and Social Framework (ESF) requirements prior to project implementation.

- Establish and document environmental and socio-economic baseline conditions for the proposed project area to inform impact assessment and future monitoring.
- Examine the project's location, design, construction, and operational requirements, including feasible alternatives, within the context of sustainability.
- Identify and assess the potential environmental and social impacts, both positive and negative, associated with the proposed project throughout its lifecycle.
- Propose appropriate mitigation, enhancement, and management measures, including associated cost estimates, to address identified impacts.
- Develop an Environmental and Social Management Plan (ESMP) and Monitoring Plan, outlining implementation arrangements, institutional responsibilities, reporting mechanisms, and monitoring indicators to ensure effective management and compliance.

1.6 Terms of reference

- General Project Information

  Provide a detailed description of the proposed investment, including its objectives, location, and key components.
- Project Scope Assessment

  Assess the scope of work for the project and identify its associated environmental and social impacts.
- Project Design and Activities

  Describe the project design in detail, outlining all related activities. Discuss both the construction and operational phases, including waste generation and disposal methods.
- Policy, Legal, and Institutional Framework

  Highlight and analyze the relevant policies, legal regulations, and institutional frameworks governing the project, demonstrating their applicability.
- Project Area Characteristics

  Detail the key characteristics of the project area that are relevant to the ESIA.
- Stakeholder Consultations

  Conduct public and stakeholder consultations, document their feedback, and incorporate it into this report.
- Project Alternatives Analysis

Analyze potential alternatives for the project in terms of location, design, and technology, including the "no project" option.

- ESMP

  Identify potential environmental and social impacts both positive and negative expected during the planning, construction, operational and decommissioning phases whilst developing a comprehensive ESMP to guide mitigation measures throughout all project phases.

1.7 Scope of the ESIA study

The scope of the ESIA includes:

- a survey and review of prior studies done by others to describe the physical, and biological conditions of the study area;
- a characterization of physical and biological properties of the project area
- Carrying out of public participation
- Documentation and analysis of the positive and negative impacts identified
- Development of an ESMP
- Submission of the report to the World Bank for review and approval
- Submission to NEMA for review and approval of an Environmental Impact Assessment (EIA) license.

1.8 Assessment Methodology

1.8.1 Environment and Social Screening

The screening was carried out on 08.01.2025 at the intake site, tank sites and at the proposed mainlines and lateral lines by the sub county Environmental officer, social officer, Sub County water officer, County Agricultural Infrastructure Officer (CAIO) and County Environmental Safeguards Compliance Officer (CESCO). The NAVCDP prescribed E&S screening checklist was used (See annex 1). As per the checklist environmental, socio-economic, natural habitat, pesticides and agricultural chemicals, and land acquisition and access to resources issues were screened. The screening process revealed that anticipated environmental and social issues would be minimal. The County Director of Environment (CDE) NEMA advised for ESIA that a Comprehensive Project Report to be prepared for submission as specified in Part V (section 31-41) of the EIA Regulations (LN 101/2003, as amended by LN 32/2019).

1.8.2 E&S Scoping

Scoping was conducted on 20.05.2025, involving a site visit to assess the proposed project location and adjacent areas. This on-site evaluation aimed to document existing physical conditions and assess the environmental baseline of the vicinity to identify potential project-related impacts. The process involved definition of key environmental and social issues, grouped into physical, ecological and social, and economic themes. Stakeholder inputs from local leaders and community representatives were incorporated to ensure that priority concerns, including water access, equity, safety, and potential land-use conflicts were captured. This helped to narrow down on the most critical issues during assessment.

1.8.3 Secondary data review

The secondary data study included the review of existing documents relating to the project activities including but not limited to, design, county relevant documents such as the existing legal frameworks, existing environmental and social related publication of the project area. The review assisted in documentation of already identified impacts and assessment of impacts mention in the secondary data that the expert may have missed during the site verification and vice versa.

1.8.4 Public consultation

A public participation meeting was held on May 20, 2025, at the proposed community hall site near Kihuyo Dispensary. The meeting was attended by 40 participants, including 16 women and 24 men. Key attendees included the Area Chief, Sub-Chief, and the Sub-County Environmental and Water Officers. The primary goals were to sensitize the community on the project, gather local perspectives, assess their understanding of the implementation process, and collect feedback on both the positive and negative impacts of the investment.

On the same day, a key informant meeting was conducted with officers from the Nyeri County Department of Water and the sub-county office to gain further technical input. Additionally, a consultative meeting took place on June 17, 2025, between two KWS officials and four Kihuyo Water Project members to secure a formal "No Objection" for the proposed expansion of the water distribution pipelines. The session confirmed that the works will be located outside the Aberdare National Park's protected area. This ensures the project will improve community livelihoods through irrigation while fully protecting the park's ecosystem (see Annex 2B).

1.8.5 Structure of ESIA Report

The report is organized report is organized into nine chapters as outlined below:

- Chapter 1: Introduction
- Chapter 2: Project Description
- Chapter 3: Policy, Legal and Institutional Frameworks
- Chapter 4: Environment and Social Baseline
- Chapter 5: Analysis of Project Alternatives
- Chapter 6: Public Participation and Stakeholder Consultation
- Chapter 7: Analysis of Potential Project Environmental and Social Impacts and Mitigation Measures
- Chapter 8: Environmental and Social Management and Monitoring Plan
- Chapter 9: Conclusions and Recommendations

This is followed by the References and Annexes that provide supporting technical information, data, and documentation relevant to the ESIA.

1.9 ESIA team

The ESIA team comprised: NEMA-registered Environmental Impact Assessment and Audit (EIA/EA) Lead Expert an agriculturalist, environmentalists marketing expert, sociologist and structural engineer who played key roles during the assessment and reporting.

1.10 Project Implementing Agency / Structure

The proposed project is being implemented under NAVCDP through the County Government of Nyeri, Department of Agriculture (CGoN). The proponent (Kihuyo IWUA) has a pre-existing water committee that comprises of an executive committee and sub-committees. The executive committee comprises of the Chairman, Vice-Chairman, Treasurer, Secretary and Vice-secretary. The committee shall be responsible for local implementation of environmental and social safeguards, supported by the County Project Coordination Unit (CPCU) and the County Environmental and Social Safeguards (ESS) Officers, for oversight and ultimate accountability.

CHAPTER 2: PROJECT DESCRIPTION

2.1 Project Location

Kihuyo Water Project is located in Nyeri County, Nyeri Central Sub-County, Kiganjo/Mathari Ward, approximately 5 km north of Nyeri Town, borders of Kieni East Sub-County and Kieni West Sub-County. The intake point at the river from the KWS gate is -12km along Mathari-Kihuyo-Njegu Road. The project can also be accessed through Nyeri - MauMau Road.

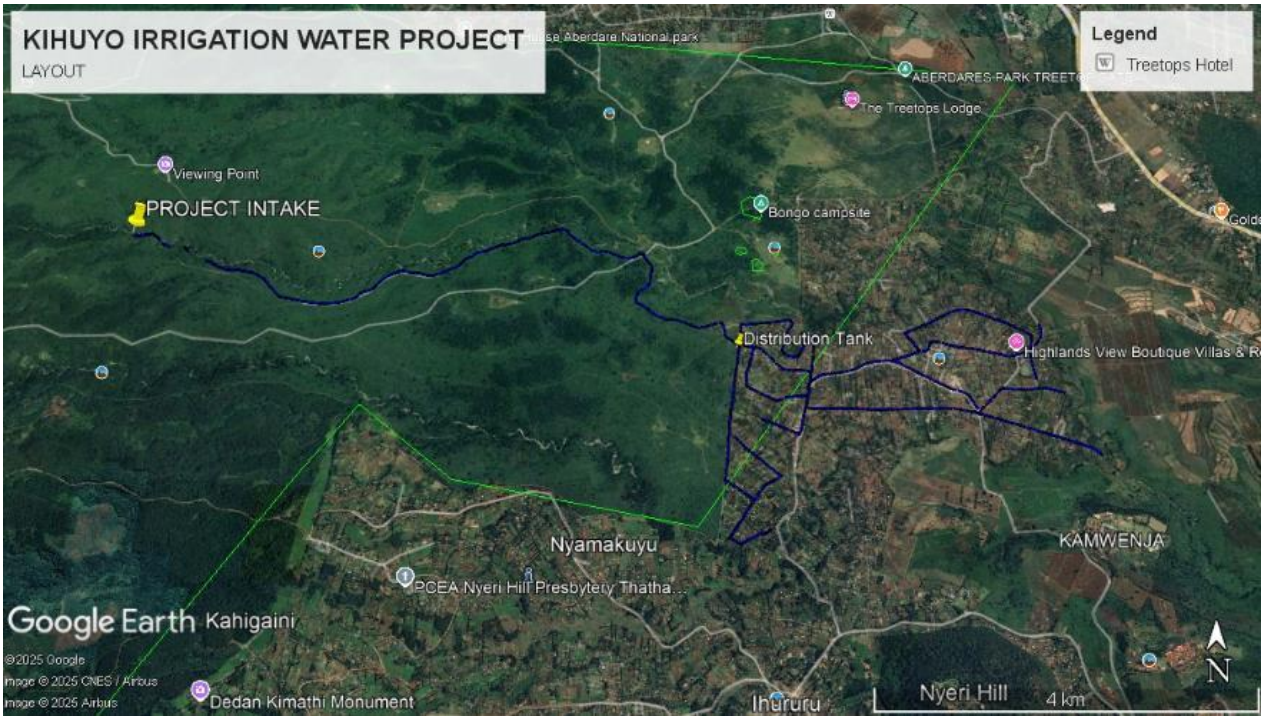


Figure 1 Map of the project area with sites for the proposed investments

2.2 Land Tenure and Access Requirements

The Kihuyo Irrigation Water Project traverses three distinct land categories, each requiring specific legal instruments to authorize the construction and operation of the 15.8 km pipeline network.

2.2.1 Summary of Legal Access Strategy

Segment 1: Source and Headworks (Intake and Sedimentation Tank)

The intake and 11.2m x 4.6m x 2.8m sedimentation basin are located on Public Land within the Aberdare Forest Reserve. Access to this area is governed by the Forest Conservation and Management Act (2016). The legal right is secured through a Statutory Special Use Permit (SUP) issued by the Kenya Forest Service (KFS). A "No Objection" letter has been secured from the Kenya Wildlife Service (KWS) to ensure the construction works does not interfere with wildlife protection (Annex 2A and 2B).

Segment 2: Mainline and Public Infrastructure Crossings

The mainline follows public road reserves and includes six-meter road crossings (one major tarmac road and two murram roads). The legal right to excavate and lay pipes in these areas is secured via a Statutory Wayleave Permit from the County Government of Nyeri. This permit, issued on 17th June 2025, grants the authority for trenching, pipe laying, and maintenance within the Kihuyo - Njengu Road (Class D 1399) corridor and is attached in Annex 3.

Segment 3: Distribution Network (15.8 km Sub-mains and Laterals)

To reach 1,000 households across 100 hectares, the infield distribution network will traverse Private Land (Settlement and Agricultural Parcels). The project secures access through Voluntary Wayleave Agreements (Easements) through signing of MOU/agreement. These are permanent, non-possessory rights that allow the project to install, pressure test, and maintain buried pipelines while the farmers retain full ownership of the land for agricultural use. These agreements shall be signed (in progress) by each affected landowner and witnessed by the Area Chief to be compliant with World Bank ESS 5.

2.2.2 Wayleave Implementation and Monitoring

The proponent, through the Project Management Committee (PMC) is responsible for executing individual wayleave agreements with landowners of the affected parcels. These agreements provide voluntary, legally binding access while ensuring landowners retain full title and usage rights for compatible agricultural activities (such as cropping over the buried pipes).

To ensure full compliance with World Bank safeguards, the following monitoring measures will be implemented:

- Wayleave Register: The proponent will maintain a comprehensive database of all parcels along the 15.8 km route, tracking the execution status of every agreement to ensure 100% coverage before ground-breaking.
- Monthly Progress Updates: NAVCDP, as the grantor/facilitator, will receive monthly updates to verify that all legal access requirements are met prior to construction.
- Social Audit: Before any excavation, the PMC will document existing assets (trees, fences, or crops) within the pipeline corridor to ensure proper restoration or compensation as per the ESMMP and ESS 5 requirements.

Construction works shall only commence once all wayleave agreements have been fully executed. These agreements are legally required to grant the proponent access while protecting the landowner from unauthorized intrusion.

2.3 Project design

2.3.1 Scheme Water Demand Summary

The Water Resources Authority (WRA) issued a water abstraction permit in 2006 authorizing a maximum withdrawal of 246.321m³/day during normal flow and 603m^3/day during the flood season from the Nyameru River (Annex 4). A No objection to continue with the works along the intake given see annex 5.

The proposed irrigation scheme covers a total command area of 250 acres (100 ha), operating on a maximum irrigation interval of 6 days. In the short term, and to remain compliant with the existing abstraction ceiling, the scheme will adopt a seven-block rotational irrigation schedule, supplemented by the promotion of on-farm storage structures to enhance reliability during peak demand periods.

With the operational measures, the calculated net irrigation water requirement for the full command area is approximately 470.4 m³/day, which substantially exceeds the authorized abstraction volume. This indicates that rotational irrigation allows for initial compliance, and is sufficient to meet the full agronomic water demand required for optimal productivity and system performance.

2.3.2 Technical Design

The design aims to deliver a sustainable, reliable, and efficient gravity -fed water supply system based on detailed field assessments, hydraulic modelling and local environmental conditions. The criteria guiding design include water availability, demand projections, system efficiency, long-term sustainability, and community needs.

2.3.2.1 Design of the proposed sub project

The Kihuyo Piped Irrigation Network (PIN) designed system includes pipes, fittings such as valves and other devices, all intended to supply water under pressure from the source to the irrigable areas. The proposed Kihuyo Irrigation Scheme in Nyeri County will as per engineer's design utilize a Gravity Piped Irrigation Network, which is as a result of the falling topography thus eliminating the need for electricity power sources for water pumping.

The existing tank has two galvanized iron (GI) pipeline outlets that were installed during its construction phase. These outlets include a 200mm diameter GI pipe and a 75mm diameter GI pipe. As per the design, the 200mm pipe serves as the main off take, supplying water to 850 project

members, while the 75mm pipeline supplies water to 150 members through the Kamuchugu Branch pipeline, which functions as the Sub Mainline. As a result, the Mainline alone will not serve all 1,000 members and therefore the need for the sub mains and the lateral lines. Water distribution is structured so that five branches - Kiahiti, Karia, Mainganiro, Gichagi, and Thareini - will receive water directly from the Mainline. Meanwhile, the Kamuchugu lateral will obtain water from the Kamuchugu Sub Mainline. Therefore, the mainline off take was designed to supply the five branches, while the Sub Mainline (Kamuchugu Branch) was specifically designed to provide water to the Kamuchugu lateral.

2.3.2.2 Site Layout

The site layout has been provided in the documents for the Engineer and site engineer usage during supervision and carrying out of site activities**.** It must be done with sufficient accuracy to ensure that it is appropriate to the actual plan design.

2.3.2.3 Sedimentation Basin

A sedimentation basin will be constructed upstream of the intake to reduce silt and sediment load entering the system. This will protect the intake and downstream pipelines, ensure efficient operation and reduce maintenance needs. The sedimentation basin dimensions are 11.2M * 4.6M * 2.8 M.

2.3.2.4 Water Conveyance System and Distribution

The proposed design draws water from Nyameru River (intake elevation 2175 m above sea level) to the existing tank (2005 m). The design is based on both irrigation demand and assessed water availability. The main pipeline distributes water through gravity to from the intake (-0.373611° Longitude 36.839722°) to the storage tank (GPS coordinates Tank: Latitude -0.383889° Longitude 36.890278°). The water from the storage tank will be distributed via gravity, this will reduce any extra cost in that in water pumping.

2.3.2.5 Off-Take Main Line

The off-take main consists of the appropriately sized pipes fitted with valves and other to ensure operational control, pressure management and access for maintenance (*Table 1*).

Table 1 Tabulation of the main pipeline per KM and length

LINES	UNIT OF MEASUREMENT	LENGTH
MAINLINES	KM	3.2 HDPE PIPES
KIAMUCHUGU LINE	KM	2.95 HDPE PIPES
KIAHITI LINE	KM	1.35 HDPE PIPES
KARIA LINE	KM	0.95 HDPE PIPES

MAINGANIRO LINE	KM	2.825 HDPE PIPES
GICHAGI LINE	KM	1.525 HDPE PIPES
THAREINI LINE	KM	2.225 HDPE PIPES
	Metal bars+ cement+ sand for valve chambers. 40m GI pipe ,12 Air valves,10 washouts 22 valve chambers of 1.2M*1.2M*1.2M	

All pipes' needs have been specified in the design. The specific and accurate points for placement of line protection, air valves and washout have been marked. The appropriate fittings like reducers are also well set out.

2.3.2.5 225m^3 Masonry Distribution Tank

The project incorporates the use of the existing 225m^3 distribution tank, located at an elevation of 2005 m above sea level, as the primary reservoir for water storage and distribution into the irrigation scheme. While the new works focus on the intake (sedimentation basin) and mainlines and laterals, the design integrates this tank to serve the irrigation area. The tank has already been tested and holds water. The tank is at the periphery of the park (outside the fenced area-at the forest buffer zone).

2.4 Construction activities

The activities to be undertaken in the construction of storage tanks and distribution lines and appurtenance will comprise:

- Site clearance of all sizeable bushes/shrubs
- Excavation and digging of trenches for the pipelines
- Laying of pipes for the main line
- Laying of pipes for sub-mains, branch lines
- Construction of chambers, sedimentation basin
- Backfilling of the trenches A dedicated ESMMP will guide all project activities, ensuring strict adherence to mandatory Labor Management Procedures (ESS2) and the detailed safety protocols of ESS4. These protocols cover worker OHS, site security, and the implementation of a formal Emergency Response Plan (ERP).

2.4.1 Mobilization of Machinery

This will be done by the contractor who will have been appointed through the project tendering and awarding process. The type and the quantity of mechanical equipment to be used depend largely on

availability and the structure type and dimensions. The following items are useful: excavator for the excavation of the pipelines, Butt fusion machine for joining HDPE pipes and trucks to carry the materials needed.

2.4.2 Excavation Phase

Excavation of trenches for pipelines shall include the excavation of all materials, of whatever nature coming within the designated lines of the trenches, as hereinafter described. On average the excavations will not exceed 1.5M, however, the exact trench depth is provided for in the Bill of Quantities (BoQ) and the project profile. Excavation of pipelines both mainlines and distribution lines will be carried out. It shall include all excavation required for the removal or lowering of existing pipelines or appurtenances and shall include all necessary clearing and grubbing, all necessary draining, pumping, timbering, sheeting and subsequent removal of these materials. The site should be rehabilitated to the best environmentally friendly state as possible. Excavated soils should be properly placed to avoid over spread of the soil.

2.4.3 Site Clearing

From the site visits conducted at some of the pipeline sites, it was noted that clearing of short bushes and shrubs will be necessary. Few trees will also be affected. The cleared vegetation should be disposed-off or used for other purposes.

2.4.4 Laying of pipes

All the pipes specification, qualities and quantities have been specified in the BoQ therefore the contractor will follow the engineers design and the BOQ for the activity. Laying of the pipes will mostly be done manually. The contractor will hire workers from the community. The contractor will ensure that the workers have signed the code of conduct (CoC) and contracts. The contractor will also maintain records of all workers engaged.

2.4.5 Back-filling

Backfilling will be done for all trenches (distribution) for the main-lines and the lateral lines. It shall include the disposal of all material excavated and the back-filling of the trenches and appurtenant structures. The trenches will be fully backfilled.

2.5 Materials to be used in the construction

The inputs to implementing the proposed project are human labor (skilled and unskilled), plant and machinery, GI pipes, wire mesh screens, water pumps, concrete fencing poles, chain link, barbed wire,

construction material (sand, stones, cement) metals and gate. All the materials needed have been specified in the BoQ :

Table 2 Materials to be used in Construction of the sedimentation basin and the pipes to be laid

MAINLINE	3.2KM HDPE PIPES
KIAMUCHUGU LINE	2.95KM HDPE PIPES
KIAHITI LINE	1.35KM HDPE PIPES
KARIA LINE	0.95KM HDPE PIPES
MAINGANIRO LINE	2.825KM HDPE PIPES
GICHAGI LINE	1.525KM HDPE PIPES
THAREINI LINE	2.225KM HDPE PIPES
Metal bars+ cement+ sand for valve chambers. 40m GI pipe ,12 Air valves,10 washouts 22 valve chambers of 1.2M*1.2M*1.2M	

2.3.5 Project activities during operation phase

The project will involve supply of water to the beneficiaries, however during the operation there might be issues of pipeline leakages. The IWUA committee will oversee the operation and maintenance. The project management will be trained on the irrigation system operation and maintenance. The management will responsible for the development of an irrigation schedule to be used by the scheme. The proponent will be responsible for payment of any costs incurred during operation and maintenance.

2.3.6 Wastes to be generated and methods of disposal

Table 3 Waste to be generated during construction and proposed disposal methods

Waste type generated	**Method of disposal**
Excavated Soil & Rock	Should be used for backfilling Crushed rocks can be repurposed as aggregate
Pipeline Construction Waste-Cutting & Jointing Waste, packaging waste	PVC/HDPE pipe trimmings (should be recycled). Ductile iron/Metal scraps (sent to metal recyclers) Plastic & metal waste should be segregated and sent to recycling facilities
Domestic & General Waste	Workers' Waste: Food wrappers, plastic bottles, PPE (gloves, masks). Separate recyclables (plastic, paper) from general waste
Vegetation & Organic Waste-shrubs, grass	Organic waste can be composted. Mulching can be used for erosion control

In compliance with ESS 3 (Pollution Prevention), the Contractor will adhere to the waste hierarchy (reduce, reuse, recycle) and develop a site-specific Waste Management Plan (WMP). Any residual waste that cannot be re-used or recycled must be collected and transported by a NEMA-licensed waste handler and disposed of only at an approved and licensed disposal facility. Similarly, solid

waste from the operational repair and maintenance phase will be managed through re-use and proper licensed disposal.

CHAPTER 3: RELEVANT POLICIES, LEGAL AND INSTITUTIONAL FRAMEWORK

3.1 Introduction

This section considers the relevant Government of Kenya (GoK) policies, legal and institutional frameworks and other international frameworks such the World Bank Environment and Social Framework and the applicable environmental and social standards that give the actions to be carried out by the borrowers in matters environment and social. The chapter discusses the relevance of these documents in the implementation of the project including how potential impacts will be mitigated in accordance with the national laws, regulations and international best practices

3.2 Relevant policies

3.2.1 Kenya Vision 2030

The Kenya Vision 2030 is the current National Development blueprint for period 2008 to 2030. The blue print recognizes that measures should be taken to increase the hectares under irrigation which will have an increase in irrigated land in million acres under the economic and macro pillar -agriculture sector.

Relevance: *The proposed project will directly contribute towards achievement of the objectives of the vision because it will increase the number of people carrying out irrigation while at the same time increasing the area/land under irrigation. Under the following pillars the project will;*

Economic Pillar – Boosting Agriculture & Food Security

Increased Agricultural Productivity*: The Irrigation project will ensure year-round farming, reducing reliance on rain-fed agriculture and increasing crop yields. This aligns with Vision 2030's goal of transforming agriculture into a key driver of economic growth.*

Food Security*: Stable water supply will mitigate droughts, ensure consistent food production and reducing reliance on imports.*

Job Creation*: The Irrigation projects will create employment in farming, agro-processing, and water management, supporting wealth creation (a Vision 2030 objective).*

Social Pillar – Improving Livelihoods & Reducing Poverty

***Rural Development**: Irrigation projects will uplift Kihuyo rural communities by increasing incomes for smallholder farmers, reducing poverty, and improving living standards.*

3.2.2 National Irrigation Policy,2017

This Policy is the central high-level guiding document for developing and managing the irrigation sector in Kenya. Its primary objective is to ensure national food security, wealth creation, and poverty reduction through accelerated and sustainable irrigation development. It sets the standard for promoting efficient irrigation systems, coordinating infrastructure development, and ensuring the long-term governance and management of irrigation schemes within a broader agricultural strategy.

***Relevance**: The project aims to provide water for crop and livestock production, a direct function of this Policy. Full compliance is confirmed as the scheme's governance structure is already anchored in the officially registered Kihuyo Water Project (certificate of registration as IWUA is attached in Annex 5). The proponent commits to designing the water-use strategy and providing technical support to the Registered Water Users to ensure the project operates with the highest standards of sustainable management and water use efficiency*

3.2.3 Water Resources Management Rules 2006

The Water Resources Management Rules, 2009 provide a framework for water abstraction, conservation, monitoring, and pollution control. The rules require that all water uses such as irrigation be licensed through a formal permitting process and adhere to water use efficiency, environmental protection, and stakeholder participation s.

Relevance; The proposed Kihuyo Irrigation Project is guided by the provisions of the Water Resources Management Rules, 2006, which establish the framework for sustainable abstraction, use, and protection of water resources. The project has obtained the necessary water use permit from the Water Resources Authority (WRA). The CPR integrates environmental safeguards; stakeholder consultations including engagement and technical designs aimed at ensuring water use efficiency. Monitoring mechanisms of the project will also be put in place in line with the Rules to support sustainability.

3.2.4 National Environment Policy (NEP), 2013

The policy sets out important provisions relating to the management of ecosystems and the sustainable use of natural resources, recognizing fresh waters are part of the country's critical ecosystems due to their capacity to store and retain water for agricultural and other uses. The government therefore pledges to improve the management and conservation of water supply sources.

It also requires infrastructural projects to undergo Environmental and Social Impact Assessment. In addition, public participation in the planning and approval of the proposed project is mandatory.

Relevance: *This ESIA study report acts as a first step in fulfilling NEP requirements to ensure that ecosystems are sustainably used and managed. The project will include the construction of a sedimentation basin to control erosion at the intake. The proponent has secured the relevant permits / authorizations from KWS and WRA. The proponent should however adhere to the conditions given to ensure ecosystem conservation.*

3.2.5 National Policy on Gender and Development

The policy by the department of gender in the Ministry of Public Service, Youth and Gender outlines the national agenda for gender equality and how Kenya intends to realize these ideals. The policy promotes national values and principles of governance towards creating a just, fair and transformed society free from gender-based discrimination in all spheres of life practices.

Relevance: *This This policy provides the national framework for promoting equality and equity in hiring and procurement. Critically, it provides the foundation for the project's commitment to preventing Gender-Based Violence (GBV) and Sexual Exploitation and Abuse / sexual Harassment (SEA/SH). It will guide the implementation of the GBV/SEAH Action Plan outlined in the ESMMP (Chapter 8) to ensure equality of opportunity and safety for all persons (ESS2).*

3.2.4 Kenya National Youth Policy 2006

The National Youth Policy visualizes a society where youth have an equal opportunity as other citizens to realize their fullest potential, productively participating in economic, social, political, cultural and religious life without fear or favor. It emphasizes increasing youth participation in economic activities and decision-making processes.

Relevance: *The proposed development project will provide direct employment to the youth as required by the policy. The proponent has proposed ways of involving youths during construction and operational stages of the project. Which also includes the employment of the youth in the value chain nodes of the value chains supported by NAVCDP which their production will be boosted by the provision of water for irrigation. This ensures fairness and equity in recruitment for both construction and operational phases, maximizing social benefits in line with the policy's objectives.*

3.2.6 National Land Policy 2009

The National Land Policy (2009) classifies all land in Kenya as Public, Community, or Private and provides a framework for sustainable and productive land use. The policy emphasizes efficient land utilization, guided by principles on land management, productivity targets, and planning.

Relevance: *The Project traverses multiple land tenure types. Public land and road reserves along the project route are accessed through statutory licenses and permits, allowing use without transferring ownership. On private land the proponent will secure voluntary wayleave agreements (permanent of non-possessory) prior to construction, granting legal access for installation, operation, and maintenance of pipelines while landowners retain full ownership.*

This approach ensures alignment with the National Land Policy, Kenyan land laws, and World Bank ESS5, facilitating legal, voluntary, and compliant access.

3.2.7 National Climate Change Framework Policy, 2018 and National Climate Change Action Plan III (2023 - 2027)

The National Climate Change Framework Policy, 2018, provides the overarching strategic direction for Kenya's response to climate change. This policy mandates the integration of climate change considerations into all sectoral development and planning. It is operationalized through the subsequent National Climate Change Action Plan (NCCAP) III (2023–2027), which specifically designates the Water and Blue Economy sector as a priority area for adaptation, focusing on building infrastructure resilience and enhancing adaptive capacity against climate change-induced risks.

Relevance*: Since the project relies on a surface water source, its sustainability is directly threatened by climate change -induced events like droughts and floods. The project must demonstrate adherence to this Policy by: (a) designing infrastructure (intake and reservoir) using climate - resilient standards, and (b) contributing to the national adaptation goal by providing a stable, guaranteed water source that increases the community's overall climate resilience*

3.2.8 Public Participation Policy 2023

The policy aims to strengthen citizens' involvement in governance, building on the Constitution's mandate for participatory democracy, by addressing gaps in current processes, enhancing access to information, and promoting inclusivity through better frameworks, technology, and standardized guidelines. Its main objective is to ensure open, accountable, inclusive, and timely engagement in law-making and development.

Relevance: *The ESIA process will include public participation, stakeholder engagement, and consultation to ensure the timely disclosure of investment activities and proper documentation of the feedback received. This input should serve as a key guiding factor for both project implementation and licensing decisions.*

3.3.9 National GBV Policy

The policy designed to prevent and respond to violence, integrating survivor-centered care, legal reforms, coordination across sectors, and data management to create a society free from violence, often focusing on holistic approaches and protecting all genders, including men and boys as potential victims. Key elements include strengthening laws (like Kenya's Domestic Violence Act), ensuring trauma-responsive justice, empowering survivors economically, and collaborating with civil society for implementation.

Relevance: *During construction and operation, the project may involve interaction between workers and community members, increasing the risk of GBV. The Proponent and the contractor will develop and implement a GBV Action Plan as part of the C-ESMP. The plan will include:*

- *A Code of Conduct signed by all workers and contractors.*
- *Awareness and training on GBV prevention for staff and local communities.*
- *Confidential reporting and grievance mechanisms with clear survivor support and referral pathways.*
- *Strict enforcement measures and coordination with local authorities for case management.*

These actions will ensure that project implementation upholds national law, promotes community safety, and prevents sexual misconduct throughout the project lifecycle.

3.2.10 Nyeri County Gender and Development Policy 2021-2025

The policy focuses on systemic eradication through multi-sectoral collaboration, behavior change programs, and empowering community champions (like trained GBV champions) to tackle root causes like harmful cultural practices, ensuring survivor-centered response and promoting gender equality across all sectors for development. The county utilizes a GBV Technical Working Group (TWG) for strategy, involving national/county government, CSOs, and FBOs, aiming for inclusion of men and addressing issues like teenage pregnancies through initiatives like community sensitization and policy integration.

Relevance: The proponent shall ensure the involvement of trained GBV champions. Their role will include training project members and site workers on GBV prevention and response, and disseminating information on GBV/SEAH referral pathways to facilitate timely reporting and survivor care

3.3 Institutional framework

3.3.1 Constitution of Kenya 2010

The constitution of Kenya Article 42 entitles every person the right to a clean and healthy environment, which includes the right to have the environment protected for the benefit of present and future generations through legislative and other measures. Key relevant articles include;

- Article 42 (Environmental Right): Entitles every person the right to a clean and healthy environment, including the right to have the environment protected for the benefit of present and future generations through legislative and other measures.
- Article 43 (Socio-Economic Rights): Recognizes that every person has the right to clean and safe water in adequate quantities and to be free from hunger.
- Article 69 (Obligations in respect to the environment) Mandates the State to ensure sustainable exploitation, utilization, management, and conservation of natural resources and to establish systems of environmental impact assessment, audit, and monitoring.

Relevance: *The project directly addresses the fundamental rights enshrined in the Constitution. By abstracting water and facilitating irrigation, it promotes the realization of the right to a clean and safe water and the right to be free from hunger (Article 43). Furthermore, by undertaking this ESIA process and providing mitigation measures, the proponent seeks is fulfilling the constitutional obligation (Article 69) to protect the environment and ensure that the exploitation of the water resource is managed and conserved for the benefit of present and future generations (Article 42). The public participation component of the ESIA process is a direct measure to uphold constitutional transparency and engagement principles.*

3.3.2 Environmental Management and Coordination Act 1999 (Amendments 2015)

The EMCA (Cap 387) represents the primary statute governing environmental management in Kenya. It establishes the legal framework and institutions (such as NEMA) for coordinated management, conservation of natural resources, and sustainable development. The Act mandates environmental planning tools to be used prior to and during project implementation.

Key provisions include:

- Section 58: Mandates the proponent of any project listed in the Second Schedule to undertake an ESIA and obtain a license from NEMA before commencing.
- Second Schedule: Specifically includes the "construction of waterworks, water diversion, and development of irrigation schemes" as projects requiring an ESIA.
- Part VIII (Water Pollution): Prohibits the discharge of any harmful, toxic, or polluting matter into any aquatic environment.

Relevance: *The proposed construction of the water infrastructure, including the intake, pipeline, and reservoir, falls under the scope of EMCA's Second Schedule. Undertaking and submitting this CPR is the Proponent's direct measure for compliance with Section 58 of the Act. The commitment to implement the proposed mitigation measures ensures adherence to the Act's broader principles of environmental protection and the prohibition of aquatic pollution (Part VIII).*

3.3.3 EMCA Subsidiary Legislations (Regulations)

The following Regulations give practical effect to the provisions of the principal Act (EMCA) and govern specific environmental controls crucial to the proposed Kihuyo Water Project.

3.3.3.1 Environmental (Impact Assessment and Audit) (Amendment) Regulations, 2019

These Regulations detail the mandatory procedures, content, and application process for conducting an EIA (which results in this ESIA report) and for carrying out Environmental Audits (EA) during project operation.

Relevance: *The entire process of preparing and submitting this ESIA report, including the public consultation, is in direct compliance with these Regulations. The proponent is legally bound to secure the EIA license under these Regulations before physical commencement and to submit to subsequent mandatory EAs, as required by NEMA.*

3.3.3.2 The Environmental Management and Coordination (Water Quality) Regulations, 2024

These Regulations provide updated standards and procedures for protecting water resources in Kenya. The Regulations outline requirements for protection of water bodies, establishment of buffer zones, and control of effluent discharge and pollution from domestic, agricultural, or industrial sources. They prescribe water quality standards for abstraction, treatment, and reuse, and mandate continuous water quality monitoring and reporting by users and project proponents to safeguard public health and aquatic ecosystems.

Relevance: *The project involves abstraction and distribution of water from a natural source (Nyameru River). The Proponent must ensure compliance with the Water Quality Regulations, including maintaining defined buffer zones, protecting the intake from contamination, and implementing a water quality monitoring program during construction and operation. Any wastewater or runoff generated on-site must meet the prescribed discharge standards, and all activities should aim to maintain the ecological integrity of the water source.*

3.3.3.3 The Environmental Management and Co-ordination (Waste Management) Regulations, 2006

These Regulations provide the framework for managing all types of waste, including solid, liquid, and hazardous waste, emphasizing waste minimization, segregation, and disposal by licensed entities.

Relevance*: The project must comply with these Regulations by implementing a robust WMP. This plan will cover the proper handling and disposal of construction debris, excavated material, maintenance wastes (oil, grease), and domestic waste generated on site. This commitment ensures that waste generated during the project does not lead to environmental pollution or degradation.*

3.3.3.4 EMCA (Noise & Excessive Vibration Pollution Control) Regulations, 2009

Part 11 section 6 (1) provides that no person shall cause noise from any source which exceeds any sound level as set out in the First Schedule of the regulations. It gives standards for maximum permissible noise levels for construction sites, mines, and quarries. It also gives maximum permissible noise levels for silent zones, places of worship, residential (indoor/outdoor), mixed residential; and commercial.

Relevance: *The proponent will ensure compliance at all stages of the project implementation by implementing measures that minimize noise and excessive vibration some of which have been proposed in this report.*

3.3.3.5 Environmental Management and Coordination Act (Air Quality) Regulations, 2014

This act provides for prevention, control, and abatement of air pollution to ensure clean and healthy ambient air, emission standards for various sources of air pollution including mobile sources (e.g. motor vehicles) and stationary sources (e.g. industries) as outlined in EMCA (Cap 387).

Relevance: *The proponent will ensure compliance with Air quality regulations by enforcing all the proposed preventive and mitigation measures proposed in this report.*

3.3.3.6 Environmental Management and Co-ordination (Wetlands, Riverbanks, Lake Shores and Sea Shore Management) Regulations, 2009

These Regulations provide for the protection, conservation, and sustainable management of wetlands and riparian areas in Kenya. They define the procedures for identifying, managing, and protecting wetlands, riverbanks, and lakeshores, and prohibit any reclamation, degradation, or construction within such areas without prior authorization from NEMA. The Regulations also require that any proposed development within or adjacent to a wetland or riparian reserve be subjected to an ESIA study process and approval by NEMA.

Relevance: *The project involves the abstraction of water from the Nyameru River and construction of pipelines that may cross riverbanks or riparian zones. The proponent will ensure that all works are located outside the legally defined riparian reserve, unless written approval is obtained from NEMA. The ESIA includes mitigation measures to protect riverbanks and adjacent wetlands, including erosion control, restricted machinery access, and vegetation restoration along the pipeline corridor. Continuous monitoring will be conducted to ensure no degradation or encroachment occurs within protected riparian or wetland areas.*

3.3.4 The Water Act, 2016

The Water Act, 2016, governs the sustainable management, regulation, and use of water resources in Kenya. It requires that all significant water uses, including abstraction, impoundment, and diversion, be authorized through a Water Use Permit issued by the WRA. Permit conditions include maintaining ecological flows, monitoring abstraction, and protecting catchment areas.

Relevance: WRA has issued a water abstraction permit authorizing a maximum withdrawal of 246.321m³/day during normal flow and 603m3/day during the flood season from the Nyameru River. The proposed irrigation scheme covers a total command area of 250 acres (100 ha), operating on a maximum irrigation interval of 6 days. In the short term, and to remain compliant with the existing abstraction ceiling, the scheme will adopt a seven-block rotational irrigation schedule, supplemented by the promotion of on-farm storage structures to enhance reliability during peak demand periods.

With the operational measures, the calculated net irrigation water requirement for the full command area is approximately 470.4 m³/day, which substantially exceeds the authorized abstraction volume. This indicates that rotational irrigation allows for initial compliance, and is sufficient to meet the full agronomic water demand required for optimal productivity and system performance.

The Proponent must also install master metering and implement a monitoring and reporting system to ensure ongoing compliance with the permit and protection of the Nyameru catchment. Full validation and approval by WRA are required before construction or operation commences.

3.3.5 The Agriculture and Food Authority Act, 2013

It's an Act of Parliament to provide for the consolidation of the laws on the regulation and promotion of agriculture generally, to provide for the establishment of the Agriculture, Fisheries and Food Authority, to make provision for the respective roles of the national and county governments in agriculture excluding livestock and related matters in furtherance of the relevant provisions of the Fourth Schedule to the Constitution and for connected purposes. Under the Rules on preservation, utilization and development of agricultural land, the Act has given the CS authority to advice and prescribe the manner in which occupiers shall farm their land in accordance with the rules of good husbandry, advise on the control or prohibition of the cultivation of land or the keeping of stock or any particular kind of stock thereon and advise on the kinds of crops which may be grown on land**.**

Relevance

Through this Act NAVCDP has prioritized value chains crops and livestock that can be cultivated and stocked in the project area. Further through the designing of the proposed project the design has considered other crops that can be grown in the project area and an economic analysis done to fully give guidance to the farmers on the crops to grow. The projects support the objectives of the act through improving food security through promotion of commercial agriculture within the regulated framework.

3.3.6 The Occupational Health and Safety Act, 2007

This Act is the principal law governing the safety, health, and welfare of workers and all persons lawfully present at workplaces in Kenya. It is administered by the Directorate of Occupational Safety and Health Services (DOSHS).

The Act imposes duties on employers (defined as 'occupiers' of a workplace) to ensure that all work activities are carried out in a manner that protects the health and safety of employees and non-employees who may be affected by the work.

Key Provisions include:

- Section 6 (General Duties): Obliges the occupier (the proponent/contractor) to ensure the safety, health, and welfare of all persons working in the workplace. This includes providing and

maintaining safe plant, systems, and procedures of work; providing adequate training and supervision; and maintaining a safe means of access and egress.

- Section 13 (Duties of Employees): Requires employees to take reasonable care for their own safety and that of others, to use the provided PPE, and to report any risks or accidents.
- Part VII (Machinery Safety): Contains provisions for the safe use, fencing, and maintenance of all plant, machinery, and equipment used in construction (e.g., cranes, hoists, power tools).
- Part VI (Health General Provisions): Covers workplace conditions such as cleanliness, ventilation, lighting, sanitary conveniences, and first-aid facilities.
- Section 44 (Registration of Workplaces): Mandates the registration of all workplaces (including construction sites) with the DOSHS.
- Section 7 (Safety and Health Policy): Requires the preparation of a Safety and Health Policy Statement and the conduct of a thorough safety and health audit at least once every twelve months.

Relevance: *Construction and operation of the water project constitute a workplace under OSHA, 2007. Compliance to the Act is mandatory for the contractor during the construction phase and for the proponent / IWUA during the operation phase. The proponent will share the ESMMP with the contractor to enable him/her to develop a Contractor's ESMP (C-ESMP) which will be strictly followed during construction. The contractor will be required to comply with the requirements of this Act through obtaining relevant work site permits and licenses, training workers on OHS, inspection of equipment to ensure good working condition and provide appropriate PPE to workers among other measures.*

Compliance of the C-ESMP will be monitored by the regulatory agents. A comprehensive occupational health and safety audit will be carried out periodically to ensure compliance with this Act, particularly during the construction phase.

3.3.7 Work Injury Benefits Act, 2007

This Act provides a framework for the payment of compensation to employees who sustain work-related injuries or contract occupational diseases in the course of employment. The Act establishes '*no-fault*" compensation system, meaning the employer is liable regardless of who caused the accident.

Key provisions include;

- Section 7 (mandatory insurance): Every employer is legally required to obtain and maintain an insurance policy with an approved insurer to cover their liabilities under the Act in respect of all their employees. Failure to insure is an offence punishable by law.

- Section 10 (Employer's Liability): An employee is entitled to compensation for any accident arising out of and in the course of their employment that results in the employee's disablement or death.

- Compensation: The Act specifies compensation for:

    - Temporary Total Disablement (TTD): Periodical payments equivalent to the employee's earnings for up to 12 months.

    - Permanent Disablement: Calculated based on 96 months' earnings and the percentage of disablement.

    - Death: Compensation to the dependents of the deceased employee, calculated on the basis of 96 months' earnings.

- Section 47 (Medical Aid): The employer is liable to pay all reasonable expenses for medical, surgical, and hospital treatment, as well as the supply of necessary appliances.

- Section 22 (Reporting): The employer must notify the DOSHS of any work-related injury or death within 24 hours for a fatality or 7 days for a non-fatal accident.

Relevance: *The proponent and the contractor are fully subject to the provisions of WIBA for all workers employed during the construction and operation phases. The project has an inherent risk of accidents associated with earthworks, trenching, heavy machinery operation, and working in confined spaces.*

- *Mandatory Insurance: The proponent/contractor must immediately procure and maintain a WIBA insurance policy for all project employees, covering the full extent of their legal liability under the Act.*

- *Safety Culture: Compliance with WIBA is intertwined with the OSHA, 2007. The proponent's commitment in the ESMMP to ensure a safe working environment is the primary measure to prevent accidents, thereby managing WIBA liability.*

- *Claims Management: Clear procedures must be established for the immediate reporting of all accidents and occupational diseases to both the insurer and DOSHS as stipulated by the Act. This ensures injured workers or their dependents receive prompt compensation and medical aid.*

3.3.7 Employment Act, 2007

The Employment Act, 2007, is the principal legislation governing the relationship between employers and employees in Kenya. It establishes the basic minimum terms and conditions of employment, including contracts of service, protection of wages, leave, working hours, termination, and prohibition of forced labour.

Key provisions:

- Section 3 (1): States that the Act applies to all employees employed during the project implementation under a contract of service.
- Section 5 (3): Prohibits an employer from discriminating (directly or indirectly) demand that no employer shall discriminate directly or indirectly, against an employee or prospective employee or harass an employee or prospective employee on grounds of race, colour, sex, language, religion, political or other opinions, nationality, ethnic or social origin, disability, pregnancy, mental status or HIV status.
- Part IV(Wages): Governs the timely payment, calculation, and permissible deduction of wages, ensuring fair compensation.
- Part VI (Protection of Wages): Stipulates the conditions under which wages must be paid and prohibits the reduction of wages without an employee's written consent.
- Part VII (Employment of Women and Young Persons): Provides special protection regarding working hours, maternity, and employment conditions for specific categories of workers.

Relevance: *The Proponent (and the engaged Contractor) is the "employer" and must comply with all provisions of the Act during the construction and operational phases. Specifically:*

- *Non-Discrimination: The proponent will ensure fairness and gender equity during the recruitment of the labour force in all phases of the project, strictly avoiding the discriminatory and harassment practices prohibited by Section 5(3). Preference will be given to the local community for both skilled and unskilled labour as provided for in the ESMMP.*

- *Contracts and Terms: All workers must be engaged under a formal written contract of service that clearly outlines the terms of employment, working hours, leave entitlements, and wages, adhering to the statutory minimums and best labour practices.*

- *Grievance Mechanism: The proponent must establish and communicate a clear, accessible, and non-retaliatory GRM for workers to address issues such as unfair treatment, wage disputes, or harassment, ensuring compliance with both this Act and international labour standards.*

3.3.8 The Public Health Act (Cap. 242)

The Public Health Act is the key legislation safeguarding public health, ensuring sanitation, and providing for the prevention and suppression of disease. It places a fundamental duty on property owners and owners and developers to maintain hygienic conditions and prevent conditions harmful to human health.

Key provisions include:

- Section 115 (Nuisances Prohibited): States that no person/institution shall cause a nuisance or condition liable to be injurious or dangerous to human health.

- Section 118 (What Constitutes Nuisance): Broadly defines nuisances, specifically including -

    - Any noxious matter or waste water flowing or discharged into any watercourse or irrigation channel not approved for the reception of such discharge.

    - Any well, cistern, or other source of water supply that is, or is likely to be, used by man for domestic purposes and the water from which is polluted or otherwise dangerous to health.

    - All collections of water, sewage, rubbish, refuse, and other fluids which permit or facilitate the breeding or multiplication of pests (e.g., mosquitoes).

- Section 129 (Duty of Local Authority): Places a duty on health authorities to take all lawful, necessary, and reasonably practicable measures for preventing any pollution dangerous to health of any public water supply.

Relevance: *Compliance with the Public Health Act is non-negotiable for this project. The proponent must ensure the construction and operation activities do not create any of the defined nuisances. Specifically, the project must:*

- *Prevent Water Pollution: Strictly manage all discharges (wastewater, silt, debris, or fuel/oil) to avoid polluting the Nyameru River and surrounding water sources.*
- *Ensure Sanitation: Implement a robust sanitation plan during the construction phase to provide appropriate sanitary conveniences (toilets and washing facilities) for the workforce to prevent fecal contamination and disease spread.*
- *Manage Stagnant Water: Design the water conveyance and storage infrastructure to prevent the creation of stagnant water that could facilitate the breeding of mosquitoes or other vectors.*

The commitment to implementing the ESMMP serves as the primary mechanism for the proponent to prevent any condition liable to be injurious or dangerous to human health, as required by the Act.

3.3.9 Sexual Offenses Act of 2006 (The Sexual Offenses (Amendment) Bill, 2016)

This Act provides the legal framework for the prevention, definition, and punishment of sexual offences in Kenya. It seeks to protect all persons, particularly women, children, and other vulnerable groups, from sexual abuse, exploitation, and harassment. The Act criminalizes offences such as rape, defilement, sexual harassment, and indecent acts. Sections relating to minors provide strict protection against sexual contact, exploitation, or inducement. Various amendment bills (2016, 2020, and 2023) have been proposed to strengthen penalties and improve protection and reporting mechanisms, and the Proponent should monitor their status to ensure ongoing compliance with the law.

Relevance: *During construction and operation, the project may involve interaction between workers and community members, increasing the risk of SEA/SH. The Proponent will develop and implement a SEA/GBV Action Plan as part of the C-ESMP. The plan will include:*

- *A Code of Conduct signed by all workers and contractors.*
- *Awareness and training on SEA/SH prevention for staff and local communities.*
- *Confidential reporting and grievance mechanisms with clear survivor support and referral pathways.*
- *Strict enforcement measures and coordination with local authorities for case management.*

These actions will ensure that project implementation upholds national law, promotes community safety, and prevents sexual misconduct throughout the project lifecycle.

3.3.10 The Water Act, 2016

This is an act of Parliament to provide for the regulation, management and development of water resources, water and sewerage services; and for other connected purposes. The act states that very person has the right to access water resources, whose administration is the function of the national government as stipulated in the Fourth Schedule to the Constitution. Article 40(4) provides an application for a permit to which shall be subject to public consultation and, where applicable EIA in accordance with the requirements of the EMCA. Under Section 12(d) the authority receives water permit applications for water abstraction, water use and recharge and determine, issue, vary water permits; and enforce the conditions of those permits and under 12(e)collect water permit fees and water use charges;

Relevance

The proponent will comply fully with the Act by ensuring WRA authorization for civil works is obtained and licence issued. Follow-up on water abstraction permit, adhere to water quality standards, follow water use regulations and reporting requirements. Ensure that the water supply system and the project design will work to conserve the available water resources. Master metre will also be installed to ensure water abstraction and use is monitored

3.3.11 County Government Act, 2012 (No. 17 of 2012)

Part VIII of the Act outlines the principles of citizen participation in counties among others reasonable access to the process of formulating and implementing policies, laws, and regulations, including the approval of development proposals, projects, and budgets, the granting of permits and the establishment of specific performance standards and protection and promotion of the interest and rights of minorities, marginalized groups and communities and their access to relevant information.

Relevance

The proponent will ensure that all parties are involved in the implementation of the project including relevant county government department. Inclusion of vulnerable and marginalized groups as beneficiaries of the project shall also be observed. Public consultations will be conducted to ensure that local communities, including marginalized groups, are meaningfully involved and that project information is readily accessible.

3.3.12 National Construction Authority ACT, 2011

This Act establishes the National Construction Authority (NCA) with the mandate to oversee, regulate and coordinate the development of the construction industry in Kenya. Its primary purpose is to standardize construction practices, promote quality assurance, and enforce the Code of Conduct (CoC) for the industry.

Key provisions include:

- Section 15 (Contractor Registration): Mandates that all contractors, local or foreign, must be registered by the NCA and hold a valid annual practicing license for the relevant class of works (e.g., Civil Engineering Works for water projects).
- Section 17 (Project Registration): Requires the Owner/Proponent to register the entire construction project with the NCA within 30 days of awarding the contract.
- Quality and Safety: Empowers the NCA to conduct site inspections to ensure compliance with quality, safety standards, and the construction industry's CoC.
- Accreditation: The NCA accredits and certifies skilled construction workers and site supervisors to ensure competence on-site.
- Section 18 (Foreign Contractor Rule): Requires foreign contractors to subcontract a minimum of 30% of the contract value to local firms and commit to skills transfer.

***Relevance**: Compliance with the Act is mandatory for the project to legally proceed. The Proponent will ensure:*

- *Legal Operation: The selected Main Contractor and all Sub-Contractors are registered and licensed by the NCA for the required category of Civil Engineering Works (Water and Roads).*
- *Statutory Approval: The project is registered with the NCA, and the required compliance certificates are obtained before, during, and after construction.*
- *Local Content: Compliance with the 30% local sub-contracting and skills transfer requirement, especially if a foreign firm is engaged, thereby meeting the project's commitment to local empowerment.*

3.3.13 Children Act No.29 of 2022

An Act of Parliament to give effect to Article 53 of the Constitution; to make provision for children rights, parental responsibility, alternative care of children including guardianship, foster care placement and adoption; to make provision for care and protection of children and children in conflict with the law; to make provision for, and regulate the administration of children services; to establish

the National Council for Children's Services and for connected purposes. The act considered employment of children as child abuse. Under section 18(1) the act states that No person shall subject a child-to-child labour, domestic servitude, economic exploitation or any work or employment which is hazardous, interferes with the child's education or is likely to be harmful to the child's health or physical, mental, moral or social development.

Relevance

To ensure compliance with the Act and uphold children's rights during project, the Proponent must ensure that:

- *No person under 18 years is employed in any project activity, including casual labour.*
- *Project activities do not expose children to harm or exploitation, either directly or indirectly.*
- *Community engagement and awareness activities promote the protection and welfare of children in surrounding communities.*

3.3.14 Sustainable Waste Management Act, 2022

The Sustainable Waste Management Act, 2022 provides a national framework for promoting sustainable, efficient, and circular waste management practices in Kenya. The Act aims to protect human health and the environment by reducing pollution, enhancing waste recovery and recycling, and ensuring that waste generators take responsibility for proper disposal. It establishes principles such as segregation of waste at source, the polluter-pays principle, extended producer responsibility, and zero-waste approaches. It also assigns county governments key roles in planning and implementing integrated waste management systems, while NEMA oversees enforcement and compliance.

Relevance: *The proponent will prepare and implement a site-specific WMP within the ESMMP, outlining waste minimization, segregation, reuse, recycling, and safe disposal measures. All waste will be handled by licensed service providers, using color-coded and labeled receptacles in line with the Act's requirements. Hazardous waste, such as oils or chemicals, will be stored and disposed of in approved facilities.*

By adopting sustainable waste management practices, the project will minimize environmental pollution, promote resource efficiency, and ensure full compliance with national and county waste management regulations

3.3.15 Land Governance and Access Framework

Key Acts relevant to the project are summarized below:

3.3.15.1 Land Act, 2012

The Land Act operationalizes the constitutional principles on land and provides the overarching framework for sustainable use, administration, and acquisition of land. It regulates voluntary land transactions, public land management, and the creation of easements and wayleaves. It also sets out the procedures for compulsory acquisition through the National Land Commission (NLC), ensuring prompt and just compensation where acquisition is unavoidable.

Relevance: *For this project, the Act is relevant primarily for the establishment of lawful wayleaves across private and the formalization of access rights. No compulsory acquisition is anticipated; however, if any permanent land take becomes necessary, the process would be undertaken through the NLC in accordance with the Act.*

3.3.15.2 Land Registration Act, 2012

This Act governs the registration, protection, and transfer of all interests in land, including easements and wayleaves. It establishes the requirement for proper title searches, registration of land rights, and rectification of registry records where necessary.

Relevance: *In the context of the project, wayleave agreements with private landowners will be formally documented and registered to give the proponent a legally recognized, non-possessory right of access for pipeline installation and maintenance. Registration under this Act safeguards both the landowner and the project from future disputes.*

3.3.15.2 National Land Commission Act, 2012

The Act establishes the NLC and mandates it to manage public land on behalf of national and county governments, oversee compulsory acquisition, and ensure transparent, equitable land administration.

Relevance:

- *The project's primary interaction with the NLC concerns the public land components, specifically the Aberdare Forest Reserve and the County Road Reserves where the intake, sedimentation basin, and mainline are located.*
- *Unlike private land (secured via voluntary wayleaves), access to the forest land is governed by Special Use Permits issued by the KFS.*
- *As per the project design, all private land access for the 15.8 km distribution network is secured through voluntary wayleave agreements (easements). This avoids the need for compulsory land acquisition through the NLC, ensuring compliance with World Bank ESS 5 and the Land Act 2012.*

- *Future Oversight: Should any future project modifications require the permanent allocation of public land, the NLC would facilitate such actions in accordance with the law to ensure transparency.*

3.3.15.3 Land Control Act (Cap. 302)

The Land Control Act regulates dealings in agricultural land and requires approval from the Land Control Board (LCB) for transactions such as transfers, leases, and easements within designated agricultural zones. Without LCB consent, such transactions are void.

Relevance: *Given that much of the distribution network passes through agricultural holdings, any wayleave agreement involving agricultural parcels will be submitted to the relevant LCB for consent prior to registration. This ensures that all land transactions related to the project remain valid and enforceable.*

3.3.15.4 Physical and Land Use Planning Act, 2019

This Act provides the framework for spatial planning and development control at national and county levels. It ensures that land use decisions are consistent with approved physical and local development plans, protects sensitive areas, and mandates county-level review and approval of development proposals.

Relevance: *The project will obtain the necessary planning permissions from the Nyeri County Government to confirm that the siting and design of the water infrastructure align with county spatial plans and land use policies. Compliance with this Act ensures orderly development and minimizes land use conflicts.*

3.3.16 HIV and AIDS Prevention and Control Act 2011

The objective and purpose of this Act is to promote public awareness about HIV and AIDS as well as protect the human rights and civil liberties of any person suspected or known to be infected with the virus.

Section 31 prohibits any form of discrimination against qualified employees, on the basis of actual, perceived or suspected HIV status unless the employer can prove to a tribunal that the job requires a particular state of health or medical or clinical condition.

Relevance

The contractor will sensitize workers/community on HIV/AIDs as well as other measures such as provision of condoms on site during construction. Voluntary Counselling and Testing (VCT) services will be provided by the contractor (can refer the workers to the nearby health facilities). The results will be private and not disclosed to any third party. Fair employment practices will be followed.

3.4 International Conventions and Treaties

3.4.1 United Nations Framework Convention on Climate Change, 1992 and Paris Agreement 2015

These global agreements aim to stabilize greenhouse gas (GHG) concentrations and strengthen adaptive capacity to climate impacts. *The project contributes to Kenya's climate adaptation goals by improving water availability, supporting catchment restoration, and enhancing community resilience to droughts and rainfall variability*.

Ramsar Convention on Wetlands, 1971

This convention emphasizes the conservation and wise use of wetlands as critical ecosystems for biodiversity and water regulation. *The project will maintain riparian buffer zones, safeguard ecological flow at the intake, and avoid degradation of wetland or riverbank ecosystems during construction.*

3.4.2 United Nations Convention to Combat Desertification, 1994

This Convention promotes sustainable land management and rehabilitation of degraded lands.
The project supports soil and water conservation through improved irrigation management, reduced erosion, and sustainable catchment rehabilitation activities.

3.4.3 Convention on the Elimination of All Forms of Discrimination Against Women, 1979

This Convention commits member states to promote gender equality and protect women's rights in all sectors. *The project will ensure inclusive participation of women and youth in planning, capacity-building, and water management, promoting equitable benefit-sharing across all groups.*

3.4.4 Sustainable Development Goals

The Sustainable Development Goals (SDGs) provide a universal framework for sustainable development. *The project supports several goals, particularly - Goal 2 (Zero Hunger), Goal 5 (Gender Equality), Goal 6 (Clean Water and Sanitation), and Goal 9 (Industry, Innovation and Infrastructure), by ensuring sustainable water supply, improved food production, gender empowerment, and climate-resilient infrastructure.*

3.5 Applicable World Bank's Environment and Social Standards

a) ESS1: Assessment and Management of Environmental and Social Risks and Impacts

ESS1 requires an integrated assessment of environmental and social risks and impacts throughout the project lifecycle. It ensures that projects are designed and implemented in an environmentally and socially sustainable manner.

Relevance: *This ESIA has been prepared in line with ESS1 requirements to identify, assess, and propose mitigation measures for potential risks such as soil erosion, water abstraction impacts, vegetation loss, occupational and community health and safety, and social impacts including land access and labour relations. The proponent will be required to implement the proposed measures throughout the project phases.*

b) ESS2: Labor and Working Conditions

ESS2 promotes fair treatment, non-discrimination, and safe and healthy working conditions. It applies to all workers engaged in the project, including those directly employed, contracted, or working through suppliers. NAVCDP has established Labour Management Procedures (LMP) to guide labour recruitment, working conditions, grievance handling, and prevention of SEA/SH.

Relevance: *The project will engage the following categories of workers, consistent with NAVCDP LMP provisions:*

- *Direct workers: Staff employed by CPCU and Supervising Engineer under NAVCDP.*
- *Contracted workers: Construction and technical staff hired by the contractor(s) to implement civil works, including skilled and unskilled laborers, drivers, and machine operators.*
- *Primary supply workers: Those employed by suppliers providing key materials such as pipes, aggregates, cement, and equipment.*
- *Community workers: Local residents voluntarily engaged in non-specialized activities such as tree planting, minor trenching, or catchment restoration under community arrangements.*

Labor Management and Contractor Obligations

The Contractor will maintain a worker registry and provide all employees with written contracts detailing employment terms, wages, hours, OHS measures, grievance channels, and termination conditions. All staff and contracted workers will sign a CoC, a requirement under NAVCDP's SEA/SH Prevention and Response Plan, covering acceptable workplace behaviour, gender equality, child protection, and prohibition of GBV/SEA/SH.

A Child Protection Plan will be implemented to ensure no person under 18 years is employed. The project will also undertake induction and periodic training on labour rights, SEA/SH awareness, and OHS.

Worker GRM

A dedicated Worker GRM will be established at the site level, integrated into the NAVCDP three-tier grievance structure:

- *Contractor's Worker Grievance Management Committee (GMC) - chaired by the Site OHS/Human Resources (HR) Officer, responsible for resolving worker-related grievances within 14 days.*
- *General Project GMC - for unresolved cases elevated to the CPCU.*
- *GBV/SEAH GRC - managed by a gender/SEA focal person to handle SEA/SH-related complaints confidentially and with survivor-centered care.*
- *Grievances can be submitted verbally, in writing, or via suggestion boxes. All grievances will be logged, acknowledged within 2 working days, and resolved within 14 days, following NAVCDP timelines. Retaliation against complainants is strictly prohibited.*

c) ESS3: Resource Efficiency and Pollution Prevention and Management

ESS3 promotes the sustainable use of energy, water, and raw materials, and aims to prevent and manage pollution throughout project design, construction, and operation. The standard requires projects to adopt measures that enhance efficiency in resource use while minimizing environmental degradation and GHG emissions.

The project has been designed to incorporate measures that will promote resource efficiency and reduce pollution. Key proposed actions include:

- The irrigation scheme will be divided into 4 irrigation blocks to maintain abstraction within the WRA-approved limit of 246.321m³/day ~~230 m³/day.~~ Installation of flow control valves, master meters, and on-farm storage tanks will minimize water losses and ensure equitable water distribution.
- The project will support catchment protection interventions such as reforestation, riparian restoration, terracing, and soil stabilization within the upper catchment to safeguard water sources and reduce sedimentation.
- The design will prioritize gravity-fed systems where feasible to minimize pumping requirements. Where pumping is necessary, energy-efficient pumps and pressure regulation systems will be used to reduce operational energy demand.
- The contractor will be required to source construction materials locally, where possible, to reduce transport-related emissions and support local economic participation.
- A site-specific WMP will be prepared and implemented to ensure proper handling, reuse, and disposal of excavated materials, oils, and packaging waste, consistent with the EMCA (Waste Management) Regulations, 2006.
- In addition, the project will be guided by the IPMP proposed under Chapter 8 (ESMMP). The IPMP promotes environmentally sound pest control methods and safe pesticide use.

Relevance: *ESS3 is applicable because the project involves water abstraction, irrigation development, and agricultural intensification. The Proponent will ensure efficient use of natural resources, adherence to the proposed IPMP, and implementation of catchment conservation measures to maintain ecological integrity. These measures will contribute to sustainable water resource management in the project area.*

d) ESS 4: Community Health and Safety

ESS4 seeks to protect project-affected communities from health, safety and security risks arising from construction and operational activities. It covers issues such as traffic safety, communicable SEA/SH and public awareness during project implementation.

Relevance

The project will involve interaction between construction workers and local communities, which may increase risks related to transmission of sexually transmitted infections (STIs), GBV, SEA/SH, and community safety incidents. To mitigate these risks, the following measures will be implemented:

- *The contractor will prepare and implement a Community Health and Safety Plan as part of the C-ESMP. This will include awareness campaigns on HIV/AIDS, GBV, SEA/SH, and OHS.*
- *All workers will be required to sign and adhere to a CoC covering behavior towards community members and prohibiting GBV and SEA/SH.*
- *The contractor and CPCU will establish working relationships / Memoranda of Understanding (MoUs) with nearby government-owned health facilities to provide HIV testing, counselling, and GBV/SEA support services for both workers and community members.*
- *The GRM will integrate a GBV/SEA/SH-sensitive reporting pathway, ensuring confidentiality. Survivor protection, and timely referrals to qualified service providers. The community will be sensitized on the available grievance redress mechanism in the project.*

e) ESS5: Land Acquisition, Restrictions on Land Use, and Involuntary Resettlement

ESS5 addresses land acquisition, restrictions on land use, and involuntary resettlement. It aims to avoid or minimize physical and economic displacement while ensuring that affected persons are treated fairly. The standard emphasizes meaningful consultation, transparent processes, and appropriate compensation at full replacement cost to restore livelihoods when land access cannot be avoided.

Relevance: *The Kihuyo Irrigation Project requires access to a 15.8 km corridor for the construction of an intake, a sedimentation tank, and a distribution network serving 1,000 households across 100 hectares.*

- *Public Land: Includes the Aberdare Forest Reserve (managed by KFS), riparian reserves, and County Road Reserves (Class D 1399). Access is secured through statutory permits (Special Use Permits and Wayleave Licenses).*
- *Private Land: Comprises agricultural parcels where Voluntary Wayleave Agreements (Easements) will be executed. These allow for the burial of pipelines while enabling farmers to retain title and continue agricultural activities above the pipes, provided deep-rooted trees or permanent structures are not established over the easement.*

To ensure full alignment with ESS 5 and the Kenyan Land Act (2012), the Proponent will:

- *Notify all affected landowners in writing regarding specific pipeline routes, construction timelines, and restoration procedures.*
- *Secure 100% of wayleave agreements for the 15.8 km network, witnessed by the Area Chief, prior to ground-breaking in any specific section.*
- *Conduct a pre-construction social audit to document standing crops, fruit trees, or fences. Any verified losses (temporary or permanent) will be compensated at full replacement cost before construction begins.*
- *Utilize the project-specific GRM to resolve any land-access disputes or compensation claims promptly and transparently.*
- *Ensure the contractor restores all trenched areas to their original state (topsoil replacement and compaction) and maintain a Wayleave Register for audit and accountability.*
- *Obtain the KFS Special Use Permit for forest land and the WRA Water Abstraction Permit renewal to ensure all public resource use is legally sanctioned.*

Through these measures, the project ensures that land access is handled through voluntary negotiation rather than compulsory acquisition, thereby safeguarding land tenure rights and ensuring equitable treatment of all affected persons.

f) ESS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources

ESS6 addresses project-related risks and impacts on biodiversity, the variety of life in all its forms, including species, ecosystems, and genetic diversity. The standard is designed to protect natural habitats, critical habitats, and modified habitats, requiring the Borrower to demonstrate efforts to avoid or minimize impacts and, where possible, achieve net gains in biodiversity. Furthermore, it promotes the sustainable management of living natural resources, ensuring that projects utilizing these resources (such as water for irrigation) do so responsibly to maintain ecological functionality.

Relevance: *The project involves the abstraction of water from the Nyameru River for irrigation, which inherently modifies the stream's natural flow regime. This activity poses a risk to aquatic biodiversity (e.g., fish and invertebrates) and the riparian habitat that supports local flora and fauna. Compliance with ESS 6 requires the project to implement strict measures to conserve the ecological health of the stream, most critically by ensuring that the established MEF is protected as mandated by the WRA. The ESMMP includes measures to prevent sedimentation and pollution of the stream during construction and to manage the impacts of agricultural chemical use to maintain the integrity of this natural habitat.*

g) ESS 8: Cultural Heritage

ESS 8 addresses the protection and preservation of Cultural Heritage. This includes both tangible heritage (movable or immovable objects, sites, or structures with archaeological, historical, religious, or aesthetic value) and intangible heritage (practices, knowledge, traditions, and living culture). The standard requires the Borrower to identify any known cultural heritage potentially affected by the project and establish protocols to manage and protect any undiscovered heritage during the project life cycle, ensuring consultation with relevant stakeholders regarding its significance and use.

Relevance: *ESS8 is applicable because the construction phase of the project involves excavation for the intake structure, pipeline trenches, and distribution network across the project area. Although no known sites of tangible cultural heritage may have been pre-identified, these civil works present a risk of encountering 'chance finds' (undiscovered archaeological artifacts, burial sites, or historical relics).*

To ensure compliance, this ESIA has provided a mandatory, legally binding Chance Finds Procedure as an Annex to the ESMMP (Annex 17). This procedure outlines the protocol for the Contractor to immediately stop work, cordon off the area, and notify the relevant government authorities and project management if any material cultural heritage is unearthed, thereby ensuring its protection and proper management.

h) ESS 10: Stakeholders Engagement and Information Disclosure

ESS10 is applicable to the proposed Kihuyo Water Project because it mandates continuous stakeholder consultation and full project information disclosure throughout all implementation phases. The project ensures full compliance by adopting and operationalizing the robust NAVCDP Stakeholder Engagement Plan (SEP) and its functional GRM.

Relevance: *To maintain compliance with ESS10 and national laws, the proponent will be required to:*

- *Implement stakeholder consultations following the NAVCDP SEP, ensuring inclusivity across gender, age, and vulnerability lines.*

- *Provide timely and accessible project information on scope, activities, and anticipated impacts.*
- *Implement the Project-level GRM for all grievances and ensure that all contractors and local committees are trained in its procedures.*
- *Maintain up-to-date grievance logs and submit regular reports to the CPCU and NPCU.*
- *Provide continuous feedback to communities through the Water Users' Group meetings and public forums.*

The GRM for the Kihuyo Project will be locally customized based on the NAVCDP's tiered framework to ensure accessibility and local ownership. The mechanism is operationalized at the Community Level (Tier 1) through the Grievance Management Committee (GMC), which serves as the primary entry point for all project-related grievances. The GMC for the Kihuyo Project will be composed of:

- *The Kihuyo Water Project's GRM Focal Person (elected by the Registered Water Users group).*
- *Local Community Representatives (selected to ensure broad representation of beneficiaries and non-beneficiaries).*
- *Mandatory inclusion of members from women and vulnerable groups to guarantee an inclusive and accessible reporting channel.*
- *The Contractor's representative (during the construction phase).*

The standard operation flow for the project-level GRM is described in detail in Chapter 8 (ESMMP).

3.6 Institutional Framework

3.6.1 National Environment Management Authority

NEMA, established under EMCA (Cap. 387), is the principal government agency responsible for coordination and supervision and co-ordination over all matters relating to the environment management in Kenya. Specific NEMA roles related to this project are:

- Reviewing the ESIA report in collaboration with relevant lead agencies and issuing approval, improvement comments, or rejection where necessary;
- Issuing EIA license with project -specific environmental and social compliance conditions;
- Monitoring the implementation of the ESMMP, and adherence to EIA license conditions. Where necessary the Authority may issue compliance notes, or stop orders as prescribed under Section 117 of EMCA (Cap. 387).

3.6.2 Water Resources Authority

WRA, established under Part IV of the Water Act (2016), is responsible for regulation and management of water resources in Kenya. Its responsibilities include issuing water abstraction and effluent discharge permits, enforcing environmental flow requirements to maintain river ecosystem integrity, monitoring water use, and promoting equitable allocation among users.

WRA has issued an abstraction permit for water abstraction permit authorizing a maximum withdrawal of 246.321m³/day during normal flow and 603m^3/day during the flood season from the Nyameru river. The Proponent must ensure continuous flow monitoring, maintain records of abstraction volumes, and comply with all permit conditions to safeguard downstream users and ecosystem sustainability.

3.6.3 Department of Occupational Health and Safety (DOSHS)

DOSHS, a department under the Ministry of Labour and Social Protection, enforces OSHA (2007), ensuring safe working environments. The project proponent and contractor must register the site as a work place with DOSHS, prepare a site-specific Health and Safety Plan, and report workplace accidents in line with WIBA (2007) and ESS2 requirements.

3.6.4 County Government of Nyeri

The County Government Nyeri, through its Departments of Water, Environment, Agriculture, and Public Health, plays a key role in local-level project implementation and oversight. In line with the Fourth Schedule of the Constitution of Kenya (2010) and the County Governments Act (2012), the County Government will collaborate with the Registered Water Users, WRA, and the County Environment Committee (CEC) to ensure sustainable management and environmental compliance for the Kihuyo Water Project.

The CEC, established under EMCA (Cap. 387) serves as the county-level coordination body for environmental management. The Committee is responsible for:

- Overseeing the implementation of environmental policies and ESMMPs within the county;
- Facilitating collaboration between NEMA, county departments, and project proponents; and
- Reviewing and providing input on environmental and social compliance reports from projects within the county.

Specifically, the Department of Water and Irrigation will:

- Provide technical backstopping and extension support to the Registered Water Users and farmer groups;

- Participate in joint monitoring of ESMMP implementation with NEMA and the CEC;

Support capacity building of the Project's Management Committee and farmer groups to enhance sustainability and compliance with project safeguards.

3.6.5 Kihuyo Irrigation Water Users Association

3.6.5.1 Legal Identity and Statutory Alignment

Kihuyo IWUA To meet World Bank quality standards, this section must present the Kihuyo Community Irrigation Water Users Association (IWUA) as a legally empowered, operational entity rather than a group in development.

The following prose summarizes the institutional framework, incorporating the evidence from your recently provided documents:

3.6.5 Current Institutional Status: Kihuyo Community Irrigation Water Users Association (IWUA)

The project has achieved a vital institutional milestone with the formal establishment of the Kihuyo Community IWUA as a registered legal entity. The IWUA was officially registered under the Societies Act (Rule 4) on 13th August 2025, receiving Certificate of Registration No: SOCA-77SNEKA. This registration provides the association with the necessary legal capacity to manage the project's long-term sustainability, including the authority to open bank accounts, enter into binding operation and maintenance (O&M) agreements, and legally collect water tariffs from its members.

This institutional structure is specifically aligned with Part III, Sections 18-20 of the Irrigation Act (2019), which mandates the formalization of water user groups to ensure professional oversight of irrigation schemes. The IWUA now serves as the primary custodian of the project's infrastructure, including the masonry reserve tank, the sedimentation basin, and the 15.8 km distribution network. Its operational mandate includes managing the equitable distribution of water across the 100-hectare command area and ensuring the financial viability of the scheme through the collection of O&M fees.

Beyond its internal governance, the IWUA has already demonstrated significant institutional capacity through its proactive engagement with key regulatory agencies. In June 2025, the association's leadership, including the Chairman and Secretary, successfully conducted site meetings with the KWS, securing a formal "No Objection" for the construction of the water tank and distribution pipelines. Furthermore, the IWUA has secured essential statutory permissions from the

County Government of Nyeri for road crossings along the Class D 1399 road, proving its ability to navigate complex legal and technical requirements.

Ultimately, the IWUA functions as the critical link between the community, the National Irrigation Authority (NIA), and donor facilitators. By maintaining a formalized structure, the association ensures that women and vulnerable groups are represented in governance while providing a transparent mechanism for grievance redress and environmental compliance throughout the project's operational phase.

CHAPTER 4: ENVIRONMENT AND SOCIAL BASELINE

4.1 Introduction

This Chapter presents the environmental and social baseline information for the proposed Kihuyo Water Project. describes the existing physical, biophysical, and socio-economic conditions of the project area, providing a reference point against which potential project impacts will be assessed.

4.2 Biophysical Environment

4.2.1 Climate

The project area experiences bimodal rainfall due to its location within the highland zone of Kenya. The long rains occur from March to May while the short rains are experienced in October to December, but occasionally this pattern is disrupted by abrupt and adverse changes in climatic

conditions. According to data from the Kenya Meteorological Department (KMD) and the Nyeri County Integrated Development Plan (CIDP 2023 - 2027), the annual rainfall ranges between 1,200mm-1,600mm during the long rains and 500mm- 1,500mm during the short rains. In terms of altitude, the county lies between 3,076 meters and 5,199 meters above sea level and registers monthly mean temperature ranging from12.8°C to 20.8°C. This rainfall is highly variably and spatially distributed with time. Agricultural and livestock productivity is worsened by limited, unreliable and poorly distributed rainfall pattern. In recent years the rains have become erratic and unpredictable hence making it difficult to plan on farming. This therefore means that in order to sustain agricultural productivity, irrigated agriculture is highly recommended.

4.2.2 Topography

The project's intake is located at approximately – 0.373611°, 36.839722°, at an elevation of about 2175 m above sea level. From the intake to the tank at an elevation of about 2005 at approximately – 0.383889°, 36.890278°, the terrain descends towards the Kihuyo farming areas with an average slope of 13 - 17 percent, providing sufficient hydraulic head to support gravity-fed water conveyance. The topography facilitates natural flow for irrigation distribution and reduces the need for pumping systems.

4.2.3 Geology

The region is underlain by volcanic rocks, primarily from the Tertiary and Quaternary periods. These rocks originated from historical volcanic activity associated with the formation of the Kenyan Rift Valley and the Aberdare Ranges. The dominant geological formations include basalts, phonolites, and trachyte, which have undergone significant weathering over time. The area is characterized by deeply weathered profiles, contributing to fertile soils suitable for agriculture.

4.2.4 Soils

The soils in Kihuyo are predominantly red volcanic soils (Nitisols), known for their high fertility and good structure, making them ideal for farming. These soils are well-drained, deep, and rich in essential nutrients like phosphorus, potassium, and nitrogen, supporting cash crops like coffee and food crops such as maize, beans, potatoes, and vegetables. Due to the hilly terrain, there is some risk of soil erosion, especially in sloping areas. However, good farming practices such as terracing and agroforestry help mitigate soil degradation. The organic matter content is relatively high due to decomposed plant material, contributing to soil fertility. Overall, the geology and soils of Kihuyo exhibit good water-holding capacity and are commonly utilized for crop and fodder production and

support productive agriculture, especially for coffee and mixed farming, while the hilly terrain necessitates soil conservation efforts to prevent erosion and maintain soil health.

4.3 Socio economic baseline

4.3.1 Population

According to the Kenya National Bureau of Statistics (KNBS, 2019 Kenya Population and Housing Census), Kihuyo Sub-Location in Kiganjo/Mathari Ward, Nyeri Central Sub-County had a recorded population of approximately 2,347 persons across about 681 households. Applying the county's average rural population growth rate of around 2 % per year, as used in the Nyeri CIDP 2023 - 2027, the 2025 population is projected to be about 2581.7 persons in roughly 749 households.

Settlement in the project area is rural and scattered in some area, with homesteads surrounded by agricultural land. The main local centers are Kihuyo Market Mathari Market, with close proximity to Nyeri Town Markets which provide access to basic goods, services, and social interaction. Community facilities within the area include Kihuyo Primary School, Kihuyo Secondary School, Nyeri High school, Nyeri Minor Seminary etc., several churches representing different Christian denominations, and Kihuyo Police Post, Kihuyo Chiefs camp which provides local security coverage.

Land is held under freehold tenure, and most households practice mixed farming for both subsistence and income. The area's settlement pattern reflects 3 to 5 members per household with gradual land subdivision among household members.

4.3.2 Gender dynamics

The gender dynamics within the Kiganjo/Mathari area of Nyeri Central Ward reflect broader county-level trends on gender inequality and sexual and gender-based violence (SGBV) as documented in the Nyeri County Gender and Development Policy (2021–2025). Although ward-specific quantitative data on SGBV is limited, the county profile provides a relevant contextual baseline for assessing gender-related risks and vulnerabilities in the project area.

County-wide data indicates that physical violence is the most prevalent form of SGBV, with hitting or battering reported at 71.4 percent, followed by domestic conflict (52.4 percent) and rape (33.3 percent). These patterns suggest that women and girls in Kiganjo/Mathari may face similar risks, particularly within domestic settings and informal work environments. Additional forms of abuse, including economic abuse (22.2 percent) and verbal abuse (17.5 percent), highlight persistent power imbalances and control over access to resources and decision-making, which are relevant to labor engagement and benefit-sharing under the project. (Nyeri Gender and Development Policy).

Lower but notable incidences of psychological humiliation, forced marriages, and deprivation of resources (4.8 percent each) point to entrenched cultural and social norms that can marginalize women and limit their participation in development initiatives. Reports of early marriage and human trafficking (1.6 percent each), while relatively low, underscore existing vulnerabilities among adolescent girls and young women, especially in contexts of economic hardship or labor influx. The reported absence of marital rape and social isolation in the data is likely attributable to underreporting, stigma, and normalization of certain abuses, rather than an actual absence of such practices.

Within the Kihuyo Project context, construction activities and labor influx, even at a small scale, may exacerbate existing gender risks if not properly managed. Potential risks include sexual harassment, exploitation linked to employment opportunities, exclusion of women from project benefits, and increased domestic tensions due to shifting income dynamics. Women may also face barriers to participation in project consultations and decision-making processes if meetings are not deliberately inclusive.

Overall, while the prevalence of reported SGBV in Nyeri County is not categorized as extreme, the patterns observed warrant preventive and mitigation measures for the Kihuyo Pipeline System Project. Targeted gender sensitization, enforcement of a GBV/SEA/SH zero-tolerance Code of Conduct, establishment of confidential grievance and referral mechanisms, and promotion of inclusive employment and stakeholder engagement are essential to minimizing gender-related risks and ensuring that both women and men in Kiganjo/Mathari equitably benefit from the project.

4.3.3 Farming Systems

Most of the land in the project area is owned by individuals as freehold and mainly subsistence farming is practiced. The larger part of the arable land is used for food crop while the rest is used for cash crop farming, livestock rearing and farm forestry. The mean holding size is 2.5 acres for majority of the small holders. Agriculture is a key economic activity in Kihuyo. The region's fertile soils, favorable climate, and consistent rainfall contribute significantly to agricultural productivity. Key Agricultural Activities include: Tea Farming, Coffee Farming, Horticulture, Dairy Farming, Beekeeping, and Food Crops

Livestock production plays a significant complementary role, with most households keeping dairy cattle, sheep, goats, and poultry. Dairy farming is a key income source and an important contributor to household nutrition.

The proposed irrigation project aims to enhance water availability and support year-round cultivation to improve crop yields, diversify production, and strengthen household food security. The main crops targeted for irrigation include avocados, horticultural crops, beans, cabbages, and fodder crops for livestock.

4.3.4 Education institutions

Nyeri central Sub-County has an established network of public primary and secondary schools supported by the County Education Department whilst there is a substantive number of private primary and secondary schools. The project area has a combination of developed rural and urban area and therefore challenges related to classroom congestion, limited learning materials, and teacher shortages during peak enrolment periods are mostly experienced in the informal settlement.

Education levels among residents are moderate to high, reflecting the county's strong emphasis on literacy and youth development. Most school-going children in the area walk or use local transport to access nearby institutions, with secondary education enrolment supported by national bursary and scholarship programs. The project area forms part of Kiganjo/Mathari Ward in Nyeri Central Sub-County, where access to basic education is generally well established with Kihuyo Primary School, Kihuyo Secondary School, Nyeri High school, Nyeri Minor Seminary etc.

4.3.5 Religion

The population within the project area is predominantly Christian, reflecting the general religious composition of Nyeri County and central Kenya region. The main Christian denominations represented include the Presbyterian Church of East Africa (PCEA), the Catholic Church, the African Independent Pentecostal Church of Africa (AIPCA) and several Pentecostal and Evangelical groups such as the Full Gospel Church and the Pentecostal Evangelistic Fellowship of Africa (PEFA).

Churches serve not only as centres of worship but also as important platforms for community mobilization, information sharing, and social support within the project area. In addition, a small number of residents identify with Islamic or traditional belief systems, though these represent a small minority within the area (KNBS, 2019 Census: Nyeri County Religious Affiliation Data).In this sub county there are several churches that offer education and health services to the citizenry eg Catholic church-Mathari Hospital

The strong presence of organized religious institutions provides a valuable avenue for stakeholder engagement and public sensitization during the implementation of the proposed project.

4.3.6 Market centers

The main mode of trade is service industry which is well spread within the project area, in form of manual and semi-skilled labour. Ihururu is the nearest trading Centre which is only 3.5 km and offers requirements for dairy, agricultural inputs as well as hardware. Nyeri town is only 7km which is the largest market Near Kihuyo for dairy and agricultural produce. The market areas also host retail shops,fresh produce shops,agrovets and other agricultural related enterprises.
The presence of these markets is expected to enhance the socio-economic benefits of the proposed irrigation scheme by providing reliable outlets for increased farm production once the project becomes operational.

4.3.7 Security

Nyeri Central Sub-County continues to experience low-moderate crime levels, and collaboration between local administrators, community policing units, and the County Security Committee has enhanced public confidence and safety.

The project area is generally peaceful and secure, benefiting from active administrative and community-based security structures. Security within Kihuyo Sub-Location is maintained through the Kihuyo Police Post and the Chief's Camp, which coordinate with the Nyeri Central Police headquarters under the National Police Service.

The community also implements the *Nyumba Kumi Initiative*, a national neighborhood watch system that promotes information sharing and collective responsibility for local safety. This has contributed to effective prevention and response to petty theft and other minor security incidents.

Overall, the area provides a conducive environment for project implementation, with existing law enforcement and community safety structures capable of supporting construction and operational activities.

4.3.7 Extension Services

State and county departments of Agriculture, Water and Irrigation, Livestock Development, Fisheries and Cooperatives provide agricultural extension services. Extension departmental staffs are available at Sub County, ward and location levels. There are other private extension providers like veterinary services and NGOs.

4.4 Physical infrastructure

4.4.1 Roads and Accessibility

The project is well served by tarmacked and a very small section of murram feed access roads connecting Nyeri-Kingongo-Mathari-Ihururu -Kihuyo road or Nyeri-Njegu (Mau Mau)-Kihuyo road and the project area. These roads facilitate the delivery of construction materials, equipment, and transport of farm produce from the irrigation command area. Seasonal conditions may affect some murram sections; however, the roads remain generally passable throughout the year, with periodic maintenance ensuring year-round accessibility.

4.4.2 Energy

The project area is connected to the Kenya Power and Lighting Company (KPLC) main grid, which provides electricity for operational and potential construction activities. To enhance sustainability and reduce reliance on the grid, solar energy systems are recommended for pumping and irrigation operations, as well as for any project offices or support facilities

4.4.3 Communication

The area is well covered by communication facilities landline and mobile telephony services being adequately covered by the two main mobile phone telephone service providers; Safaricom and Airtel. The communication systems are reliable in the area.

4.4.4 Water Supply

The area is supplied with domestic /drinking water piped as per the customers need by NYEWASCO. It is recommended that the residents of the area should consider roof catchment to harvest rainwater so as to supplement the water supplied from the water project.

4.4.5 Financial Institutions and Cooperative Societies

Nyeri Central financial ecosystem is anchored by mainstream and main banks providing broad financial services and a strong cooperative movement offering tailored support to its agricultural and small-business communities. Nyeri Central has several -focused societies for, dairy Coffee and tea plus sector based SACCOs such as transport -2NK, Taifa, New Fortis and Biashara SACCOS.

4.5 Regulatory Compliance / Permits

The proposed Kihuyo Irrigation Project requires several permits and approvals to authorize the extraction of water, the use of protected forest lands, and the installation of a 15.8 km distribution network. Legal compliance is mandatory to safeguard environmental resources and fulfill the requirements of NEMA, WRA, KFS, KWS, and the County Government of Nyeri.

The current status of these permits, supported by the documentation in the report annexes, is summarized in Table 4 below.

Table 4 Project Permits and Compliance Status

Permit / Approval	Issuing Authority	Purpose / Scope	Compliance Requirement	Status / Remarks
Water Abstraction Permit	WRA	Authorizes abstraction of water from Nyameru River for irrigation	The project is required to maintain abstraction within strictly permitted limits and is actively implementing enhanced storm water harvesting to boost these limits sustainably.	There is an Active Application in place, with the adoption of storm water harvesting measures currently being integrated into the project design. WRA has provided for a NO objection to the construction of the sedimentation basin -see annex 5
Protected Area and Forest Access	KWS and KFS	These permits authorize access to the Aberdare Forest Reserve and the areas bordering the Aberdare National Park for the construction of the intake, sedimentation basin, and the masonry tank.	The project must comply with forest management guidelines and ensure that infrastructure remains outside core park ecosystems to avoid major environmental impacts.	Following a site meeting between 2 KWS officials and the proponent's representatives on 17th June 2025, KWS issued a "No Objection". Additionally, an authorization from 10th May 2022 allows for pipe laying in a 2.1 km trench section within the protected area under ranger supervision.
				For the intake and sedimentation basin located within the Aberdare Forest Reserve, a Special Use Permit (SUP) from KFS is required.
Wayleave and Land Access Agreements	Private landowners	These agreements grant the project legal	All voluntary agreements must be signed by the	This process is ongoing; all agreements are to be finalized and documented

Permit / Approval	Issuing Authority	Purpose / Scope	Compliance Requirement	Status / Remarks
		access for the excavation and laying of the 15.8 km distribution network and associated infrastructure.	landowners and witnessed by the local administration prior to construction to ensure the project meets World Bank ESS 5 requirements.	in the Wayleave Register before works commence.
County Government Approvals / Utility Permits	County Government of Nyeri (relevant departments)	These permits authorize the project to utilize county-designated utility spaces and road reserves, specifically the Kihuyo–Njengu Road (Class D 1399).	The project is mandated to reinstate all grounds to working conditions, leave the site clean, and notify the County Engineer 48 hours before commencing works.	Formal authority was granted on 17th June 2025.
Environmental clearance	NEMA	This involves the formal approval of the ESIA and ESMMP.	The Proponent is required to implement the ESMMP during both construction and operation, with periodic monitoring reports submitted to NEMA.	EIA license is expected upon the final submission and review of this ESIA report.
Proponent's Legal registration as IWUA	Registrar of Societies	This provides the Kihuyo Community IWUA with the legal	The association must operate under the Societies Rules (1968) and the	Secured; the IWUA was officially registered on 13th August 2025 with Certificate No: SOCA-77SNEKA

Permit / Approval	Issuing Authority	Purpose / Scope	Compliance Requirement	Status / Remarks
		identity required to manage the scheme and its proposed 1,000 beneficiaries.	Irrigation Act (2019) to ensure transparent governance	

CHAPTER 5: PUBLIC AND STAKEHOLDER CONSULTATION

5.1 Introduction

The Kenyan government has enshrined the need for human societies' involvement in project development in the Constitution. This has been set out in the EMCA, 1999 and Environmental (Impact and Audit) Regulations, 2003 (Amendment 2015). The proposed project has incorporated public consultations in order to understand the local impacts, needs and wishes of the community and eventually incorporate them into the final designs and operations of the project. The World Bank Environmental and Social Framework (ESF) provides a comprehensive set of standards to ensure that development projects are environmentally and socially sustainable. One of its key pillars is Environmental and Social Standard (ESS) 10: Stakeholder Engagement and Information Disclosure, which outlines the requirements for inclusive, transparent, and meaningful engagement with project stakeholders throughout the project life cycle. Implementation and sustainability of such projects.

5.2 Purpose for the public and stakeholder consultation

The key objectives of the public participation and stakeholders'consultation for proposed project were to:

a) Disseminate and inform the public and stakeholders about the project including key components and anticipated impacts.
b) Raise awareness among the public on the need for the ESIA process and its purpose.
c) Collect comments, suggestions and concerns from interested and affected parties.
d) Ensure stakeholder feedback is integrated into the ESA findings and project design.
e) Build community consensus and acceptance of the proposed project.
f) Promote inclusive participation, particularly of women, youth and vulnerable groups, in line with ESS10.

5.3 Methodology of Public Participation and Consultation

Public Consultation process

Members of the local community and other project stakeholders were engaged through a public meeting (baraza), key informant interviews (KIIs) with local leaders, and administration of questionnaire samples. This approach allowed community members to share their views, raise concerns, and provide input that has been considered in project planning and mitigation measures.

5.3.1 Administration of Questionnaire Samples

Questionnaire survey- Respondents were purposively selected from the seven zones of the project to fill a questionnaire. The sub county/ward representatives, local chiefs, Sub County Environmental officer and Sub County Water officer also filled the questionnaires (*Annex 14*). Forty-40 questionnaires were disseminated for public participation and all the questionnaires were dully filled. From the dully signed questionnaires fifteen 15 -were females and twenty-five 25 - were males. Other relevant stakeholders from various departments were consulted on the suitability of the project. Landscape Management Committee members were also present.

A summary of the questionnaire responses is presented in Table 5 below.

Table 5 Analysis of Questionnaire Responses

S/No.	Topic / Aspect	Analysis of Responses
1.	Familiarity with the Proposed Project / Need for the Irrigation Project	The vast majority of respondents answered "Yes." This indicates that the community is already aware of the project and recognizes the need for it within the Kihuyo communities. The persons acknowledged that the proposal for the project originated from the community
2.	Perceived Negative Impact on Livelihood or Income	Most respondents answered "No," while a significant minority responded "Yes." Those who expressed concern mainly to potential increased subdivision of the land and possible rationing of the irrigation water over time
3.	Compatibility of the project with surrounding developments	Responses were mixed but leaned towards "Yes." Respondents generally felt the irrigation project would fit well with existing agricultural activities and community structures including the existing water tank that does not have distribution lines
4.	Anticipated Positive Social and Environmental Impacts	Key positive impacts cited: job creation, increased income, improved food security and

S/No.	Topic / Aspect	Analysis of Responses
		agricultural productivity and general improvement of living standards,
5.	Anticipated Negative Social and Environmental Impacts	Some respondents were concerned that the excavation works may result to destruction of the roads. Reduced job opportunities for the local community if the contractor hires elsewhere. Some respondents felt there might be cases of unwanted pregnancies
6.	Community Suggestions for Mitigation Measures	The community suggested: prioritizing local labour, ensuring fair treatment and timely payment of workers, preserving vegetation proper restoration of trenches and barricades to avoid accidents especially at night, and providing training for farmers on irrigation and related technologies.
7	Additional Comments and Safeguards Recommendations	Respondents emphasized: need for training and education, business skills support, provision of quality seeds and protective gear, need for clear communication, and preference for using local labour so youth can benefit.

5.3.2 Public Consultation meeting

Consultative meeting- one consultative meetings was held on 20th May 2025 at Kihuyo Community grounds next to Kihuyo dispensary. At the same meeting the members were Forty-40 persons were present fifteen 16 -were females and twenty-five 24 - were males. The persons represented the seven zones of the water project. The attendance list of the persons annex 13 and the minutes of the participation annex 12. The second consultative meeting was during the AGM on 26th Jan 2025 where 123 (95m, 28F, least attached) attended. During the public participation meeting, stakeholders had a chance to interact with the proponent and the ESIA team. The meeting was attended by members who are also representatives of each zone. It was agreed that continuous engagement will be maintained, especially regarding the signing of agreements with owners of

affected individual parcels, through which members will extend their own water lines at their own cost via Memoranda of Understanding (MOUs).

Key issues raised and responses from the project are highlighted in Table 6.

Table 6 Outcome of Public Consultation meeting

S/No.	ISSUES RAISED	RESPONSES
1.	The community raised concerns regarding the distribution of labor during the implementation of the project.	The committee should be consulted in matters casual labour requirement The consultant to capture in the report that the contractor should engage community members as workers when necessary (Men, Women & Youth)
2.	The committee was tasked to ensure that the distributions lines will be located in the right areas /road reserves to ensure there are no conflicts on land and human displacements.	All the excavations will be along the road reserves. A provision for road crossing easements from the roads departments has already obtained (Men)
3.	The community inquired on the specific cost of the project as in the BoQ.	It was agreed that the committee will be issued with the revised BoQ for their perusal and reference. (Management)
4.	Upon project implementation the community should discuss on the most appropriate CSR to benefit the project area.	The Contractor to advice the most appropriate site for conducting CSR(Youth)
5.	It was recommended that community through the Sub-County Environmental and Agricultural officers should	An ESMP should consider all the possible impacts, mitigation measures and monitoring and evaluation to be carried out (Men)

	create awareness to the community on the most appropriate conservation method.	

5.3.3 Key Informant Interviews

The ESIA team also engaged/consulted key informants from County departments that might be affected by the proposed project. The concerns of the stakeholders are analyzed as highlighted on the table below

Table 7 Analysis of Stakeholder Comments

Organization	No. of representatives	Key concerns raised	Summary of responses
Local administration	2 administration officers	-collaboration between all members and beneficiaries from all the zones	-the proposed project has incorporated members from the all the zones. The members have been registered under the project. All the members and beneficiaries' lists have been documented for reference (in the design report).
Water and irrigation	2-Sub County Officers (environment and water)	-The sustainability of the project in terms of continuous water supply -The measures to be put in place in the management of the proposed water systems -The measures to be put in place in the management and	-The proposed project has conducted a Hydrological survey and design reports. From the report's findings have stipulated that the supply will be efficient with a number of prescribed measures such as water rationing, farming as per the stipulated acreage. - the ward has a Social Accountability and Integrity Committee (SAIC) is operational

		resolutions of water conflicts	to address any emerging issues raised
Occupation safety and health	1-DOSHS officer	-Measures to be put in place to barricade the Open trenches -PPEs	**-**warning signs to be erected in all open trenches refilling. -all trenches to be refilled to avoid any accidents -any person engaged during the project implementation should wear the most appropriate PPEs.
Agriculture department	**3-**Director, Sub County and Ward officers	**-**soil and water conservation -safe use of chemicals -Sustainable land management -climate smart agriculture	**-**Recommended structures to be in place -Adopt integrated pest management (IPM) -Adopt conservation agriculture technologies -adopt climate smart agricultural technologies
Project Beneficiaries	5 management committee members	Need for strict adherence to the approved designs Need for continuous involvement of the committee in project implementation	Commitment to implement the project as per the designs Pledge to engage all relevant stakeholders throughout the project cycle.
KFS	Nyeri County Forest Conservator and Chief Conservator of Forest	The Service has no objection to the water project however the officer has tasked for a site visit to verify the custody of the forest	-Detailed feedback to be provided on 16/2/2026 See Annex 18

		area for the construction of the sedimentation basin	
Total key informants consulted	**14**		

5.4.3 Acceptability of the Proposed Project

From the stakeholder consultation and public participation conducted as part of the ESIA process, it was determined that the proposed Kihuyo Water Project is broadly acceptable to the local community. Participants expressed support for the project, highlighting anticipated benefits such as:

- Employment creation during construction and operation phases
- Improved water supply for domestic use, irrigation, and livestock
- Enhanced agricultural productivity, including crops and livestock
- Enhanced food security and nutrition for households in the project area
- Capacity building and community engagement through involvement in project activities.

The feedback collected from stakeholders has been analyzed and incorporated into the ESIA findings and project design, ensuring that project planning reflects local priorities and concerns, consistent with World Bank ESS10.

No objections were raised against the implementation of the project, indicating strong community acceptance. Continuous engagement and transparent communication will be maintained throughout the project lifecycle to preserve this acceptability.

CHAPTER SIX: ANALYSIS OF PROJECT ALTERNATIVES

6.1 Introduction

This chapter presents an analysis of the feasible alternatives considered for the proposed Kihuyo Water Project, examining the environmental, technical, economic, and social implications of each. The evaluation aligns with the requirements of the EMCA (Cap. 387), EIA Regulations (LN 101/2003, as amended by LN 32/2019), and the World Bank's ESF, particularly ESS 1 on the assessment and management of environmental and social risks and impacts.

The analysis covers the alternatives related to site location, water source, technology and design, project scale and phasing, construction materials, waste management, and energy use. The "*No Project*" option is also examined to provide a comprehensive assessment of the possible development scenarios.

6.2 Alternative Project Site

The option of relocating the proposed project to a different site was considered during preliminary screening. However, the current site was selected following extensive community consultations, technical feasibility assessments, and confirmation of its strategic location relative to beneficiary settlements and existing water infrastructure. Relocating the project would exclude the intended beneficiaries and introduce additional costs related to land acquisition, hydrological studies, and new approvals. Consequently, the proposed site remains the most suitable and socially justified location for the sub-project.

6.3 The No Project Alternative

Selection of the "*No Project*" alternative would mean that the proposed project would not be implemented and the proposed project site would remain in its current state. While this option would avoid temporary environmental disturbances associated with construction, it would also perpetuate the prevailing water scarcity challenges, limit agricultural productivity, and constrain improvements in health and sanitation. The community would continue to depend on unreliable and often unsafe water sources. This alternative is therefore not considered viable, as the socio-economic and public health benefits of the project far outweigh the minimal environmental risks that can be effectively mitigated through proper planning and management.

6.4 Alternative Technology and Design Options

6.4.1 Alternative Intake Designs

Two options were examined for the intake design, as described below:

a) Intake with Sediment Basin (Proposed Option)

This option entails the construction of a sediment basin at the intake point to trap sediments from upstream before water enters the main supply line. This approach improves water quality, reduces sediment load in the system, and prolongs the lifespan of the pipeline, though it requires additional land and periodic maintenance to remove accumulated silt. This option was preferred due to its long-term operational and environmental benefits.

b) Intake without Sediment Basin

This option, construction of a simple intake structure without sediment-trapping features, would reduce initial construction costs and allow for faster implementation. However, it would lead to more frequent pipe blockages and higher maintenance costs over time. Given these trade-offs, the intake with a sediment basin is preferred for its operational efficiency and long-term sustainability.

6.4.2 Water Conveyance Alternatives

Two conveyance methods were assessed: a gravity-fed system and a pumped distribution system.

a) Gravity-fed Piping System (Proposed Option)

The gravity-fed design relies on the natural topography (the slope) to deliver water through a network of main and lateral pipes, minimizing operational costs, reducing energy use, and limiting the project's carbon footprint. The main drawback is that it requires optimal topography and alignment to maintain flow.

In view of the area's suitable gradient and the community's preference for low-maintenance infrastructure, the gravity-fed system is considered the most appropriate and sustainable option.

b) Pumped Irrigation System

Under this alternative, water is abstracted using pumps and then conveyed through pipes to farms. The main advantage of this alternative is that it can overcome topographical challenges and reach distant farms. The main drawbacks are due to high energy costs, frequent maintenance, potential for noise pollution and emissions especially when diesel run pumps are used.

6.5 Alternative Water Sources

6.5.1 Rainwater Harvesting

Rainwater harvesting was examined as an alternative water supply method. The system would involve rooftop catchments (metal or tile roofs preferred); gutters and downspouts with first flush diverter; storage tanks (above or underground); filtration unit; distribution system (gravity-fed or pumped). The benefits of rain water harvesting include: reduces dependency on groundwater or surface water; mitigates flood risk and soil erosion and low operational cost.

Although effective at household level, rainwater harvesting cannot meet the scale and reliability requirements of the proposed community water supply. Its dependence on seasonal rainfall and limited storage capacity renders it inadequate as a primary source. It is, however, recommended as a supplementary measure for households and public institutions within the project area.

6.5.2 Other Sources: Surface and Groundwater

Other potential water sources were considered, including nearby streams, springs, and groundwater abstraction through boreholes. Groundwater abstraction was found less favorable due to the depth of aquifers, topography, potential salinity, and high energy and maintenance costs associated with pumping. The selected option (abstraction from Nyameru River) was identified as the most viable based on its adequate yield, water quality, accessibility, and compatibility with gravity conveyance. It offers the most sustainable and technically feasible supply option for the project.

6.6 Alternative Project Scale and Phasing

The possibility of implementing the project in phases, beginning with limited-service coverage, was also explored. While this approach could reduce initial financial outlays, it would increase per-unit construction costs, complicate future system integration, and delay the realization of project benefits. Implementing the project at the designed full scale ensures efficiency, equitable access, and timely delivery of benefits to the community. The full-scale approach is thus retained as the most practical and cost-effective.

6.7 Alternative Construction Materials and Methods

Various materials were assessed for use in the construction of the water conveyance system. High-Density Polyethylene (HDPE) pipes were selected over Polyvinyl Chloride (PVC) pipes and galvanized steel due to their durability, flexibility, resistance to corrosion, and lower environmental footprint. Construction materials such as sand, gravel, and masonry will be sourced locally to minimize transportation impacts and support local livelihoods. Environmentally sensitive construction practices, including controlled excavation, site restoration, and dust suppression, will be applied to minimize disturbance during implementation.

6.8 Waste Management Options

Construction activities are expected to generate solid waste, including excavated materials, packaging, and metal scraps. Alternatives for managing these wastes include on-site disposal, off-site disposal at approved facilities, and reuse or recycling of materials. The preferred approach emphasizes waste minimization, segregation, reuse of excavated soil, and proper disposal of non-recyclables through licensed service providers in compliance with the EMCA (Waste Management) Regulations, 2006.

This approach ensures environmental protection and aligns with best practices for sustainable construction.

6.9 Alternative Energy Sources

Although the project primarily utilizes gravity flow, limited energy requirements may arise during construction or operation of auxiliary facilities. Energy options assessed include grid electricity, diesel generators, and solar systems. Solar energy was identified as the most sustainable and cost-effective option, offering clean and renewable power with minimal greenhouse gas emissions and low operational costs. This aligns with national energy policy and World Bank climate co-benefit objectives.

6.10 Preferred Alternative and Conclusion

Following a comprehensive evaluation of all feasible options, the combination of a gravity-fed system and sediment basin at the intake as the most technically feasible, environmentally sustainable, and socially acceptable design. Complementary use of HDPE materials, solar power for auxiliary needs, and sustainable waste management practices further enhance the project's environmental performance.

This configuration minimizes energy consumption, reduces sedimentation, and ensures long-term system reliability while supporting Kenya's objectives for sustainable water resource management. The "*No Project*" alternative remains undesirable as it would perpetuate water scarcity and limit community development opportunities.

In conclusion, the selected design provides the optimal balance between technical viability, cost efficiency, environmental protection, and community benefit, and is therefore recommended for implementation as the preferred alternative under the proposed Kihuyo Water Project.

CHAPTER 7: ANALYSIS OF POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS AND MITIGATION MEASURES

7.1 Introduction

This chapter discusses the potential positive and negative environmental and social impacts and mitigation measures for the potential negative impacts for the three project phases i.e. construction, operational and decommissioning Phases.

7.2 Construction phase

7.2.1 Potential Positive Impacts

a) Creation of Employment Opportunities to the Community

The proposed project activities are expected to provide short term employment opportunities to the host community. The proposed pipeline works for the irrigation project will create employment opportunities for both skilled and unskilled workers. This will be beneficial both from the economic and social point of view. Economically, people employed will earn income which will improve their livelihoods and those of their families. Socially, the workers who will be engaged in productive employment will translate into reduced social ills at the same time fostering healthy interaction thus social integration.

b) New Business Opportunities for the Host Community

In the construction phase the local community will benefit from supply of essential items to the workers on site such as foodstuffs and construction material. This will contribute to increased household income. Farmers with farm produce will particularly benefit from the new market created for them during the construction stage. Market will be created for local transporters who will get the opportunity to ferry construction materials to the site and for the vehicle fuel filling stations that will get the business opportunity to sell fuel to vehicles and for machinery attached to the construction.

c) Increased Household Income

Beside household income obtained from the local supply of foodstuffs and construction materials the proposed project will also benefit households with a diversified source of income

d) Improved collection of government revenue

The supply of construction materials to the project and fuel will contribute revenue to the county and national government in form of VAT, Cess, fuel levies among others.

e) Market for Construction Materials

The construction works will provide ready market for locally available construction materials such as cement, sand, timber, and steel, building stones and fencing materials. This will result in a boost in the local economy.

7.2.2 Potential Negative Impacts and Mitigation measures

a) Soil Erosion and Soil Quality Degradation

Construction activities may be associated with machines (excavator) have the potential to loosen soils as a result of removal of vegetation and excavations. Disposal of excavated and other construction wastes may also result in soil degradation in the neighborhoods.

Mitigation Measures:

- Site clearing to commence only when the contractor is ready to undertake excavation and clearing should be minimal
- Implement soil conservation structures on erosion-prone areas to control soil movement.
- Excavated materials not reusable are not disposed on productive land that may result in degradation.
- Vehicles supplying materials to use marked routes to prevent loosening the soil.
- Proper backfilling of the trenches
- Re-vegetation of the excavated areas
- Install appropriate drainage systems to manage surface runoff.

b) Air Pollution (dust and exhaust emissions)

The construction activities will result to increased dust and gas emissions. Dust particles caused by vibrations of machines and vehicle movement suspends in the air. In addition, vehicles/trucks and machinery used in the construction will produce fumes that will affect the quality of air.

Sensitive receptors: workers onsite, local residents (homesteads, market centers, learning institutions, and places of worship).

Proposed Mitigation Measures

- Sprinkle water on exposed surfaces and access roads.
- Limit vehicle speeds to reduce dust dispersion.
- Cover trucks transporting friable materials.
- Provide appropriate PPE such as nose masks/respirators to exposed workers.
- Regular and prompt maintenance of construction machinery and equipment. This will minimize fuel consumption and emissions.
- Avoid unnecessary idling and schedule efficient equipment use.
- Use low-emission machinery where feasible.

- Monitor air quality in high traffic or machinery intensive areas.
- Workers should be encouraged to go for regular health check-ups for respiratory monitoring.

c) Noise and Excess Vibrations

The proposed project is likely result in noise emission as a result of machines such as excavators and rollers used on site during construction. Noise could impact negatively on the workers involved in the construction work. Noise can also be a nuisance to the local community near the site

Mitigation Measures

- Contractor to ensure the use of well-maintained machinery/equipment and vehicles
- All construction works to be limited to daytime only; 08:00am to 5:00pm
- Sensitize drivers and machinery operators to switch off engines when vehicles and machinery when not in use.
- Provide appropriate PPE such as earmuffs and earplugs, to workers operating noisy machinery or working in high-noise areas.
- Machinery and equipment should be maintained regularly to reduce noise resulting from friction or malfunctions.
- Where feasible, employ manual labour to minimize machinery noise.
- Sensitize workers on the importance of noise control and proper use of PPE.

d) Disturbance of Vegetation and Loss of Biodiversity

The pipeline excavation activities will require site clearing in preparation for construction. Some of the existing, shrubs and grasses will be lost. This will consequently affect the fauna species onsite and the neighborhood. This impact will however be of minimal significance since the site area in is not vast and there exists similar vegetation on adjacent undisturbed parcels of land.

Mitigation Measures

- Limit clearly strictly to the areas required for construction.
- Rehabilitate cleared areas post-construction using native plant species.
- Control vehicles and machinery movement to avoid inadvertent disturbance.
- Implement riverbank stabilization measures (e.g gabions, stone pitching, bamboo planting).
- Avoid instream works during critical periods for local species.
- Monitor riparian habitats during and after construction to address unintended disturbance.

e) Generation of Solid Waste and Excavated material

During construction, the project will generate various forms of solid waste, including excavated soils, packaging materials, timber offcuts, broken pipes, and domestic waste from workers. Improper management of these materials can result in soil contamination, obstruction of drainage systems, sedimentation of watercourses, and general environmental degradation. Similarly, excavated or spoil material, if not properly handled, may contribute to erosion, dust emissions, and blockages of drainage channels, with potential downstream impacts.

Proposed Mitigation Measures

- Prepare and implement a construction WMP as part of the C-ESMP, in line with NEMA requirements and WB ESS1. The plan should cover waste minimization, segregation, storage, collection, transportation, and disposal.
- The wastes should be properly segregated at source into reusable, recyclable and non-recyclable streams, providing clearly labelled waste receptacles on site.
- Stockpile spoil and excavated material only in designated areas away from drains, watercourses, and community areas. Stabilize or cover spoil piles to prevent erosion, dust generation, and runoff.
- Reuse suitable spoil for backfilling, landscaping, or other construction purposes wherever feasible.
- Transport excess waste and spoil to NEMA-approved disposal sites, ensuring proper documentation of movement and disposal.
- Prohibit open burning and indiscriminate dumping of construction waste on-site or in surrounding areas.
- Implement site grading and drainage to manage runoff from spoil piles and prevent sedimentation of nearby drains or watercourses.
- Conduct awareness and training sessions for workers on proper waste handling, spill response, and environmental protection.
- Maintain records of all waste and spoil generation, storage, reuse, and disposal for auditing purposes and compliance with regulatory requirements.

Construction runoff water pollution

During construction there will be risk of runoff pollution from the construction site. This can result from washing of construction equipment along the water courses, lack of silt traps at the construction and also construction during the rainy season.

Mitigation measures

- Ensure proper storage of fuels/chemicals in bunded areas away from water.

- Carry out regular Monitoring of the stream/river water quality.
- Install silt traps, sediment fences, bunds around excavation.
- Prevent washing of construction equipment's into watercourses
- Schedule construction to avoid heavy rains especially in the park.

Land / Soil Contamination (Oil and Grease Spills)

During construction, the project will use forms of oils (vehicles) and grease, during these activities there might be spillages of the same. Improper management of these materials can result in soil/land contamination, obstruction, pollution of water and general environmental degradation. Similarly, excavated or spoil material, if not properly handled, may contribute to water pollution, soil contamination with potential downstream impacts.

Proposed Mitigation Measures

- Carry out regular inspection and maintenance of machinery;
- Ensure that all the fuels and oils are well stored in bunded areas
- Carry out maintenance in service bays; clean spills promptly.
- Carry out regular training of the site workers on safe handling of fuels and chemicals

f) Occupational Health and Safety (workers)

Construction workers are exposed to dust, noise, machinery accidents, and musculoskeletal strain from lifting heavy equipment. Without proper management, these hazards may lead to injuries, illness, or fatalities.

Sensitive Receptors: Construction workers on-site, especially labourers involved in trenching, material handling, and machinery operation.

Proposed Mitigation Measures

- Register the site with DOSHS and ensure all workers are provided with appropriate PPE (helmets, gloves, safety boots, ear and eye protection) according to their tasks.
- Conduct regular toolbox talks and regular OHS training for all workers.
- Equip the site with a fully stocked first aid kit (as per the First Aid Rules, 1977) at all times and managed by qualified and trained first aid personnel.
- Develop and implement an ERP for incidents such as fire outbreaks, oil spills and accidents.
- Restrict site access to authorized personnel only.
- Ensure all workers have insurance and workmen's compensation.

- Facilitate the formation of a Safety and Health Committee, if workforce exceeds 20, in accordance with the Health and Safety Committees Rules, 2004.
- Conduct medical examination of workers as required by national laws.

  Inspect, maintain, and repair all vehicles, machinery, and equipment regularly; ensure machine operators are trained on safe operation. Maintain accidents and incidents records on site and implement a worker grievance mechanism for safety concerns.

- Maintain accidents and incidents records on site and implement a worker-GRM for safety concerns.

g) Increased risk of child labour and school dropout

The construction phase may create perceived economic opportunities for local households, potentially leading to the use of children in the production or sale of goods and services to the workforce. Furthermore, the demand for casual labor for pipeline excavation may entice older students to abandon school for immediate daily wages.

Proposed Mitigation measures:

To ensure full compliance with ESS 2 and ESS 4, the Proponent and Contractor shall implement the following:

- The Contractor must maintain a mandatory Labour Register. No person under the age of 18 shall be employed in any capacity. Age must be verified using National Identity Cards or original Birth Certificates prior to hiring.
- Specific clauses prohibiting the use of child labour must be inserted into the Contractor's Environmental and Social Management Plan (C-ESMP), with heavy penalties or contract termination for non-compliance.
- The Proponent shall conduct targeted awareness sessions for the 1,000 beneficiary households regarding the long-term value of education versus short-term labour gains and the legal consequences of child labor under the Societies Rules and Irrigation Act.
- All workers, including those from the community, must sign a mandatory Code of Conduct that explicitly prohibits the solicitation of goods/services from children and forbids the presence of children at construction sites.
- The PMC and local administration (Area Chief) shall conduct unannounced site inspections of the 15.8 km corridor to ensure no children are engaged in hawking or labour.

h) Risk of Accidents (traffic related)

The laying of irrigation pipelines along existing road reserves is likely to temporarily disrupt traffic flow during construction. Movement of construction vehicles, excavation works, and partial road closures may cause traffic congestion, slow movement, and inconvenience to road users. There is also an increased risk of road accidents involving workers, pedestrians, and motorists due to the presence of open trenches, machinery, and inadequate signage or traffic control.

Proposed Mitigation Measures

- Prepare and implement a Traffic Management Plan (TMP) covering all construction access routes, internal roads, and delivery schedules.
- Restrict vehicle speeds within the construction site and on nearby roads.
- Erect clearly visible warning signs, barriers, and flag persons at high-traffic or crossing points to alert and guide road users.
- Provide high visibility PPE such as vests and jackets, for all workers exposed to traffic.
- Schedule deliveries and heavy vehicle movements outside peak community activity hours to reduce interaction with residents and school children.
- Train all drivers and machinery operators on road safety, signaling, and defensive driving.
- Ensure adequate lighting and reflective markings on vehicles operating during low-light conditions.
- Ensure all machinery and vehicles are roadworthy and operated by licensed drivers.
- Restore road surfaces and remove debris immediately after completion of works.
- Establish a reporting and monitoring system for near-misses and traffic incidents, with corrective actions implemented immediately.
- Establish a reporting and monitoring system for near-misses and traffic incidents, with corrective actions implemented immediately.

i) Community Health and Safety Risks

Disturbances During construction, community members may be exposed to health and safety hazards, including noise, vibration, dust, open trenches, and the movement of construction vehicles and machinery. These risks can lead to injuries, stress, or other adverse effects if not properly managed.

Proposed Mitigation Measures

- Conduct all construction activities during daylight hours (8.00 am to 5.00 pm) to minimize community disturbance.

- Erect temporary notice boards or signage at strategic locations to inform the community of ongoing works, expected timelines, and potential hazards.
- Clearly mark and secure trenches and excavated areas with safety tapes, barriers, or cones.
- Provide visible warning signs, barriers, and signals at key access points to prevent accidents involving the community.
- Avoid trenching during the wet season and promptly backfill trenches after laying water pipelines.
- Carry out public health and safety awareness campaigns in nearby settlements to educate residents on site hazards, safe movement around construction areas, and pipeline trenching activities.
- Inform the community in advance of any temporary road closures and provide clear, visible signage to guide road users.
- Promptly fill excavated depressions to prevent the formation of stagnant water pools, which may serve as disease vectors.
- Promote awareness of the project grievance redress mechanism to enable community members to report concerns or incidents safely.

j) Non-Responsible Sourcing of Natural Resources

The construction of the project requires significant quantities of bulk materials, including sand, ballast, timber, and construction water. The demand for these resources, if sourced from unpermitted quarries, illegal timber harvesters, or unapproved water abstraction points, poses a risk of localized environmental degradation (e.g., habitat loss, accelerated erosion, riverbank instability, and water scarcity conflicts). To mitigate this risk, all materials must be procured exclusively from legally licensed and permitted suppliers.

Proposed Mitigation Measures

- The Contractor shall procure all bulk natural resources (sand, ballast, timber, water) exclusively from suppliers who possess valid operating licenses and permits issued by the relevant national or county authorities (NEMA, WRA, KFS, KWS etc.).
- Prior to any procurement, the Contractor must submit proof of the supplier's legal operating status to the Supervising Engineer and the County Safeguards Team for verification.
- Specifically, the Contractor must obtain and maintain:

- Valid licenses/permits from NEMA/County authorities for all quarrying sites supplying sand and ballast.
- Legal documentation proving sustainable sourcing of timber (where applicable).
- A valid WRA Permit or licensed vendor documentation for the abstraction or supply of construction water.

- The Contractor will implement a tracking system to record the volume and source location of all materials used to ensure compliance and traceability

k) Chance Finds / Cultural Heritage

Excavation and earthworks may uncover archaeological, historical, or culturally significant materials. Disturbance or removal of such finds can result in loss of heritage and non-compliance with national legislation and World Bank ESS8 - Cultural Heritage.

Proposed Mitigation Measures

- Develop and implement a Chance Finds Procedure aligned with national laws and ESS8.
- Immediately halt construction and notify relevant authorities if cultural heritage materials are discovered.
- Train construction workers to identify and report potential cultural artifacts.
- Ensure that any recovered artifacts are handled, documented, and conserved according to legal and professional standards

l) Sexual Exploitation and Abuse (Community-Focused)

Community members, particularly women and girls, may be vulnerable to sexual exploitation or abuse by project workers if safeguards are not implemented. SEA risk can arise from insufficient awareness, lack of monitoring, or inaccessible reporting mechanisms.

Proposed Mitigation measures

- Implement a SEA Action Plan aligned with the World Bank Good Practice Note on GBV.
- Enforce Codes of Conduct for all project personnel, with ongoing sensitization on SEA prohibitions and consequences of violations.
- Establish a community GRM: confidential, survivor-centered complaint channels accessible to all community members.
- Provide referral pathways, psychosocial support, and case management for survivors.

- Integrate SEA responsibilities to staff contracts, performance appraisals, and training programs.

m) Sexual Harassment (Worker Focused)

Workplace sexual harassment may occur among project staff if human resource policies are weak or poorly enforced. This can create a hostile work environment, reduce productivity, and potentially compromise safety.

Proposed Mitigation Measures

- Implement robust HR policies aligned with national law and best practice practices.
- Integrate SH provisions into worker CoC, specifying expected behaviour and reporting mechanisms.
- Conduct training for staff on appropriate workplace behavior and reporting mechanisms.
- Establish a worker-GRM: confidential complaint channels for employees, including escalation procedures and protection from retaliation.

n) Gender-Based Violence (Community and Worker-Focused)

Project activities, including employment and compensation schemes, may heighten GBV risk both in the workforce and the surrounding community.

Proposed Mitigation Measures

- Conduct proactive community engagement, particularly with women and vulnerable groups, to identify GBV risk points.
- Review project components (e.g., compensation or employment practices) to mitigate triggers.
- Implement specific mitigation plans for identified GBV risks.
- Ensure referral mechanisms and psychosocial support services are available for both community members and workers affected by GBV.
- Maintain separate GRMs for community and workforce complaints, ensuring confidentiality and survivor-centered handling.

o) Risk of Increased Sexually Transmitted Infections (Community and Workers)

The influx of workers during construction may expose individuals to communicable diseases, including HIV and AIDS and other STIs.

Proposed Mitigation Measures

- Conduct awareness campaigns and workshops for workers and the community on HIV and AIDS, STIs, and general communicable disease prevention.
- Provide condoms and promote safe sexual practices.
- Include health monitoring and preventive measures in the Contractor's Health and Safety Plan.

7.3 Operation Phase

7.3.1 Positive impacts

a) **Food Security**

Once the project is implemented, food production is expected to rise significantly. This will enhance food security at both household and national levels. The cultivation of diverse crops will improve nutrition for local communities, contributing to better long-term health outcomes.

b) **Economic Growth**

The irrigation initiative aims to boost crop yields, minimize losses, and expand arable land, enabling year-round farming. Higher agricultural output will stimulate economic growth by increasing farm sales. With more produce and agricultural supplies available in markets, poverty levels are likely to decline. Enhanced farming revenue will benefit local farmers, spur market growth, reduce poverty, strengthen food security, and elevate living standards in the project regions.

c) **Employment Opportunities**

The project will generate direct employment for farmers and indirect jobs through product distribution, improving livelihoods with steady income. During construction, local employment opportunities will rise, providing both direct and indirect economic benefits to the country.

d) **Infrastructure Development**

The irrigation project will also drive infrastructure improvements, including road expansions, market growth, and the development of recreational facilities.

e) **Skills Development**

To ensure project success, farmers will receive training from extension officers on water management and crop cultivation techniques. Capacity-building initiatives will help disseminate knowledge, while

skilled professionals will be employed to enhance farmers' expertise in adopting best practices. This will *equip farmers with essential skills to maximize productivity.*

f) Reliable Water Supply and Agricultural Productivity

A consistent and reliable water supply for irrigation and domestic use will enhance agricultural output, increase fodder and crop production, and support livestock management.

Enhancement Measures: Provide training and extension services to farmers on efficient water use, modern irrigation techniques, and sustainable crop management to maximize productivity and resource efficiency

g) Strengthening Community Resilience

Water availability contributes to long-term community resilience against climate variability, drought, and food insecurity.

Enhancement Measures: Encourage community-managed water governance structures to ensure equitable access and sustainable use.

7.3.2**Potential Negative Impacts and Mitigation Measures**

The operations phase of Kihuyo Project will focus on irrigation management, farm-level water use, and engagement with the project's registered water users. While these activities are critical for improving agricultural productivity and livelihoods, they can also give rise to several potential negative impacts if not properly managed. The expected negative impacts, along with mitigation measures, are described below.

a) **Gender-Based Violence and Sexual Exploitation and Abuse (Community**)

Women youth, and vulnerable households may face GBV or SEA due to power imbalances, inequitable access to irrigation resources, or increased interaction with project staff. Such incidents could lead to physical, emotional, and economic harm, undermine trust in the project, reduce participation in irrigation schemes, and exacerbate existing social inequalities.

Proposed Mitigation Measures

- Conduct community awareness and sensitization campaigns on GBV/SEA and reporting mechanisms.
- Establish a confidential, survivor-centered community GRM guided by the NAVCDP GRM framework but tailored to local context, with clear escalation pathways.
- Provide psychosocial support and referral services through established County or partner institutions.

- Promote women's participation in water management committees to enhance decision-making power.
- Conduct targeted gender-sensitive training sessions for women at household and farm level on crop production, climate-smart agriculture, and financial management.
- Track women's engagement and decision-making in project activities through gender-responsive M&E to guide adaptive management.

Supporting activities include baseline gender analysis, targeted workshops, and periodic reporting on participation metrics.

b) Sexual Harassment (Workers)

Project workers may experience workplace sexual harassment if behavioural standards and reporting mechanisms are weak.

Proposed Mitigation Measures

- Integrate explicit SH prohibitions within worker CoC consistent with national labour laws and World Bank ESS2.
- Ensure all staff sign the CoC prior to engagement and are briefed on consequences of non-compliance.
- Conduct mandatory training and refresher on professional conduct and reporting.
- Implement the NAVCDP worker-GRM framework, tailored for the subproject, to ensure confidential and safe reporting channels with protection from retaliation.
- Designate a trained Gender/GBV focal point within the project team.
- Enforce disciplinary action for confirmed SH incidents.
- Periodically monitor workplace culture and grievance trends through staff surveys and GRM reports to identify risks early.

c) Gender Disparities and Social Inclusion

Without targeted actions, benefits from irrigation may not be equitably shared, limiting participation of women, youth, and marginalized households.

Proposed Mitigation Measures

- Mainstream gender and inclusion principles in all operational activities to ensure equitable access to water, training, and governance.

- Ensure 30-45 % representation of women, youth, and vulnerable groups in Kihuyo Water Project's management and related committees.
- Conduct gender-responsive capacity building on irrigation management, leadership, financial literacy, and resource planning.
- Provide targeted agricultural support and inputs (e.g., seeds, tools, irrigation equipment) to women- and youth-led households.
- Establish transparent benefit-sharing mechanisms with clear communication on water allocation, tariffs, and maintenance obligations.
- Track participation and benefits using sex-disaggregated data and inclusion indicators.
- Engage local leadership and the project's management / governance structures to address potential exclusion, discrimination, or elite capture of project benefits.

d) Theft, Vandalism and Damage to Infrastructure

The project's distributed assets (pipelines, valves, storage facilities) are vulnerable to theft or vandalism, which can interrupt water supply and lead to disputes. This risk is compounded by the exposure of the 225m^3 masonry distribution tank, which is along the buffer zone of the park making it susceptible to external damage and unauthorized access.

Proposed Mitigation Measures

- Strengthen community awareness and ownership through continuous engagement led by by the PMC.
- Develop a community-based monitoring and reporting system.
- Incorporate security features (lockable valve chambers, tamper-proof meters, and signage) during installation and rehabilitation.
- Develop and implement a detailed OSSP detailing strict protocols for regular inspection, maintenance, and securing all permanent structures, with specific attention given to the high-risk location of the 225m^3 masonry distribution tank.
- Ensure grievance redress mechanisms are accessible for reporting theft or disputes.

e) Water Use Conflicts and Governance Risks

Inequitable water distribution or unclear allocation schedules may create disputes between users.

Potential Mitigation Measures

- Establish transparent water-allocation plans and water users' by-laws.
- Convene periodic stakeholder forums for scheduling and dispute resolution.

- Train the PMC in mediation and document all allocation decisions.

f) Occupation Health and Safety Risks (Workers)

Project staff and contracted workers involved in irrigation infrastructure maintenance, water distribution, or administrative functions may face various occupational hazards, including physical injuries from slips, falls, and accidents during maintenance.

Proposed Mitigation Measures

- Regular OHS training and refresher courses for all operational and maintenance workers, including safe work procedures, equipment handling, and emergency preparedness.
- Conduct task-specific risk assessments before undertaking any maintenance or repair activities to identify hazards and preventive controls.
- Provide and enforce the proper use of PPE such as helmets, gloves, boots, reflective jackets, hearing protection, and eye shields, as per OSHA 2007.
- Maintain clean, dry and unobstructed work areas to minimize slips and falls, particularly in offices, pumping stations and maintenance yards.
- Ensure first aid kits are available and adequately stocked at all operation sites, with at least one trained first aider per shift.
- Prepare and regularly update ERPs for the operational phase. These protocols must specifically address procedures for rapid and safe response to pipeline failures (e.g., bursts, major leaks, washouts) to minimize property damage and prevent injury.
- Conduct routine medical examination for maintenance personnel as required by the Medical Examinations Rules of 2005.
- Where the workforce exceeds 20, facilitate formation of a safety and health committee.
- Carry out regular safety audits and workplace inspections to ensure compliance.
- Maintain an incident register and investigate all reported cases or near misses.

g) Public Health and Waterborne Disease Risks

Stagnant irrigation water may promote mosquito or snail breeding, leading to malaria or bilharzia outbreaks.

Proposed Mitigation Measures

- Maintain proper drainage and remove stagnant pools.
- Promote hygiene and sanitation awareness.
- Collaborate with County Public Health offices for surveillance and vector control.
- Encourage household use of mosquito nets and clean canal surroundings.

h) Soil Erosion and Land Degradation

During the operational phase, irrigation and cultivation on sloping land may accelerate soil erosion, particularly where vegetation cover is inadequate or conservation measures are weak. This may lead to loss of topsoil, siltation of canals and storage tanks, reduced soil fertility, and long-term land degradation, undermining both agricultural productivity and infrastructure sustainability.

Proposed Mitigation Measures

- Establish soil and water conservation structures such as "*Fanya Juu* / *Fanya Chini*" terraces, contour bunds, grass strips, and hedgerows and gabions where necessary
- Encourage contour ploughing and planting along contour lines to reduce surface runoff.
- Promote vegetative cover and agroforestry to stabilize soils and enhance moisture retention.
- Regularly monitor erosion-prone areas and implement corrective measures.
- Provide training through extension officers on land husbandry and conservation agriculture techniques.

i) Soil Degradation and Pollution

Improper irrigation practices, overuse of fertilizers and pesticides, and inadequate drainage may cause soil degradation and contamination. These can result in nutrient depletion, salinization, and pollution of nearby water bodies through agrochemical runoff, reducing soil fertility and posing risks to human and ecosystem health.

Proposed Mitigation Measures

- Promote integrated soil fertility management (ISFM), including contour ploughing, mulching, crop rotation, and use of organic manure to maintain soil structure and fertility.
- Ensure appropriate irrigation scheduling and soil moisture monitoring to prevent over-irrigation and waterlogging.
- Train farmers on safe handling, application, and disposal of agrochemicals in accordance with NEMA and Pest Control Products Board guidelines.
- Encourage periodic soil testing to guide fertilizer application and maintain nutrient balance.
- Establish and maintain drainage systems within the irrigated areas to prevent salinity buildup and stagnation.
- Establish buffer strips and vegetation along waterways to filter runoff.

- Integrate soil and water quality monitoring into the routine operations of the PMC.

j) Water Pollution and Contamination Risks

Water quality within the Kihuyo scheme and downstream areas may be affected by runoff carrying sediments, fertilizers, pesticides, or oil residues from irrigation equipment and vehicles. Inadequate chemical storage or accidental spills could also contaminate surface and groundwater sources, affecting domestic users, livestock, and aquatic life. Without proper mitigation, such pollution can degrade ecosystem health and reduce the safety and reliability of water resources for the community.

Proposed Mitigation Measures

- Train farmers and irrigation operators on safe handling, mixing, and application of agrochemicals, and encourage use of environmentally friendly alternatives where feasible.
- Provide designated, bunded chemical storage areas away from water bodies to prevent accidental leaks and spills.
- Develop and enforce buffer zones between irrigation plots and natural watercourses.
- Promote integrated pest management (IPM) to minimize dependence on chemical pesticides.
- Ensure all fuels, lubricants, and oils are stored and handled in line with NEMA and county regulations.
- In case of contamination, scoop and dispose of polluted soils in approved disposal sites and report incidents to NEMA and relevant authorities.
- Conduct periodic water quality monitoring (e.g., turbidity, pH, nitrates, phosphates) to detect pollution trends and guide adaptive management.

k) Inefficient Water Use and Resource Over-Extraction

During the operational phase of the project, there is a risk of inefficient or excessive water use among farmers and community members benefiting from the irrigation system. Low awareness of efficient irrigation practices, inadequate scheduling, and lack of maintenance of water distribution infrastructure can result in water wastage, over-abstraction from the source, and reduced availability for downstream users. Over time, such inefficiencies may contribute to conflicts among users, decreased water pressure, and long-term stress on the watershed and associated ecosystems. If unaddressed, this could undermine the sustainability of both the irrigation scheme and community livelihoods that depend on it.

Proposed Mitigation Measures

- Conduct regular community training and awareness programs on efficient water use, irrigation scheduling, and climate-smart farming practices
- Promote water-saving irrigation technologies such as drip and sprinkler systems where feasible.
- Strengthen the capacity of the PMC to enforce equitable water distribution schedules, usage quotas, and penalties for overuse.
- Install master meters and sectional metres to monitor water use both at source and farm level, with records maintained by the PMC.
- Undertake periodic leak detection, pipeline maintenance, and prompt repair of damaged infrastructure to prevent unnecessary losses.
- Encourage the use of rain water harvesting and storage tanks to supplement irrigation water during dry seasons.
- Incorporate water-use efficiency indicators within the project's Monitoring and Evaluation (M&E) framework, linked to the Water Users' reporting, to ensure sustainability and compliance with water management plans.
- Encourage collection of spilled water in a reservoir for use in establishment of community - managed tree nurseries.

l) Solid Waste Generation and Management

The project's operation and maintenance phase will generate diverse solid waste, including general materials like scrap metal, plastics, and office refuse, in addition to potentially hazardous streams such as contaminated rags and chemical containers. Improper disposal of this waste stream, generated during pipe replacement and administrative works, is a significant environmental risk, leading to contamination, drainage blockage, and visual pollution. These impacts are of particular concern due to the proximity of sensitive receptors, including local settlements, schools, and the riparian areas along the Nyameru River.

Proposed Mitigation Measures

- Implement an integrated solid waste management (ISWM) approach emphasizing waste minimization, segregation, recycling, and safe disposal.
- Segregate waste at source into recyclable, reusable, and non-recyclable streams categories using labelled containers at offices, storage areas, and work sites.

- Engage NEMA-licensed waste handlers for transport and disposal of non-recyclable and hazardous waste at approved facilities.
- Promote reuse or recycling of of salvageable materials (e.g., metal offcuts, old pipes, timber) through partnerships with local recyclers.
- Maintain a waste register and disposal records to ensure traceability and compliance with national waste management practices.
- Conduct periodic training and awareness sessions for the project's registered members, operators, and community workers on proper waste management practices.
- Include solid waste performance indicators in the project's monitoring plan, such as volume of waste recycled, safely disposed, or diverted from dumpsites.

m) Biodiversity and Ecosystem Disturbance

Operation of the irrigation scheme may alter natural water flows and affect aquatic habitats, wetlands, and riparian vegetation. Runoff carrying sediments or agrochemicals could degrade water quality and disturb fish, amphibians, and pollinators. Clearing of vegetation for canals or farmland may also fragment habitats and reduce biodiversity if unmanaged.

Proposed Mitigation Measures

- Maintain riparian buffer zones with native vegetation to stabilize banks and filter runoff.
- Prevent discharge of polluted or sediment-laden water into rivers and wetlands.
- Apply IPM and reduce use of chemical pesticides.
- Avoid expansion of cultivation into wetlands or other sensitive areas.
- Periodically monitor key species and vegetation cover around irrigation areas.
- Conduct community awareness programs on conservation and sustainable land use.

n) Energy Use and Greenhouse Gas Emissions

Continuous operation of irrigation pumps and water distribution systems may increase energy use and GHG emissions, particularly where diesel or grid electricity is used. Inefficient equipment or poor maintenance can raise operational costs and the project's carbon footprint.

Proposed Mitigation Measures

- Maintain pumps and equipment regularly to improve efficiency.
- Promote solar-powered or other energy-efficient pumping systems where feasible.
- Schedule pumping to reduce unnecessary operation and energy wastage.
- Track energy consumption and emissions through project M&E.

- Train operators on energy-efficient irrigation practices

o) Community and water conflicts

During operations conflicts may stem from upstream farmers hoarding water, causing tail-end scarcity and sabotage; broken rotation schedules and; refusal to collaborate during maintenance, low payments of the operational and maintenance fees crop-type competition (coffee vs. horticulture).

Proposed mitigation measures

- Strengthen Water Users Associations with gender-integrated committees, rotate water bailiffs, and publish transparent rotation rosters.
- Community-based conflict resolution using the existing GRM committee
- Encourage Agricultural demand management through Promotion drought-tolerant crops, mulching, and in-situ water harvesting to reduce irrigation frequency and ease pressure on the rotation schedule.

7.4 Project Decommissioning Phase

At the end of the project's operational life, the Kihuyo Water Project may undergo decommissioning, involving dismantling of structures, removal of pipelines and fittings, and rehabilitation of the affected areas. This process will aim to restore the site to an environmentally stable and socially acceptable condition while ensuring compliance with national environmental regulations and World Bank ESS.

Decommissioning activities, though limited in duration, will generate both positive and negative environmental and social impacts. The positive impacts relate mainly to short-term employment and material recovery, while the negative ones arise from demolition waste, dust emissions, noise, and occupational safety risks. These impacts and corresponding enhancement and mitigation measures are discussed below.

7.4.1 Potential Positive Impacts and Enhancement Measures

a) Short-Term Employment and Livelihood Opportunities

Decommissioning activities will require both skilled and unskilled labour for demolition, segregation, transport and restoration. This will provide temporary income and employment to local workers, particularly the youth.

Enhancement Measures

- Prioritize local hiring with gender inclusion.

- Offer short technical induction on safe demolition and waste management practices.
- Ensure fair labor conditions consistent with ESS2.

b) Material Recovery and Reuse

Demolition will generate recoverable materials such as pipes, fittings, timber, and scrap metal. Reuse or recycling of these materials will reduce waste volumes and resource demand.

Enhancement Measures

- Segregate materials at source to identify those suitable for reuse or recycling.
- Donate reusable materials to local community institutions where appropriate, ensuring transparency and record-keeping.
- Contract licensed recyclers for metal and plastic components.

c) Support to Transport Service Sector

Haulage of debris and reusable materials will stimulate local transport businesses and small enterprises providing food, supplies, or accommodation.

d) Site Rehabilitation and Environmental Restoration

Once decommissioning works are complete, disturbed areas can be rehabilitated and re-vegetated. This will restore visual aesthetics, stabilize soils, and support long-term land productivity.

Enhancement Measures

- Implement site restoration plans including backfilling, grading, and replanting with native species.
- Coordinate rehabilitation activities with county environmental officers and the Project's Management Committee.

7.4.2 Potential Negative Impacts and Mitigation Measures

a) Generation and Management of Demolition Waste

During the decommissioning phase a lot of waste is generated that include the demolition waste such as concrete, metals, timber and plastics. If not properly managed, these wastes could cause land pollution, blocked drainage, and community health risks.

Proposed Mitigation Measures

- Apply ISWM principles emphasizing waste minimization, reuse and recycling.
- Segregate waste at source and transport non-recyclable residues to approved disposal sites using NEMA-licensed waste handlers.

- Maintain documentation on quantities of waste generated, reused, recycled and disposed.
- Sensitize workers on proper waste management procedures/practices.

b) Air Pollution (Dust and Emissions)

Demolition, transportation, and waste handling will generate dust and exhaust emissions, potentially affecting workers and nearby residents.

Proposed Mitigation Measures

- Regularly water unpaved surfaces and earth stockpiles to suppress dust.
- Maintain vehicles and equipment to minimize emissions.
- Limit speed of haulage trucks within and around the site.
- Provide dust masks to workers and limit exposure duration.

c) Occupational Health and Safety Risks (Workers)

Decommissioning involves manual dismantling, lifting, cutting, and handling heavy or sharp materials. Workers will be exposed to risks of falls, lacerations, dust inhalation, and accidents with tools or machinery.

Proposed Mitigation Measures

- Conduct pre-demolition risk assessments and Job Safety Analyses (JSAs)
- Provide PPE (helmets, gloves, safety boots, goggles, dust masks).
- Ensure induction training on OHS, emergency response, and use of tools.
- Maintain first-aid kits, trained first-aiders, and firefighting equipment on-site.
- Implement and regularly test the ERP.
- Form a Health and Safety Committee where workforce exceeds 20 people.
- Ensure workers' insurance and workmen's compensation coverage.

d) Noise and Excessive Vibration

Use of mechanical tools and haulage vehicles will increase noise and vibration levels, potentially disturbing nearby communities and wildlife.

Proposed Mitigation Measures

- Restrict noisy operations to daytime hours (08:00 am - 5:00 pm).
- Use well-maintained equipment fitted with mufflers.
- Educate workers and drivers to switch off idling engines.
- Provide ear protection where noise exceeds 85 dB(A).

e) Loss of Vegetation and Habitat Disturbance

Decommissioning and site clearance may destroy vegetation planted during operation or natural regrowth, leading to minor habitat disturbance.

Proposed Mitigation Measures

- Minimize clearance footprint and avoid unnecessary destruction of vegetation.
- Replant disturbed areas with indigenous plant species after works.
- Involve the registered water users and wider community in post-decommissioning restoration activities.

f) Community Health and Safety Risks

Dust, noise, vehicle movement, and open excavations could endanger nearby residents, particularly children. Poor access control could also expose the public to injury risks.

Proposed Mitigation Measures

- Erect warning signage and secure work areas with fencing or barricades.
- Maintain clear communication with local communities regarding work schedules and restricted zones.
- Enforce vehicle safety (speed limits, flagmen, reflective markings).
- Provide contact information for reporting incidents or accidents.

CHAPTER 8: ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN(ESMMP)

8.1 Introduction

The project proponent acknowledges that the proposed project activities will have some impacts on the biophysical environment, health and safety, and socio-economic well-being of the workers and other community members. Thus, the main focus will be on reducing the negative impacts and maximizing the positive impacts associated with the proposed project activities. An environmental and social management and monitoring plan has been developed to assist the proponent in mitigating both environmental and social impacts associated with the project implementation. It is noteworthy that key factors and processes may change through the life of the project and considerable provisions have been made for dynamism and flexibility of the ESMP. As such, the ESMP should be subjected to periodic review for improvement purposes.

The ESMMP comprises phase-specific plans (construction, operation, and decommissioning) and two key thematic sub-plans, namely:

A GRM that provides a structured process for receiving and resolving project-related complaints; and

An IPMP that promotes sustainable, safe, and environmentally sound pest management practices under irrigated agriculture

8.2 Objectives of the ESMMP

The ESMMP serves as the operational tool for managing, monitoring, and reporting on the project's environmental and social performance. Its objectives are to:

- Provide a structured approach for implementation of mitigation measures proposed in Chapter 7;
- Identify institutional and financial resources for ESMMP implementation; and
- Ensure continual improvement through adaptive management and regular reviews.
- Establish measurable indicators for performance monitoring and compliance;
- Define roles and responsibilities for environmental and social management;

8.3 Phase - Specific ESMMP Tables

The ESMMP is organized into phase-specific matrix tables (Tables 8 to 10):

- Specifying mitigation and enhancement actions to prevent, minimize adverse impacts;
- Assigning clear institutional responsibilities for implementation and supervision;
- Setting measurable timelines and performance indicators; and
- Providing indicative cost estimates for implementation.

Table 8 Construction phase ESMMP

Potential Environmental / Social Impact	Proposed Mitigation / Enhancement Measures	Monitoring Indicators	Responsible Party	Monitoring Frequency	Who to Monitor / Oversight	Estimated Cost (KES)
Community Health and Safety	• Restrict construction to daytime hours (8:00am - 5:00pm). • Install notice boards/signage at strategic locations. • Secure trenches with barriers, safety tape, cones. • Avoid wet season trenching; promptly backfill trenches. • Conduct community safety awareness campaigns. • Inform community of road closures and hazards. • Promote project GRM.	• No. of safety awareness campaigns • No. of trenches properly secured • No. of grievances received/resolved •	Contractor / Community Liaison Officer	Monthly	County Safeguards Team National Government Administration Officers (NGAO)	40,000
Traffic-Related Accidents (Workers and Community)	• Develop and implement Traffic	• No. of traffic incidents/near-misses • TMP compliance	Contractor / Traffic Safety Officer	Weekly	County Safeguards Team	50,000

Potential Environmental / Social Impact	Proposed Mitigation / Enhancement Measures	Monitoring Indicators	Responsible Party	Monitoring Frequency	Who to Monitor / Oversight	Estimated Cost (KES)
	Management Plan (TMP). . Inform the KWS team while constructing the sedimentation basin . Inform the transport department of road crossing works • Restrict speeds, use signage, barriers, flaggers at crossings. • Schedule deliveries outside peak hours; provide high-visibility PPE. • Train drivers and operators on defensive driving. • Implement incident reporting and corrective actions.	• Visibility and signage adequacy . Traffic control schedules given and implemented			County Department of Transport	
Soil Erosion	• Construct erosion control structures on vulnerable sites.	• No. of erosion control measures implemented	Contractor	Monthly	County Safeguards Team,	70,000

Potential Environmental / Social Impact	Proposed Mitigation / Enhancement Measures	Monitoring Indicators	Responsible Party	Monitoring Frequency	Who to Monitor / Oversight	Estimated Cost (KES)
	• Limit unnecessary soil movement. • Proper runoff management; restrict work during wet conditions. • Rehabilitate and re-vegetate open areas post-construction.	• % of land rehabilitated/re-vegetated			County Agriculture Department	
Water Pollution from Construction Runoff	. Store fuels/chemicals in bunded areas away from water. • Monitor stream water quality. • Install silt traps, sediment fences, bunds around excavation. • Prevent washing of equipment into watercourses • Schedule construction to avoid heavy rains	•Presence/functionality of sediment control structures • Water quality measurements	Contractor	Monthly	County Safeguards Team NEMA WRA	30,000

Potential Environmental / Social Impact	Proposed Mitigation / Enhancement Measures	Monitoring Indicators	Responsible Party	Monitoring Frequency	Who to Monitor / Oversight	Estimated Cost (KES)
	especially in the park.					
Occupational Health and Safety (Workers)	• Register project site as a workplace - DOSHS. • Provide PPE (helmets, gloves, boots, ear & eye protection). • Conduct regular toolbox talks, OHS training, medical exams. • Equip first aid kits with trained personnel. • Develop ERP, restrict site access to authorized personnel. • Form Safety & Health Committee if workforce >20. • Maintain machinery/equipment; keep accident logs;	• % of workers trained in OHS • PPE compliance rate • No. of incidents/near misses reported • ERP availability • Accident/incident log completeness	Contractor / Site Safety Officer	Weekly inspection; monthly reporting	County Safeguards Team, DOSHS	40,000

Potential Environmental / Social Impact	Proposed Mitigation / Enhancement Measures	Monitoring Indicators	Responsible Party	Monitoring Frequency	Who to Monitor / Oversight	Estimated Cost (KES)
	implement worker GRM.					
Loss of Vegetation and Riparian Habitat Disturbance	• Limit clearing to construction footprint. • Replant native vegetation post-construction. • Control machinery movement; implement riverbank stabilization (gabions, stone pitching). • Avoid in-stream work during sensitive periods; monitor habitat.	• Area cleared vs. replanted • Condition of riparian habitat	Contractor	Monthly	County Safeguards Team, KWS	35,000
Air Pollution / Dust / Exhaust Emissions	• Sprinkle water on dusty surfaces; limit vehicle speed. • Cover material transport trucks; provide dust masks. • Maintain machinery; avoid unnecessary idling;	• Dust levels at site boundaries • % of workers using dust PPE • No. of machinery maintained	Contractor	Weekly	County Safeguards Team, County Department of Environment, NEMA	10,000

Potential Environmental / Social Impact	Proposed Mitigation / Enhancement Measures	Monitoring Indicators	Responsible Party	Monitoring Frequency	Who to Monitor / Oversight	Estimated Cost (KES)
	use low-emission equipment. • Conduct air quality monitoring in high-dust areas.					
Solid Waste and Spoil Material	• Implement Construction WMP – segregation, storage, collection, transport, disposal. • Stockpile spoil in designated areas; reuse or transport excess to NEMA-approved sites. • Prohibit open burning; manage site grading/drainage. • Maintain waste records.	• No. of waste bins on site • No. of spoil stockpiles properly managed • Waste disposal documentation	Contractor	Weekly	County Safeguards Team, County Environment Committee NEMA	10,000
Illegal or Unsustainable Sourcing of Materials (Sand, Ballast, Timber, Water)	• Mandate procurement of all bulk natural resources exclusively from legally licensed and permitted suppliers.	• Copy of NEMA/County quarry licenses for sand/ballast. • Copy of WRA Permit or vendor	Contractor/Procurement Officer	Pre-Construction (Verification); Monthly (Audit)	County Safeguards Team, County Department of EnvironmentNEMA, WRA	N/A (Cost included in overall procurement)

Potential Environmental / Social Impact	Proposed Mitigation / Enhancement Measures	Monitoring Indicators	Responsible Party	Monitoring Frequency	Who to Monitor / Oversight	Estimated Cost (KES)
	• Ensure construction water is sourced from WRA-permitted points or licensed vendors. • Maintain documentation proving legal origin and volume of all resources used.	license for construction water. • Contractor's Material Sourcing Log and contracts.				
Noise Pollution and Vibration	• Limit noisy activities to 8:00 - 17:00hrs. • Provide appropriate PPE (earmuffs, earplugs). • Maintain machinery; switch off idle engines. • Use manual labour where feasible; sensitize workers on noise control.	• Noise levels (dBA) • % of workers using PPE • No. of complaints from community	Contractor	Weekly	County Safeguards Team, NEMA	20,000
Land / Soil Contamination	• Regular inspection and maintenance of machinery; store	• No. of spills recorded	Contractor	Monthly	County Safeguards Team NEMA	50,000

Potential Environmental / Social Impact	Proposed Mitigation / Enhancement Measures	Monitoring Indicators	Responsible Party	Monitoring Frequency	Who to Monitor / Oversight	Estimated Cost (KES)
(Oil and Grease Spills)	fuels/oils in bunded areas. • Carry out maintenance in service bays; clean spills promptly. • Train workers on safe handling of fuels and chemicals.	• Spill response records				
Chance Finds / Cultural Heritage	• Develop and Implement Chance Finds Procedure per ESS8 and national law. • Stop work and notify authorities if artifacts found. • Train workers to recognize cultural materials.	• No. of chance finds reported • Compliance with notification procedures	Contractor / County Safeguards Team	As needed	County Safeguards Team, NMK	N/A (Cost included in overall procurement)
Risk of child labor and school drop out	-The Contractor must maintain a mandatory Labor Register. -Ensure Specific clauses prohibiting	-No of COC signed -No of site workers engaged-above 18 -No of monitoring	Contractor / County Safeguards Team	As needed	County Safeguards Team, NMK	20,000

Potential Environmental / Social Impact	Proposed Mitigation / Enhancement Measures	Monitoring Indicators	Responsible Party	Monitoring Frequency	Who to Monitor / Oversight	Estimated Cost (KES)
	the use of child labor in CESMP -Ensure monitoring of the workers onsite -Ensure mandatory signing of Code of Conduct					
Gender-Based Violence (GBV) – Community & Workers	• Conduct proactive community engagement; identify GBV risks. • Review project activities that may trigger GBV. • Implement mitigation plans and referral mechanisms for survivors.	• No. of GBV mitigation plans implemented • No. of referrals and cases handled	Contractor / Social Officer	Monthly	County Safeguards Team County Gender Office	20,000
Sexual Exploitation and Abuse – Community	• Implement SEA Action Plan per WB Good Practice Note. • Enforce Codes of Conduct; community awareness sessions. • Confidential community GRM;	• No. of GRM cases reported/resolved • No. of SEA awareness sessions	Contractor / Social Safeguards Officer	Monthly	County Gender and Social Office	40,000

Potential Environmental / Social Impact	Proposed Mitigation / Enhancement Measures	Monitoring Indicators	Responsible Party	Monitoring Frequency	Who to Monitor / Oversight	Estimated Cost (KES)
	referral pathways for survivors.					
Sexual Harassment (SH) – Worker	• HR policies against harassment; integrate SH provisions in Code of Conduct. • Training for staff; establish confidential worker GRM.	• No. of SH awareness sessions • Functionality of worker GRM	Contractor / HR Officer	Monthly	County Safeguards Team County Gender and Social Office, Labour Dept.	
STIs / HIV/AIDS Risk – Community and Workers	• Awareness campaigns and workshops on HIV/AIDS and STI prevention. • Control access to worker camps. • Provide condoms; promote safe sexual practices.	• No. of awareness sessions conducted • Availability of condoms at site • No. of reported infections	Contractor	Monthly	County Safeguards Team County Health Department.,	20,000
Total Budget for Implementation of Construction Phase ESMMP						**455,000**

Table 9 *Operations phase ESMMP*

Potential Environmental / Social Impacts	Proposed Mitigation / Enhancement Measures	Monitoring Indicators	Responsible Party	Monitoring Frequency	Who to Monitor	Estimated Cost (KES)
Soil Erosion and Land Degradation	• Establish soil and water conservation structures (terraces, contour bunds, grass strips, hedgerows) • Promote contour ploughing and vegetative cover • Regular monitoring of erosion-prone areas • Training on land husbandry and conservation agriculture	• No. of structures installed • Erosion monitoring reports • Training sessions conducted	Project Management Committee, Water Users, Extension Officers	Quarterly	County Department of Agriculture	30,000
Soil Degradation and Pollution	• Promote ISFM (contour ploughing, mulching, crop rotation,	• Soil test results • ISFM practices implemented	Project Management Committee, Water Users, Extension Officers	Quarterly	NEMA, County Department of Environment	30,000

Potential Environmental / Social Impacts	Proposed Mitigation / Enhancement Measures	Monitoring Indicators	Responsible Party	Monitoring Frequency	Who to Monitor	Estimated Cost (KES)
	organic manure) • Proper irrigation scheduling and soil moisture monitoring • Safe handling and disposal of agrochemicals • Periodic soil testing • Maintain drainage and buffer strips • Integrate soil/water monitoring into PMC operations	• No. of trainings • Agrochemical handling reports				
Water Pollution & Contamination	• Safe handling, storage, and application of chemicals • Bunded storage areas for chemicals• Buffer zones	• No. of storage sites established • Water quality results • Training sessions conducted	Project Management Committee, Water Users	Quarterly	NEMA County Department of Water	40,000

Potential Environmental / Social Impacts	Proposed Mitigation / Enhancement Measures	Monitoring Indicators	Responsible Party	Monitoring Frequency	Who to Monitor	Estimated Cost (KES)
	along watercourses • IPM to minimize chemical use • Proper handling of fuels, oils, lubricants • Contaminated soil disposal in approved sites • Water quality monitoring (turbidity, pH, nitrates, phosphates)					
Inefficient Water Use and Over-Extraction	• Community training on efficient water use, irrigation scheduling • Promote drip/sprinkler irrigation • Strengthen PMC capacity	• Water consumption reports• Meter readings • Leak detection and repair logs • No. of trainings conducted	Project Management Committee, Water Users,	Quarterly	WRA, County Department of Water, NEMA	20,000

Potential Environmental / Social Impacts	Proposed Mitigation / Enhancement Measures	Monitoring Indicators	Responsible Party	Monitoring Frequency	Who to Monitor	Estimated Cost (KES)
	to enforce equitable water use • Install master/sectional meters • Leak detection and infrastructure maintenance • Rainwater harvesting and storage tanks • Incorporate water-use efficiency indicators in M&E					
Solid Waste Generation and Management	• Implement ISWM (waste minimization, segregation, recycling, safe disposal) • Segregate waste at source	• No. of waste containers provided • Waste disposal records • Training sessions conducted	Project Management Committee, Water Users, Contractor	Quarterly	NEMA, County Department of Environment	20,000

Potential Environmental / Social Impacts	Proposed Mitigation / Enhancement Measures	Monitoring Indicators	Responsible Party	Monitoring Frequency	Who to Monitor	Estimated Cost (KES)
	• Engage licensed waste handlers • Promote reuse/recycling • Maintain waste register • Conduct periodic training and awareness sessions					
Biodiversity and Ecosystem Disturbance	• Maintain riparian buffer zones • Prevent discharge of polluted water into wetlands • Apply IPM and reduce chemical use • Avoid expansion into sensitive areas • Monitor key species and vegetation	• Vegetation cover maintained • No. of monitoring reports • Compliance with IPM practices	Project Management Committee, Water Users	Quarterly	County Department of Environment	30,000

Potential Environmental / Social Impacts	Proposed Mitigation / Enhancement Measures	Monitoring Indicators	Responsible Party	Monitoring Frequency	Who to Monitor	Estimated Cost (KES)
	• Community awareness on conservation					
Energy Use and Greenhouse Gas Emissions	• Maintain pumps and equipment for efficiency • Promote solar/energy-efficient systems • Schedule pumping to reduce wastage • Track energy consumption and emissions • Train operators on energy-efficient practices	• Energy consumption reports • No. of energy-efficient systems installed • Records of training sessions conducted	Project Management Committee, Water users	Quarterly	NEMA, County Energy Office	10,000
Gender Disparities and Social Inclusion	• Mainstream gender in operations • Ensure 30 - 40% representation of women,	• Representation in PMC • No. of households receiving inputs	Project Management Committee, County Safeguards Team	Quarterly	County Department of Gender and Social	10,000

Potential Environmental / Social Impacts	Proposed Mitigation / Enhancement Measures	Monitoring Indicators	Responsible Party	Monitoring Frequency	Who to Monitor	Estimated Cost (KES)
	youth, vulnerable groups in the Project's Management Committee (PMC) • Provide targeted agricultural support and inputs • Transparent benefit-sharing and water allocation • Track participation and benefits	• Benefit-sharing reports • Sex-disaggregated data tracked				
Theft, Vandalism, Damage to Infrastructure	• Community awareness and ownership campaigns • Community-based monitoring and	• No. of security incidents reported • OSSP completed, approved, and disseminated.	Project Management Committee, Local Administration	Quarterly	Community members, Local leaders	20,000

Potential Environmental / Social Impacts	Proposed Mitigation / Enhancement Measures	Monitoring Indicators	Responsible Party	Monitoring Frequency	Who to Monitor	Estimated Cost (KES)
	reporting system • Develop and implement a detailed Operational Safety and Security Plan (OSSP) for accessing and securing all permanent structures. • Collaboration with local leaders and security agencies • Ensure security features (fencing, locks) at the 225m^3 distribution tank are regularly inspected and	• Maintenance records updated • Condition of tank fencing/signage (lockable and intact).				

Potential Environmental / Social Impacts	Proposed Mitigation / Enhancement Measures	Monitoring Indicators	Responsible Party	Monitoring Frequency	Who to Monitor	Estimated Cost (KES)
	maintained per the OSSP • Accessible GRM for infrastructure issues					
Community Water Use Conflicts and Governance Risks	Transparent water allocation plans and by-laws • Periodic stakeholder forums for dispute resolution • Training of Water Users' leaders in mediation • Documentation of allocation decisions • Maintain documentation of the original community	• Water allocation compliance • No. of stakeholder forums conducted • Conflict reports and resolution records • Availability of documented consent for shared tank use.	Project Management Committee, Water Users	Quarterly	County Water Officers WRA	25,000

Potential Environmental / Social Impacts	Proposed Mitigation / Enhancement Measures	Monitoring Indicators	Responsible Party	Monitoring Frequency	Who to Monitor	Estimated Cost (KES)
	consent for the shared use and management of the 225m^3 distribution tank.					
Occupational Health and Safety – Workers	• Regular OHS training • Task-specific risk assessments • Provide and enforce PPE use • Maintain clean and safe work areas • Update and implement Emergency Response Protocols for pipeline failures (bursts, washouts) • Workplace inspections and	• No. of trainings • PPE compliance • ERPs updated, communicated and practiced. • Safety audits conducted • Incident reports reviewed	Project Management Committee	Quarterly	DOSHS	20,000

Potential Environmental / Social Impacts	Proposed Mitigation / Enhancement Measures	Monitoring Indicators	Responsible Party	Monitoring Frequency	Who to Monitor	Estimated Cost (KES)
	audits conducted • Incident register maintained					
Public Health and Waterborne Disease Risks	• Proper drainage and removal of stagnant pools • Hygiene and sanitation awareness campaigns • Collaboration with County Health offices for surveillance and vector control • Encourage mosquito nets and clean canal surroundings	• No. of stagnant water pools removed • Awareness sessions conducted • Vector surveillance reports	County Public Health Department	Quarterly	County Department of Health Water Users Community	10,000
GBV and SEA (Community)	• Community awareness campaigns on	• No. of campaigns conducted	Project Management Committee,	Quarterly	County Department of Gender and Social	10,000

Potential Environmental / Social Impacts	Proposed Mitigation / Enhancement Measures	Monitoring Indicators	Responsible Party	Monitoring Frequency	Who to Monitor	Estimated Cost (KES)
	GBV/SEA and reporting • Confidential survivor-centered GRM • Psychosocial support and referral services • Promote women's participation in water committees • Gender-sensitive training on crop production and financial management • Track women's engagement and decision-making	• Functionality of GRM • No. of women in committees • Training sessions conducted • Participation metrics reported	County Water Officers			
Sexual Harassment – Workers	• Integrate SH prohibitions into Codes of Conduct	• No. of staff trained • No. of SH reports	County Safeguards Team,	Quarterly	County Department of Gender and Social,	10,000

Potential Environmental / Social Impacts	Proposed Mitigation / Enhancement Measures	Monitoring Indicators	Responsible Party	Monitoring Frequency	Who to Monitor	Estimated Cost (KES)
	• Mandatory staff training • Tailored worker GRM • Designate Gender/GBV focal point • Enforce disciplinary action • Monitor workplace culture	• Functionality of worker GRM • Focal point assigned	Project Management Committee		Labour Department	
Total Budget for Implementation of Operations Phase ESMMP						**310,000**

Table 10 *Decommissioning Phase ESMMP*

Potential Environmental / Social Impacts	Proposed Mitigation / Enhancement Measures	Monitoring Indicators	Responsible Party	Monitoring Frequency	Who to Monitor	Estimated Cost (KSh.)
Generation and Management of Demolition Waste	• Apply ISWM principles (waste minimization, reuse, recycling) • Segregate waste at source • Transport non-recyclable residues to NEMA-approved sites using licensed handlers • Maintain documentation on quantities generated, reused, recycled, disposed • Sensitize workers on proper waste handling procedures	• Quantity of waste segregated, reused, recycled • Waste disposal records maintained • No. of training sessions for workers	Contractor, Project Management Committee	Weekly	NEMA County Environment Office	30,000
Air Quality (Dust and Emissions)	• Regularly water unpaved surfaces and debris piles • Maintain vehicles and equipment to reduce emissions • Limit speed of haulage trucks	• Dust levels monitored • No. of workers using dust masks • Equipment maintenance logs • No. of complaints from community	Contractor	Weekly	County Department of Environment	20,000

Potential Environmental / Social Impacts	Proposed Mitigation / Enhancement Measures	Monitoring Indicators	Responsible Party	Monitoring Frequency	Who to Monitor	Estimated Cost (KSh.)
	• Provide dust masks to workers and limit exposure duration					
Noise and Excessive Vibration	• Restrict noisy operations to daytime (08:00 - 17:00hrs) • Use well-maintained equipment with mufflers • Educate workers and drivers to switch off idling engines • Provide ear protection where noise >85 dB(A)	• Noise monitoring reports • No. of workers using ear protection • Complaints from nearby residents	Contractor, Project Management Committee	Weekly	County Department of Environment, NEMA	10,000
Loss of Vegetation and Habitat Disturbance	• Minimize clearance footprint and avoid unnecessary destruction • Replant disturbed areas with indigenous species	• No. of trees/vegetation replanted • Area restored • Monitoring reports of habitat condition	Contractor Project Management, Committee Water users	Monthly	County Environment Office	40,000

Potential Environmental / Social Impacts	Proposed Mitigation / Enhancement Measures	Monitoring Indicators	Responsible Party	Monitoring Frequency	Who to Monitor	Estimated Cost (KSh.)
	post-decommissioning • Involve registered water users and the wider community in restoration activities					
Occupational Health and Safety (Workers)	• Conduct pre-demolition risk assessments and Job Safety Analyses (JSAs) • Provide PPE (helmets, gloves, boots, goggles, dust masks) • Induction training on OHS, ERP, and tool use • Maintain first aid kits, trained first-aiders, and firefighting equipment • Implement and test ERP regularly	• No. of JSAs conducted • PPE compliance rate • Training sessions conducted • ERP available and tested • Incident reports recorded	Contractor, Project Management Committee	Weekly during decommissioning	DOSHS	20,000

Potential Environmental / Social Impacts	Proposed Mitigation / Enhancement Measures	Monitoring Indicators	Responsible Party	Monitoring Frequency	Who to Monitor	Estimated Cost (KSh.)
	• Form Health & Safety Committee (>20 staff) • Ensure workers' insurance and compensation coverage					
Community Health and Safety	• Restrict demolition to daytime hours (8:00am - 5:00pm). • Install notice boards/signage at strategic locations. • Secure demolition areas with barriers, safety tape, cones. • Conduct community safety awareness campaigns. • Inform community of road closures and hazards.	• No. of safety awareness campaigns • No. of demolition areas properly secured • No. of grievances received/resolved •	Contractor / Community Liaison Officer	Monthly	County Safeguards Team National Government Administration Officers (NGAO)	40,000
Total Budget for Implementation of Decommissioning Phase ESMMP						**180,000**

Total Estimated Cost for Implementation of ESMMP (Construction 435,000 + Operations 310,000 + Decommissioning Phases 180,000) is ***KES. 945, 000***

8.4 Grievance Management

8.4.1 Institutional Framework and Compliance

The Kihuyo Irrigation Project has institutionalized a structured grievance redress mechanism (GRM) designed to facilitate the transparent receipt, evaluation, and resolution of stakeholder concerns. This mechanism serves as a critical safeguard to ensure that project preparation, construction, and operational phases adhere to the following international and national benchmarks:

- World Bank ESF: Primarily ESS10 (Stakeholder Engagement and Information Disclosure) and ESS2 (Labor and Working Conditions), including the mandate for a distinct worker-GRM.
- National Statutory Provisions: The Constitution of Kenya (2010) regarding the right to administrative justice and access to information, and the EMCA, 1999 (Amended 2015).

The GRM is aligned with the NAVCDP GRM Framework, localized to integrate the PMC, County Government structures, and community leadership.

8.4.2 Objectives of the GRM

The GRM is designed to move beyond reactive complaint handling toward a proactive risk management tool, specifically aiming to:

- Establish a formal, predictable, and transparent pathway for redress.
- Prevent the escalation of localized disputes into legal or social conflicts through early-stage mediation.
- Build sustained stakeholder trust through inclusive engagement and visible responsiveness.
- Utilize grievance trends to inform adaptive management and continuous improvement of project safeguards.

8.4.3 Typology of Potential Grievances

Project-related grievances are categorized to ensure specialized handling and appropriate escalation:

- Environmental and Technical: Impacts related to dust, noise, hydrology, or degradation of vegetation.
- New applications/registration of beneficiaries during the operations phase
- Resource Access: Conflicts regarding land easements or downstream water equity.
- OHS: Risks to both the workforce and the surrounding community.
- Labor & Working Conditions: Disputes involving wages, contracts, or workplace conduct.

- Protection Safeguards: Cases involving GBV or SEA/SH) - which are subject to a confidential, survivor-centric referral pathway.
- Governance: Perceived inequities in benefit-sharing or misconduct by project representatives.

8.4.4 Governance Principles

The efficacy of the Kihuyo GRM is anchored on the following core principles:

- Accessibility and Inclusivity: The mechanism must be designed to be culturally suitable and readily available to all, ensuring it proactively reaches and serves vulnerable or marginalized groups without obstacles.
- Confidentiality and Non-Retaliation: The process must strictly protect complainant identities to eliminate risks of reprisal, victimization, or any form of backlash.
- Procedural Clarity: Operating protocols should be straightforward and publicly communicated to guarantee community-wide understanding and transparency.
- Objectivity: Every investigation and decision must be conducted with strict impartiality and neutrality.

8.4.5 Composition and Structure of the Subproject's GRM

The IWUA/WUA has established a Grievance Redress Mechanism (GRM) Committee comprises of five members and the area assistant chief. These members were elected by the irrigation project to address grievances related to the implementation of the proposed project.

Table 11 Kihuyo Grievance Management Committee

Name	**Contact**	**Position in the committee**
Jackson Nderitu	0725212122	Chairperson & GRM Focal Person
Mercy Muthemba	0723310901	Secretary
Paul Wachiuni	0722475180	Member
Jane Wanja	0722472116	Member
John Mwangi	0727554968	Member
John Gichohi	0704715634	Assistant Chief

The GMC's mandate is to mediate concerns at the source, ensuring that social accountability is maintained throughout the project's implementation. It is responsible for sensitizing the community

on the existence utilization of the GRM. It also serves as an intermediary between the CPCU and the IWUA. The committee will be meeting monthly and when need arises.

The GRM will operate at three hierarchical levels to ensure that grievances are addressed promptly and at the lowest level possible. The mechanism is supported by the Web based / digital "*Tusuluhishe*" platform, which facilitates lodging, tracking, and documentation via SMS, web form, or in-person reports.

The standard operational flow for receiving, recording, and resolving grievances is detailed below:

- Level 1 - Community Level
    - Entry Point: Complaints can be made verbally, in writing, via suggestion boxes, or through phone/SMS to the Kihuyo Water Project appointed-GRM Focal Person or GMC.
    - Action: Issue acknowledgment of grievance will be issues within 48 hours, record in the Grievance Register, and attempt resolution within 14 working days.
    - GBV/SEA Cases: Immediately referred to a trained GBV/SEA Focal Point, and onward to County-level survivor support services per the NAVCDP GBV Response Protocol.
- Level 2 - Project Level (County)
    - Escalation: Unresolved grievances referred to the CPCU, CGMC and County Safeguards Team.(can also be submitted through the NAVCDP web grievance)
    - Action: Joint review, field verification if needed, and resolution within 30 days.
    - Documentation: Decisions communicated in writing to the complainant and recorded in the Project GRM Database.
- Level 3 - Appeal / National Level
    - If unresolved at Level 2, grievances may be escalated to the NPCU (which hosts the National Grievance Committee) or the World Bank Grievance Redress Service (GRS).
    - The GRS can be accessed directly through the link: grievances@worldbank.org. https://grm.navcdp.go.ke

8.4.5.1 Documentation and Reporting

Each grievance will be tracked using a standardized Grievance Log Sheet capturing: Unique ID, date, complainant; Nature of complaint; Responsible person; Action taken, and Resolution status.

8.4.5.2 GRM Awareness and Capacity Building

- Awareness sessions will be conducted for community members, Registered Water Users, and contractors on how to access and use the GRM.
- GRM - focal persons and committee members will receive training on grievance handling, record-keeping, and GBV/SEA-sensitive approaches.
- GRM contacts and procedures will be displayed at all project sites and community centers in both English and Kiswahili.

8.4.5.2 Cost Estimates for GRM Implementation

The indicative cost for GRM implementation is estimated at KES 110,000, as outlined in Table 8-5 below.

Table 12 GRM implementation Budget

Item	**Estimated Cost (KES)**
Training and sensitization workshops (2 sessions)	50,000
GRM communication materials	10,000
Operational support (SMS, portal, log management)	10,000
Monitoring and reporting	40,000
Total Cost	**110,000**

8.5 Integrated Pest Management Plan

8.5.1 Introduction

The proposed irrigation water project when implemented will increase the intensity of commercial farming in the area. This is anticipated to increase the risk of pest infestation, pesticides usage due to the intensified cropping, the cropping also includes crop diversification. With the intensified manifestation of climate change impacts which significantly influences biology, ecology, occurrence, and distribution of plant pests (insects, pathogens, and weeds), pest–host plant interactions, and activity of natural enemies .Consequently, there is a risk of increased reliance on chemical pesticides, which can lead to environmental degradation, pest resistance, harm to beneficial organisms, contamination of water bodies (including Nyameru river), and adverse effects on human health if not properly managed.

As part of the broader environmental and social sustainability framework guiding the proposed sub-project, this Integrated Pest Management Plan (IPMP) has been developed to guide the IWUA members during the sub-project operation. This (IPMP) has been developed in compliance with the World Bank's Environmental and Social Framework (ESF), specifically Environmental and Social Standard 3 (ESS3): Resource Efficiency and Pollution Prevention and Management, and ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources.

8.5.2 Crops to be grown and their major pests and diseases

Main crops to be grown under irrigation, their pests and related diseases as well as management options are presented in Table below. The main crops to be grown are informed by the feasibility study and the data from the directorate of crops for the sub-project investment.

Table 13 Major pests/diseases and management options

Crop	Major pest - insect /Weeds	Major pest - Disease	Management options
Tomatoes	Thrips, aphids, tuta, miners,	Blights and bacterial	• Timely spraying with recommended pesticides, • staking, • crop rotation, • use of / tolerant /resistant varieties • Traps and pheromones
Kales	DBM, aphids and scales	Mildews, blights and black rot, black leg.	• Regular scouting, • biopesticides, • neem-based sprays,

			• rotation with non-crucifer crops and • use of tolerant varieties.
Bananas	Weevil, nematodes, aphids' thrips and nematodes	Panama, Fusarium wilt,	• Use of clean tissue culture planting materials, • mulching, proper drainage, • pruning male bud removal and • use of fungicides
Cabbages	Thrips, DBM, thrips and aphid	Black leg, black rot and deficiencies	• Use of chemicals, • traps pheromones and • micro nutrient foliar.
Avocadoes	Thrips, aphis, mites, scales FCM	Fungal and bacterial infections	• Use of traps, • catchers, • pheromones, • stickers, • fungicides and insecticides.

8.5.3 Common Pesticides used for the Targeted Crops and their E&S Risks

Table 8-6 below summarizes typical pesticides likely to be used by farmers in the area and their associated risks. Emphasis is placed on promoting Class III and U pesticides (slightly or least hazardous), and discouraging use of Class Ia, Ib, and II pesticides, unless no alternative exists and with adequate safeguards.

Common pesticides anticipated to be used, their class and health as well as environmental risks are presented in table below.

Table 14 Common Pesticides and Environmental/Health Risks

Crop	Pesticide used	Active ingredient	WHO Class	Health/ environmental Risk
Tomatoes	Dudu Acelamectin 46EC	Abamectin	Class 11	Accumulated effects over time includes- • Acute in toxification to the user, • marine life. and microbial habitats • changes and mutations. • Chronic effects to the user. • Water and soil pollution. • Development of pest resistance.
(Sukuma wiki	Duduthrin	Lambda-cyhalothrin	Class 11	Accumulated effects over time includes- • Acute in toxification to the user, • marine life. and microbial habitats • changes and mutations. • Chronic effects to the user. • Water and soil pollution. • Development of pest

				resistance.
Bananas	morcap	Ethoprophos	Class1a	• Highly toxic to humans; restricted use, requires full PPE and strict handling procedures
Cabbages	Duduthrin	Ethoprophos	Class 11	Accumulated effects over time includes • Acute intoxification to the user, marine life and microbial habitats - changes and mutations. • Chronic effects to the user. • Water and soil pollution. • Development of pest resistance.
Avocado	Milraz, rindomil gold	Mancozeb, cymoxanil, metalaxy	Class u,	Potential reproductive toxicity

- **Class Ia**: Extremely hazardous
- **Class Ib**: Highly hazardous
- **Class II**: Moderately hazardous
- **Class III**: Slightly hazardous
- **Class U**: Unlikely to present acute hazard in normal use

8.4.6.3 The Integrated Pest Management Plan Matrix for Kihuyo

To achieve effective, sustainable, and eco-friendly pest management in the proposed irrigation water project, a comprehensive Integrated Pest Management (IPM) Plan is provided in the Table below. This plan details key strategies—such as preventive and control measures—along with assigned responsibilities, timelines, and monitoring indicators. The outlined actions aim to minimize chemical pesticide use, support ecological stability, and comply with EMCA (1999, Amended 2015) guidelines as well as the World Bank's Environmental and Social Framework (ESF), specifically ESS3 and ESS6.

Table 15 ESMMP Subplan - Kihuyo Water Project IPMP Matrix

Impact issue/pest and pesticide threat	**Mitigation measures**	**Implementation tool**	**Expected results**	**Monitoring indicators**	**responsibility**	**Cost estimated (KES)**
Improper storage and disposal of pesticides	Establish pesticide storage protocols and disposal containers	Storage Standard Operation Procedures (SOPs), awareness campaigns, waste pits	• Reduced contamination risks • Change of behaviour on waste management	Number of farms with appropriate storage and disposal facilities No of trainings done	IWUA-Farmers, Directorate of crops, NEMA	150,000
Excessive use of chemical pesticides	Promote application of the IPM strategies highlighted above	Farmer training, demo plots in the ward, extension services	• Reduced use of chemical pesticides • Implementation of the IPM strategies given	Percentage of farmers adopting IPM techniques No of trainings done	IWUA-Farmers, Directorate of crops, NEMA	300,000
Pest resistance due to repeated	Promote application of	Farmer training, demo plots in the	• Implementation of the IPM	Percentage of farmers	IWUA-Farmers,	150,000

pesticide use	the IPM strategies highlighted above	ward, extension services	strategies given	adopting IPM techniques No of trainings done	Directorate of crops, NEMA	
Water pollution from runoff in the sprayed areas	Promote irrigation technologies that reduce leaching e.g. drip irrigation	Capacity building on alternative irrigation technologies Analysis of water (different sites) Adoption of IPM techniques	• Reduced pollution of the water bodies • Adoption of alternative irrigation technologies	No of trainings done Percentage of farmers adopting IPM No of water analysis done (including environmental audits)	IWUA-Farmers, directorate of crops, NEMA, WRUA	250,000
Invasive pests e.g. millipede	Early detection and rapid response measures including implementation of IPM	Capacity building Surveillance	• Reduced cases of invasion Adoption of IPM	No of trainings done Percentage of farmers adopting IPM No of surveillance done	Farmers, directorate of crops	100,000
Health risks to farmers during pesticide handling	Provision of appropriate PPEs Use of appropriate PPEs	Capacity building Liaison with the local PPEs service providers	Safer handling, reduced exposure to chemical Reduced cases of chemical incidents	Number of farmers exposure to chemicals using PPE	DOSH, directorate of crops, public health officers, IWUA	200,000

Indicative Cost Estimates for ESMMP Implementation

Indicative costs of ESMMP implementation are summarized in Table 8-8 below. These costs cover mitigation, monitoring, capacity building, and the two thematic sub-plans (GRM and IPMP).

Table 16 Indicative Costs of ESMMP Implementation

Component	Purpose / Description	Indicative Cost (KES)
Construction phase ESMMP	Outlines environmental and social mitigation and monitoring measures to be implemented during construction.	455,000
Operations phase ESMMP	Outlines environmental and social mitigation and monitoring measures to be implemented during operations and maintenance of the project.	310,000
Decommissioning phase ESMMP	Provides actions for safe, environmentally sound decommissioning and site restoration.	180,000
GRM	Establishes a formal system for grievance intake, resolution, and reporting for workers and community members.	110,000
IPMP	Promotes safe, efficient, and environmentally sustainable pest management practices under irrigated agriculture.	1,150,000

Total Estimated ESMMP Implementation Cost: ≈ **KES 2,205,000**

CHAPTER NINE: CONCLUSION AND RECOMMENDATION

9.1 Conclusion

The ESIA for the Kihuyo Project was conducted in accordance with EMCA (Cap. 387) and World Bank ESF requirements. It assessed potential environmental, social, health, and safety impacts across all project phases, addressing key themes including land disturbance, water resources, waste, pesticides, occupational and community health, and social inclusion. Most adverse impacts are site-specific, short-term, and reversible, with effective mitigation measures outlined in the ESMMP, IPMP, and GRM. Positive outcomes such as enhanced water access, agricultural productivity, climate resilience, food security, and livelihoods substantially outweigh negative effects. Subject to full implementation of mitigation and safeguard instruments, the project is environmentally and socially sound and recommended for approval under continuous oversight by CPCU, the Project Management Committee, and relevant regulators.

Recommendations

- Fully implement the ESMMP and comply with EMCA, OSHA 2007, and World Bank ESF requirements throughout the project lifecycle.
- Train the Kihuyo PMC and community structures in project management, environmental and social risk, O&M, and grievance handling to enhance local ownership and sustainability.
- Install master and sectional meters to monitor water abstraction; promote efficient irrigation technologies (drip, sprinkler) and climate-smart practices.
- Develop and operationalize a maintenance and cost-recovery strategy to ensure infrastructure functionality.
- Conduct annual environmental audits, with the first within one year of project completion.
- Implement the IPMP to reduce pesticide dependence and protect ecosystems and public health.
- Strengthen community participation and maintain a functional GRM at subproject and county levels, addressing complaints promptly, including GBV/SEA-related grievances.
- Enforce OSHA 2007 and World Bank ESS2 standards; provide PPE, safety training, and emergency preparedness.
- CPCU/NPCU to oversee environmental and social monitoring and submit quarterly performance reports to the World Bank and NEMA.

ANNEXES

Annex1: ESS Screening Checklist

ANNEX 3: ENVIRONMENTAL AND SOCIAL SCREENING CHECKLIST BY BENEFICIARY COMMUNITIES FOR COMMUNITY INVESTMENTS (DEMONSTRATIONS, FLID, EDP ETC)

Section A: Background Information

Name of County……NYERI……

Name of CPCU - Environmental /Social Safeguard Compliance Officer

(i) ……ANNE KAROKI……

INVESTMENT LOCATION (Include GPRS Co-ordinates) …N-265189.36 E-9957537.626……

Name of CIG/VMG/Group ……

Postal Address: ……

Contact Persons

(i) ……DANIEL GATIU……Cell phone: 0721900483……

(ii) ……ANNEPURITY WAKIO…… Cell phone…0701855657……

Sub -project name…PROPOSED KIHUYO IRRIGATION WATER PROJECT……

Estimated cost (Ksh.) 27,487,811.73 ……

Approximate size of land area available for the sub -project…125 ACRES to be irrigated

Objectives of the Sub – project

- Increasing the area under irrigation
- Increasing the number of farmers carrying out irrigation
- Increasing the number of farmers doing commercial farming
- Increasing the quantity of products getting to the market/commercialized

Activities/enterprises to be undertaken (List)…

(i) Excavation and back filling of the pipelines

(ii) Conveyance of the pipeline

Section B: Environmental Issues

Will the Subproject/Investment:	Yes	No	Remarks (If yes, elaborate)
Create a risk of increased soil erosion?	✓	☐	Excavation of the pipelines may increase the risk of soil erosion. With the increased number of farmers carrying out irrigation there might be risk of soil erosion
Create a risk of increased deforestation?	☐	✓	
Create a risk of increasing any other soil degradation?	☐	✓	
Affect soil salinity and alkalinity?	☐	✓	
Divert the water resource from its natural course/location?	☐	✓	
Cause pollution of aquatic ecosystems by sedimentation and agro-chemicals, oil spillage, effluents, etc.?	☐	✓	
Introduce exotic plants or animals?	☐	✓	
Involve drainage of wetlands or other permanently flooded areas?	☐	✓	
Cause poor water drainage and increase the risk of water-related diseases such as malaria?	☐	✓	
Reduce the quantity of water for the downstream users?	☐	✓	The WRA has stipulated the volumes to be abstracted to

			avoid reduction of the volumes downstream
Result in the lowering of groundwater level or depletion of groundwater?	☐	✓	
Create waste that could adversely affect local soils, vegetation, rivers and streams or groundwater?	☐	✓	
Reduce various types of livestock production?	☐	✓	
Be on monoculture cropping?	☐	✓	
Affect any watershed?	☐	✓	
Focus on Biomass/Bio-fuel energy generation?	☐	✓	
Cause accumulation of solid wastes	☐	✓	Very minimal waste will be generated
Cause accumulation of liquid wastes	☐	✓	

If the answers to any of the above is 'yes', please include an ESMP with Subproject application.

Section C: Socio-economic Issues

Will the subproject/Investment:	**Yes**	**No**	**Remarks** (*If yes, elaborate how*)
Have challenges for women farmers to benefit	☐	✓	
Target vulnerable community members such as physically challenged, Child headed household etc..?	✓	☐	The VMGs have been allowed to join the project as beneficiaries
Interfere with the normal health and safety of the worker/employee?	☐	✓	

Reduce settlement (..no further land allocated to settlements)?	☐	✓	
Reduce income for the local communities?	☐	✓	
Increase insecurity due to introduction of the project?	☐	✓	
Increase exposure of the community to HIV/AIDS?	☐	✓	
Induce conflict?	☐	✓	
Have machinery and/or equipment installed for value addition?	☐	✓	The proposed investment is an irrigation project
Introduce new practices and habits?	✓	☐	There will be increased number of farmers practicing irrigation and commercial farming
Lead to child delinquency (school drop-outs, child abuse, child labour, etc.?	☐	✓	
Lead to gender disparity?	☐	✓	
Lead to poor diets?	☐	✓	
Lead to social evils (drug abuse, excessive alcohol consumption, crime, etc.)?	☐	✓	
Will engage community labour	✓	☐	If yes, Community labor engagement agreement required A number of community member may be engaged in the excavation of the pipelines. Agreement to be done later.
Lead to exclusion of disadvantaged and vulnerable groups from participating and benefiting from the investments	☐	✓	
Exacerbate social exclusion of other members of the society	☐	✓	

Lead to increase GBV/SEAH issues	☐	✓	The areas as per the social office has not been flagged for such issues

Section D: Natural Habitats

Will the Subproject:	Yes	No	Remarks (If yes, elaborate)
Be located within or near environmentally sensitive areas (e.g. intact natural forests, mangroves, wetlands) or threatened species?	☐	✓	
Adversely affect environmentally sensitive areas or critical habitats – wetlands, woodlots, natural forests, rivers, etc.)?	☐	✓	
Affect the indigenous biodiversity (Flora and fauna)?	☐	✓	
Cause any loss or degradation of any natural habitats, either directly (through project works) or indirectly?	☐	✓	
Affect the aesthetic quality of the landscape?	☐	✓	
Reduce people's access to the pasture, water, public services or other resources that they depend on?	☐	✓	
Increase human-wildlife conflicts?	☐	✓	
Use irrigation system in its implementation?	✓	☐	

If the answers to any of the above is 'yes', please include an ESMP with Subproject application.

Section E: Pesticides and Agricultural Chemicals

Will the subproject……:	Yes	No	Remarks (If yes, elaborate)
Involve the use of pesticides or other agricultural chemicals, or increase existing use?	✓	☐	During operation stage of the project more farmers will use pesticides and other agricultural chemicals, IPM will be introduced
Cause contamination of watercourses by chemicals and pesticides?	☐	✓	
Cause contamination of soil by agrochemicals and pesticides?	☐	✓	
Experience effluent and/or emissions discharge?	☐	✓	
Involve annual inspections of the producers and unannounced inspections for Export produce?	☐	✓	
Require scheduled chemical applications?	☐	✓	
Require chemical application even to areas distant away from the focus?	☐	✓	
Require chemical application to be done by vulnerable group (pregnant mothers, chemically allergic persons, elderly, etc.)?	☐	✓	

*If the answer to the above is 'yes', please consult the **IPMF** that has been prepared for the project to help prepare **IPMP**.*

Section F: Indigenous Peoples/VMGs as per ESS7

Are there:	Y	N	Remarks
IP/VMGs living within the boundaries of, or near the project?	☐	☐	Name of the VMG community
Members of VMGs in the area who could benefit from the project?	☐	☐	
IP/VMGs livelihoods to be affected by the subproject?	☐	☐	If yes, How
Unique/specific challenges for VMGs to benefit from the project	☐	☐	Explain
VMGs minority in the community	☐	☐	If yes, Explain/name of minority VMG
Does VMG require to donate land to benefit from the project			If yes, follow Free, prior and informed consent procedure

If the answer to any of the above is 'yes', please consult the VMGF that has been prepared for the project.

Section G: Land Acquisition and Access to Resources

Will the subproject/Investment:	Yes	No	Remarks
Require that land (public or private) be acquired (temporarily or permanently) for its development?	☐	✓	If yes, elaborate the tenure type
Require that community land be acquired (temporarily or permanently) for its development?	☐	✓	If yes, elaborate the registration status and community claims. Community land agreement required following principles of FPIC.
Require more than 10 percent of the affected private land parcel	☐	✓	If yes, exclude from the project proposal
Use land that is currently occupied or regularly used for productive purposes (e.g. gardening, farming, pasture, fishing locations, forests)	☐	✓	If yes, Elaborate the current use/Prepare IRP
Complete land documents are not available for the sub- project investment?	☐	✓	If yes, what process is needed?
Is the land proposed have encumbrances?	☐	✓	If yes, elaborate the encumbrance
Physically displace individuals, families or businesses?	☐	✓	If yes, exclude from the project proposal
Cause loss of income for more than 30 days	☐	✓	If yes, how many. Exclude from the project proposal
Result in temporary or permanent loss of crops, fruit trees/fencing and pasture land/ loss of income from business activity?	☐	✓	If yes, elaborate and prepare IRP
Adversely affect small communal cultural property such as funeral and burial sites, or sacred groves?	☐	✓	If yes, avoid or exclude from project proposal
Result in involuntary restriction of access by people to legally designated parks and protected areas?	☐	✓	If yes, exclude
Be on monoculture cropping?	☐	✓	

If the answer to any of the above is 'yes', please consult the mitigation measures in the ESMF.

Section H: Proposed action

(i) Summarize the above:	(ii) Guidance

☐ All the above answers are 'No' ☐ There is at least one 'Yes'	• If all the above answers are 'No', there is no need for further action; • If there is at least one 'Yes', please describe your recommended course of action (see below).

(iii) Recommended Course of Action

If there is at least one 'Yes', which course of action do you recommend?

☐ CPCU, Social services officer, labour Officer, Children Officer and NEMA - CDE will provide detailed guidance on mitigation measures as outlined in the ESMF; and

✓ ☐ Specific advice is required from CDE[1], Lead Scientist and CPCUs regarding Sub - project specific Assessment (s) and also in the following area(s)

☐ All Subproject applications/proposals MUST include a completed ESMF checklist. The NAVCDP-CPCU will review the subproject applications/proposals and the CDEs will sign off; The input from the NLC, Social Services office, Children's office, labour office and the CSSCO will be sought before the documents are presented to the CPSC.

☐ The proposals will then be submitted to CPSC for clearance for implementation by communities in the proposed Subprojects. The projects that require CPRs will be forwarded to NPCU for further analysis also may be forwarded to the World bank for approval and finally to NEMA for clearance certificate (License).

Expert Advice

☐ The Government of Kenya through the Department of Monuments and Sites of the National Museums of Kenya can assist in identifying and, mapping of monuments and archaeological sites;

☐ Expert guidance will also be provided by the land registrar on all issues related to land tenure, The children department on all issues on children, especially child labour, plus department of social services on IPs/vulnerable groups in the community, and

Subproject specific Environmental and Social impact assessments, if recommended, must be carried out by experts registered with NEMA and be followed by monitoring and review. During the process of conducting an ESIAs the proponent shall seek views of persons who may be affected by the Subproject. The ESS10 requires consultation of Subproject affected groups and disclosure of ESIA's conclusions. In seeking views of the public after the approval of the Subproject, the proponent shall avail the draft ESIA report at a public place accessible to project-affected groups and local NGOs/CSO/SAIC/CDDCs.

-The CDE has recommended for a SPR

[1]County Director of Environment and the County Technical Team

Completed by
NAME - ANNE KAROKI
(ESCO

Date: 8/01/2025

Field Appraisal Officer (NEMA-CDE): for Daisy Naina

Signature:

Date: 8/01/2025

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY
NEMA
COUNTY DIRECTOR OF ENVIRONMENT
NYERI
P.O. Box 83, NYERI
TEL: 061 - 2032344

Note:

Project category	Characteristics
High impact	Full and extensive ESIA needed- irreversible environmental impacts; impacts not easy to pick or isolate and mitigation cost expensive; EMP design not easily done; Must have the ESIA done and future annual EAs instituted
Medium impact	Site specific environmental impacts envisaged; mitigation measures are easy to pick, not costly and ESMP needed, design readily done; need an ESIA and future EAs
Low impact	Have minimal or occasionally NO adverse environmental & social impacts; exempted from further environmental processes save environmental audits. ESMP required
Land	Land tenure documentation needed and land resolution and consent Form needed with project affected person/community
Loss of income and assets	Income restoration plan needed
Presence of VMG/IP	Additional actions needed
Risk of Child labor/SEAH	Additional actions needed

Annex 2A: Correspondence from KFS on the for approval to construct a sedimentation basin at Kihuyo Intake

KENYA
Forest Service

Kenya Forest Service Hqs
Karura, Off Kiambu Rd
P.O. Box 30513 - 00100
Nairobi, Kenya

Ref: No. WATER/1/KFS/VOL.XXIV/70 Date: 13th February, 2026

Beatrice Theuri,
Project coordinator,
National Agricultural Value Chain Development Project (NAVCDP),
County Government of Nyeri
P.O Box 1112-10100
NYERI

Dear Ms Theuri,

RE: REQUEST FOR APPROVAL TO CONSTRUCT A SEDIMENTATION BASIN ALONG THE KIHUYO IRRIGATION WATER PROJECT INTAKE, NYAMERU RIVER-ABERDARE FOREST

Reference is made to your letter Ref No: NAVCDP/NYI/FLID/GC/VOLII/43 (25) dated 11th February 2026.

The Kenya Forest Service has received the request for the proposed rehabilitation of Kihuyo Irrigation Water project inside Muringato forest in Aberdare forest reserve. A technical team has been tasked to undertake a site assessment of the proposed project to establish the components of the project, the extent, and the impact of the proposed works on the environment.

The field assessment report shall be submitted to the management for an informed decision. This letter is to give an assurance that the necessary steps are being taken to ensure the approvals are made in accordance with the FCMA Act 2016.

A communication shall be made to your office once the process is finalized.

For any further clarification, please contact Mr. Andrew Matindi, using any of the following contacts: 0723-473060 and amatindi@kenyaforestservice.org

Benedict Omondi
FOR: CHIEF CONSERVATOR OF FORESTS
Copy to:
1. *DCCF – Natural Forest Management*
2. *Regional Forest Conservator – Central Highlands Conservancy*
3. *County Forest Conservator- Nyeri County*

AM/ew

KENYA
Forest Service

Kenya Forest Service Hqs
Karura, Off Kiambu Rd
P.O. Box 30513 - 00100
Nairobi, Kenya

WATER/1/KFS/VOL.XIX/68

17th February 2026

Ref: No.....

Date.....

Beatrice Theuri,
Project coordinator,
National Agricultural Value Chain Development Project (NAVCDP),
County Government of Nyeri,
P.O Box 1112-10100
Nyeri.

Dear Ms. Theuri

RE: REQUEST FOR APPROVAL TO CONSTRUCT A SEDIMENTATION BASIN ALONG THE KIHUYU IRRIGATION WATER PROJECT INTAKE, NYAMERU RIVER-ABARDARE FOREST

Reference is made to your letter Ref No: NAVCDP/NYI/FLID/GC/VOLII/43 (25) dated 11th February 2026.

The Kenya Forest Service received your request for the proposed rehabilitation of Kihuyo Irrigation Water project inside the Abardare forest reserve. The Forest Station Manager, Kabage Forest Station, undertook a site assessment and established that all the components of the project are located in the Abardare National Park which is under the jurisdiction of Kenya Wildlife Service.

You are therefore advised to liase with KWS within the Abardare National Park for issuance of a no-objection letter to allow you to implement the project.

A. L. Lemarkoko EBS, 'ndc' (k)
CHIEF CONSERVATOR OF FORESTS

Copy to:

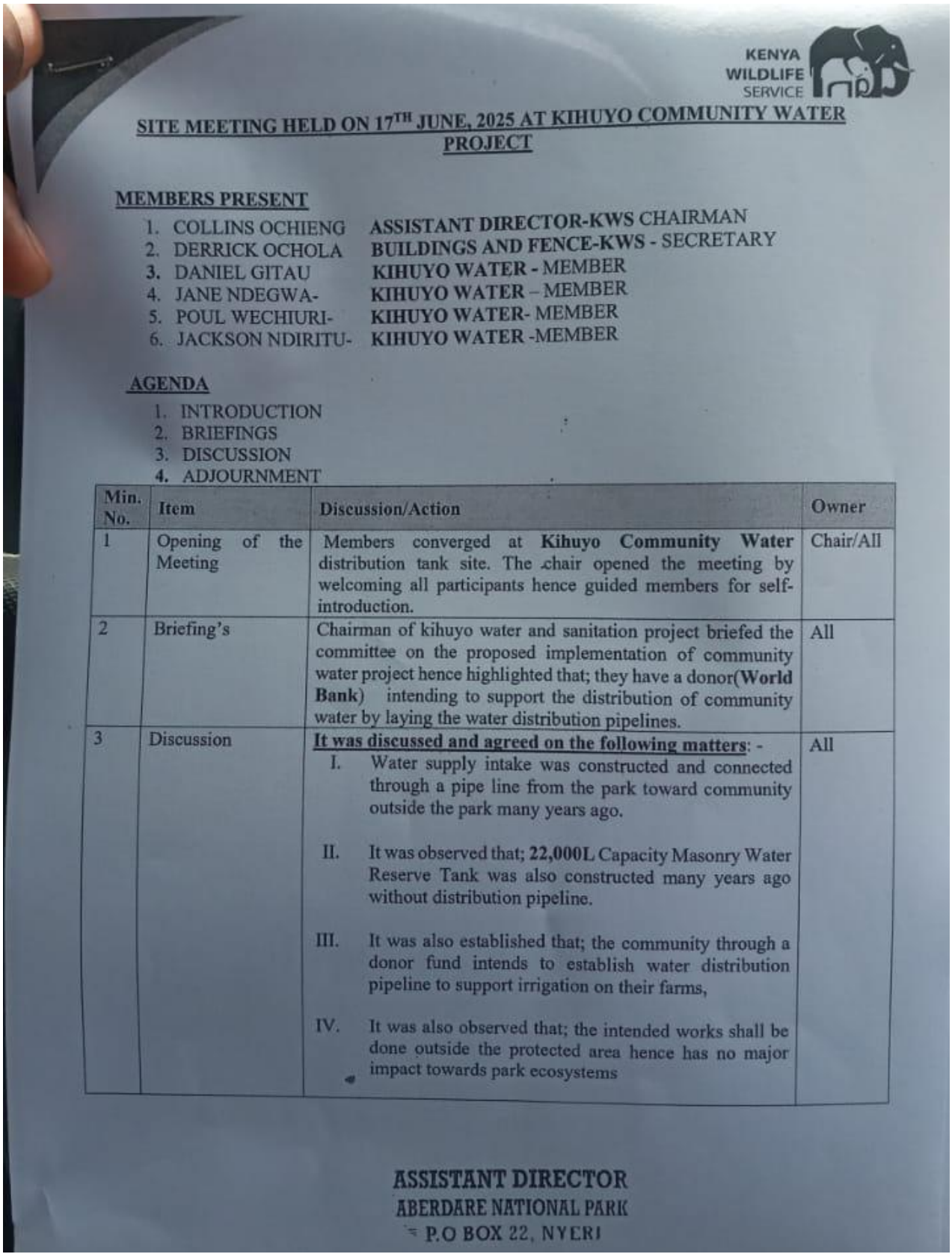
1. *Regional Forest Conservator – Central Highlands Conservancy*
2. *County Forest Conservator- Nyeri County*
3. *Forest Station Manager-Kabage Forest Station*

AMm

Trees for better lives

Tel: (254)020-3754904/5/6, (254)020-2014663, (254)020-2020285, Fax: (254)020-2385374
Email: info@kenyaforestservice.org Web: www.kenyaforestservice.org

Annex 2B: Evidence of Meeting held between KWS and the Kihuyo Water Users Association Representatives



KENYA WILDLIFE SERVICE

SITE MEETING HELD ON 17TH JUNE, 2025 AT KIHUYO COMMUNITY WATER PROJECT

MEMBERS PRESENT

1. COLLINS OCHIENG **ASSISTANT DIRECTOR-KWS** CHAIRMAN
2. DERRICK OCHOLA **BUILDINGS AND FENCE-KWS** - SECRETARY
3. DANIEL GITAU **KIHUYO WATER** - MEMBER
4. JANE NDEGWA- **KIHUYO WATER** – MEMBER
5. POUL WECHIURI- **KIHUYO WATER**- MEMBER
6. JACKSON NDIRITU- **KIHUYO WATER** -MEMBER

AGENDA

1. INTRODUCTION
2. BRIEFINGS
3. DISCUSSION
4. ADJOURNMENT

Min. No.	Item	Discussion/Action	Owner
1	Opening of the Meeting	Members converged at **Kihuyo Community Water** distribution tank site. The chair opened the meeting by welcoming all participants hence guided members for self-introduction.	Chair/All
2	Briefing's	Chairman of kihuyo water and sanitation project briefed the committee on the proposed implementation of community water project hence highlighted that; they have a donor(**World Bank**) intending to support the distribution of community water by laying the water distribution pipelines.	All
3	Discussion	**It was discussed and agreed on the following matters**: - I. Water supply intake was constructed and connected through a pipe line from the park toward community outside the park many years ago. II. It was observed that; **22,000L** Capacity Masonry Water Reserve Tank was also constructed many years ago without distribution pipeline. III. It was also established that; the community through a donor fund intends to establish water distribution pipeline to support irrigation on their farms, IV. It was also observed that; the intended works shall be done outside the protected area hence has no major impact towards park ecosystems	All

ASSISTANT DIRECTOR
ABERDARE NATIONAL PARK
P.O BOX 22, NYERI

4	Recommendations	The Park Management has No Objection with the **Tank** and we intend to allow the donor funded project to be implemented to supply the adjacent community bordering the park with water for irrigation whereby promoting their income generating activities through farming.	All
5	Closing of the Meeting	The Chairperson closed the meeting at 3.30pm.	All/Cha

CHAIRMAN

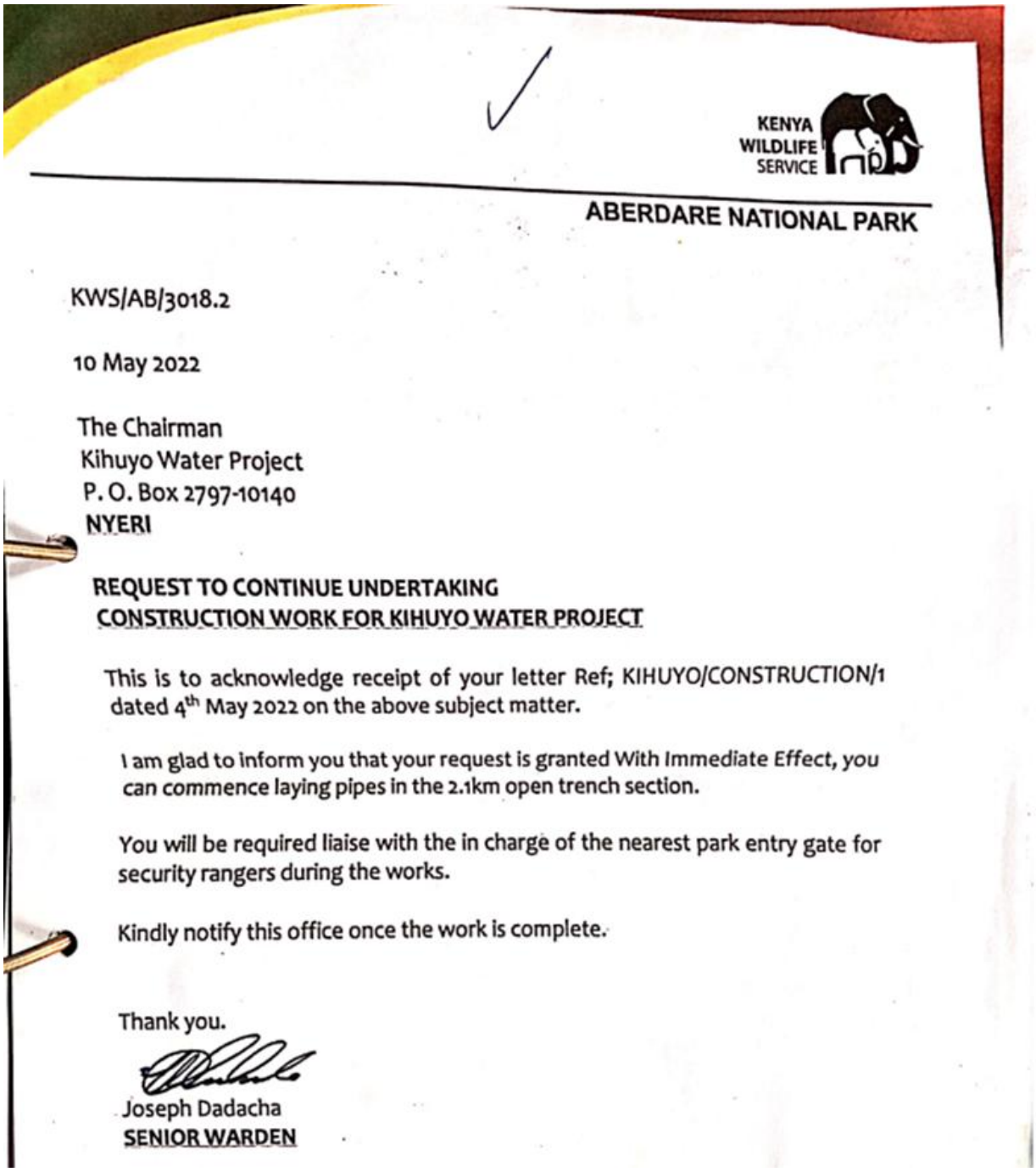
NAME. Ochieng - C ...SIGN.................DATE.....18/06/25

SECRETARY

NAME. D. Ochola ...SIGN.................DATE 18/6/2025

ASSISTANT DIRECTOR
ABERDARE NATIONAL PARK
P.O BOX 22, NYERI

Annex 2C: KWS "No Objection" for the Proposed Expansion of the Water Distribution Pipelines



KENYA WILDLIFE SERVICE

ABERDARE NATIONAL PARK

KWS/AB/3018.2

10 May 2022

The Chairman
Kihuyo Water Project
P. O. Box 2797-10140
NYERI

REQUEST TO CONTINUE UNDERTAKING CONSTRUCTION WORK FOR KIHUYO WATER PROJECT

This is to acknowledge receipt of your letter Ref; KIHUYO/CONSTRUCTION/1 dated 4th May 2022 on the above subject matter.

I am glad to inform you that your request is granted With Immediate Effect, you can commence laying pipes in the 2.1km open trench section.

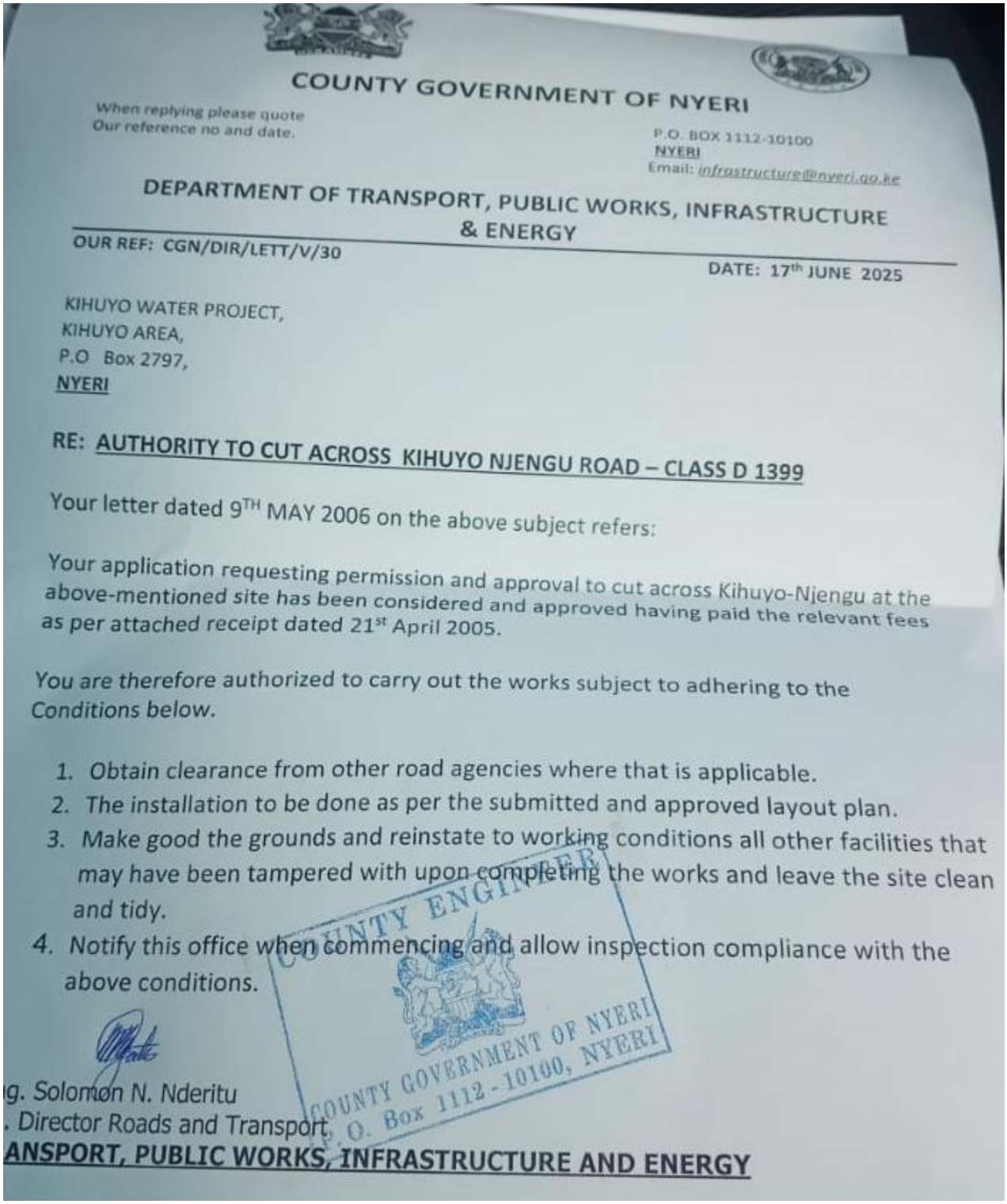
You will be required liaise with the in charge of the nearest park entry gate for security rangers during the works.

Kindly notify this office once the work is complete.

Thank you.

Joseph Dadacha
SENIOR WARDEN

Annex 3: County Government - Way leave for Kihuyo Njengu Road Excavation Works to Lay the Irrigation Pipeline



COUNTY GOVERNMENT OF NYERI

When replying please quote
Our reference no and date.

P.O. BOX 1112-10100
NYERI
Email: infrastructure@nyeri.go.ke

DEPARTMENT OF TRANSPORT, PUBLIC WORKS, INFRASTRUCTURE & ENERGY

OUR REF: CGN/DIR/LETT/V/30

DATE: 17th JUNE 2025

KIHUYO WATER PROJECT,
KIHUYO AREA,
P.O Box 2797,
NYERI

RE: AUTHORITY TO CUT ACROSS KIHUYO NJENGU ROAD – CLASS D 1399

Your letter dated 9TH MAY 2006 on the above subject refers:

Your application requesting permission and approval to cut across Kihuyo-Njengu at the above-mentioned site has been considered and approved having paid the relevant fees as per attached receipt dated 21st April 2005.

You are therefore authorized to carry out the works subject to adhering to the Conditions below.

1. Obtain clearance from other road agencies where that is applicable.
2. The installation to be done as per the submitted and approved layout plan.
3. Make good the grounds and reinstate to working conditions all other facilities that may have been tampered with upon completing the works and leave the site clean and tidy.
4. Notify this office when commencing and allow inspection compliance with the above conditions.

COUNTY ENGINEER
COUNTY GOVERNMENT OF NYERI
P. O. Box 1112 - 10100, NYERI

g. Solomon N. Nderitu
. Director Roads and Transport
ANSPORT, PUBLIC WORKS, INFRASTRUCTURE AND ENERGY

Annex 4: Authorization from WRMA for Existing Inlet and Weir along River Muringato- Extension of works to be followed

WATER RESOURCES MANAGEMENT AUTHORITY
TANA CATCHMENT AREA

Tel: 31271
Tele/Fax:31315
E-Mail: wrmatana @ winnet.co.ke

REGIONAL OFFICE
P.O. BOX 1930
EMBU

Ref. No: WRMA/TC/ 00173 / (12)

Date: 9th May 2006

Kihuyo Water Project,
Kihuyo Area,
P.O. Box 2797,
NYERI.

Dear Sir/Madam,

RE: AUTHORIZATION TO CONSTRUCT WATER WORKS ALONG MURINGATO RIVER: MUHOYA'S LOCATION: TETU DIVISION: NYERI DISTRICT

This is to inform you that you have been issued with an authorization Ref **WRMA/TC 00173** of 4th **May 2006** to enable you to construct water works along the above river for abstraction of **246.321**m^3/day from normal flow for domestic use and **603.0**. m^3/day from flood flow for minor/general irrigation purposes only. In this connection, your attention is drawn to all the conditions which are indicated at the back of the authorization under reference.

I accordingly enclose herewith the said Autherization.

Please ensure that the **DISTRICT WATER OFFICER NYERI DISTRICT** is informed on completion of the works so that an inspection can be carried out and comprehensive report is filed for reference to this office for further action.

This Authorization will be automatically cancelled when the authorized period expires, without any further reference to you unless extension of time limit is applied for prior to date of expiry.

The following details/documents are required to complete your application before a permit can be issued.

(a) Certificate of completion of works forms (to be issued at **DISTRICT WATER OFFICE**) duly signed when works have been installed.

(b) Design plan of intake works must be submitted and approved by WRMA – Tana Catchment.

(c) That Environmental Impact Assessment Report is submitted.

1

WRMA 2

REPUBLIC OF KENYA

WATER RESOURCES MANAGEMENT AUTHORITY
TANA CATCHMENT AREA

Tel: 31271
Tele/Fax:31315
E-Mail: wrmatana @ winnet.co.ke

REGIONAL OFFICE
P.O. BOX 1930
EMBU

FILE NO/WRMA/TC / 00173

DATE: 4th May 2006

AUTHORIZATION

TO CONSTRUCT WORKS FOR THE DIVERSION, ABSTRACTION, STORAGE OR USE OF WATER

ISSUED IN ACCORDANCE WITH THE PROVISIONS OF THE WATER ACT, 2002 AND THE RULES THEREUNDER

Name of body of water MURINGATO RIVER

Drainage area 4

Number permit will bear if or when issued..... ...WRMA/TC/ 00173

Number of authorization WRMA/TC/00173

KIHUYO WATER PROJECT
(Full Name)
Of P.O. BOX 2797, NYERI

Having filed the necessary application, maps and plans, and having complied with the provisions of the Water Act, 2002, and the Rules there under relating to the applications for Water Permits *is/are hereby authorized to construct, subject to the acquisition of the necessary rights of way or easements therefore, if any, the works shown by the said applications, maps and plans in accordance with provisions of the Water Act, 2002, the Rules there under, and the following conditions:-

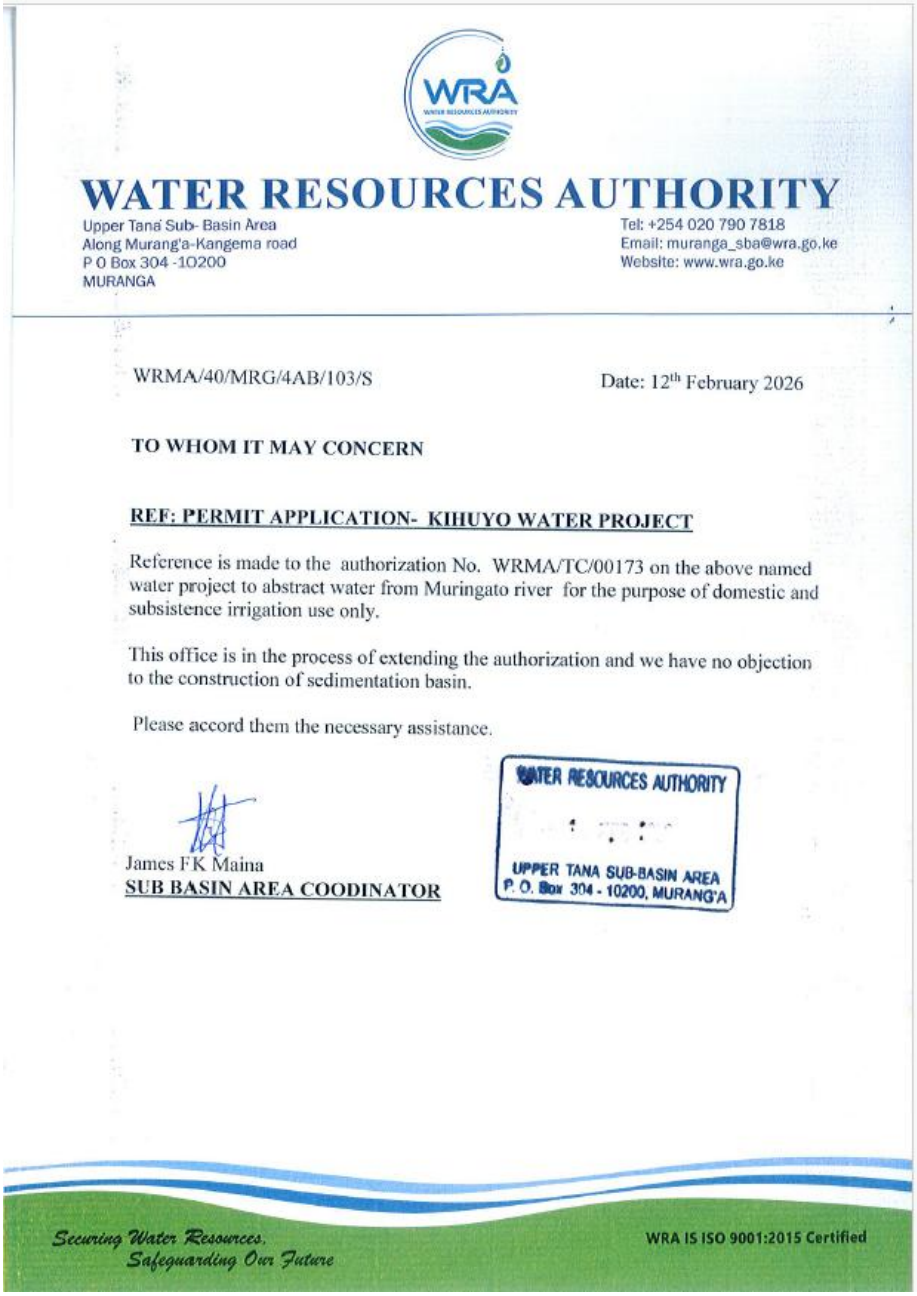
1. The construction of the works hereby authorized shall commence within a period of SEVEN (7) Days/months/years and shall be completed within a period of TWENTY FOUR (24) months/ Years from the date of this authorization.

2. (a) Any person who erects or constructs temporary works shall be entitled to divert, abstract, impound, obstruct, store or use water to such extent only as may be necessary for the construction or erection of the works, and whenever it shall be necessary to divert,

*Delete words not required

P.T.O

Annex 5: No objection from WRA for the construction of the sedimentation basin



WATER RESOURCES AUTHORITY

Upper Tana Sub- Basin Area
Along Murang'a-Kangema road
P O Box 304 -10200
MURANGA

Tel: +254 020 790 7818
Email: muranga_sba@wra.go.ke
Website: www.wra.go.ke

WRMA/40/MRG/4AB/103/S

Date: 12th February 2026

TO WHOM IT MAY CONCERN

REF: PERMIT APPLICATION- KIHUYO WATER PROJECT

Reference is made to the authorization No. WRMA/TC/00173 on the above named water project to abstract water from Muringato river for the purpose of domestic and subsistence irrigation use only.

This office is in the process of extending the authorization and we have no objection to the construction of sedimentation basin.

Please accord them the necessary assistance.

James FK Maina
SUB BASIN AREA COODINATOR

WATER RESOURCES AUTHORITY
UPPER TANA SUB-BASIN AREA
P. O. Box 304 - 10200, MURANG'A

Securing Water Resources. Safeguarding Our Future

WRA IS ISO 9001:2015 Certified

Annex 6: Evidence of Registration of Kihuyo Irrigation Water User Association

REPUBLIC OF KENYA

THE SOCIETIES RULES, 1968

(RULE 4)

REG NO:SOCA-77SNEKA

CERTIFICATE OF REGISTRATION

SOCA-77SNEKA

I **Teresia Gathagu**, Registrar of Societies, hereby certify that I have this day registered the **KIHUYO COMMUNITY IRRIGATION WATER USERS Association** under section 10 of the Societies Act.

Dated at **NAIROBI** this **13** day of **August 2025**

REGISTRAR OF SOCIETIES

Annex 7: KRA Pin Certificate of the Kihuyo Water User Association

KENYA REVENUE AUTHORITY

www.kra.go.ke

PIN Certificate

For General Tax Questions
Contact KRA Call Centre
Tel: +254 (020) 4999 999
Cell: +254(0711)099 999
Email: callcentre@kra.go.ke

Certificate Date : 15/01/2025

Personal Identification Number
P052394498U

This is to certify that taxpayer shown herein has been registered with Revenue Authority

Taxpayer Information

Taxpayer Name	KIHUYO IRRIGATION WATER ASSOCIATION
Email Address	KIHUYOIRRIGATIONWATERP@GMAIL.COM

Registered Address

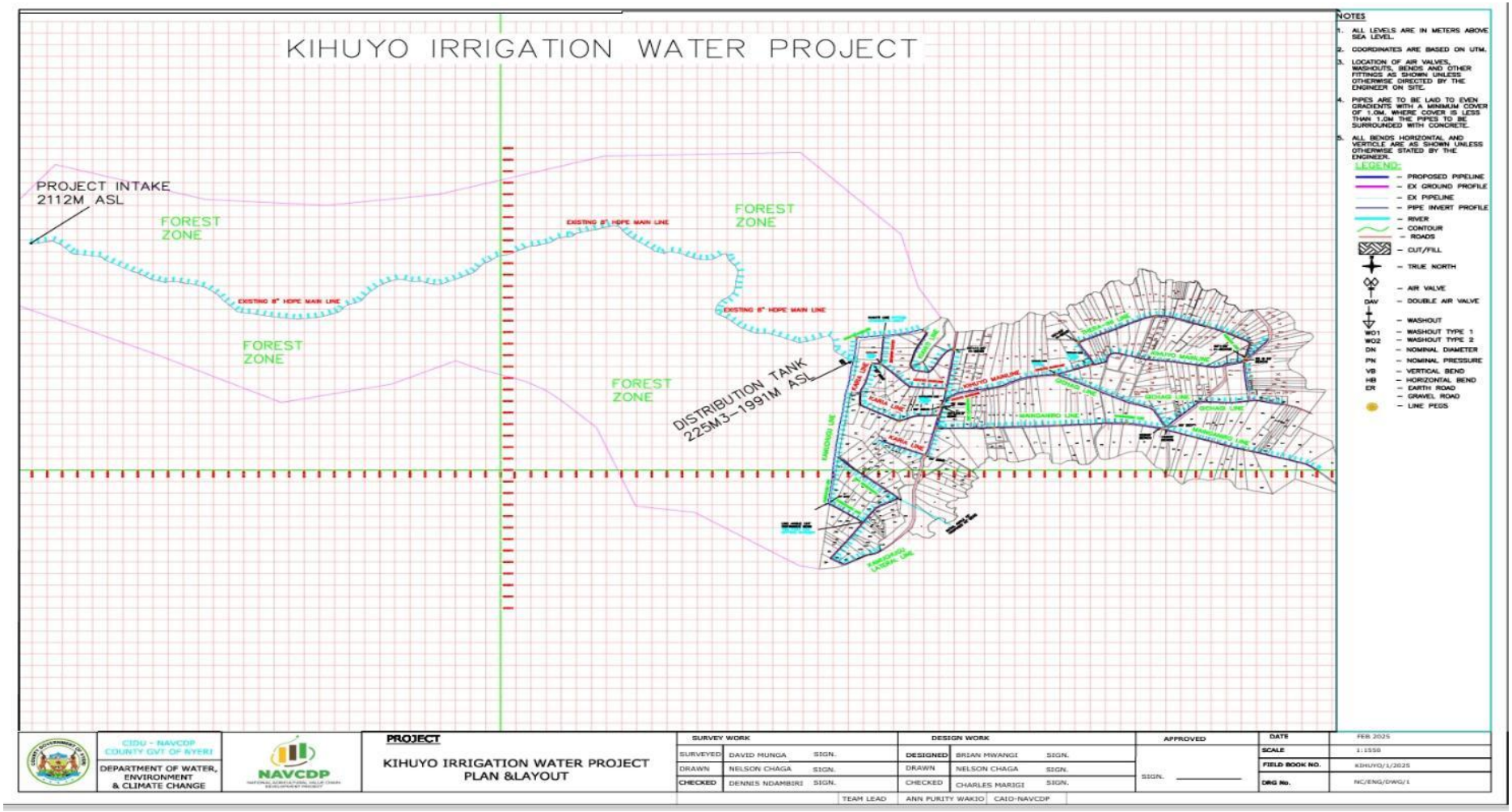
L.R. Number :	**Building :** KIHUYO
Street/Road : KIHUYO	**City/Town :** KIHUYO
County : Nyeri	**District :** Nyeri Central District
Tax Area : Nyeri Town	**Station :** Nyeri
P. O. Box : 12	**Postal Code :** 10103

Tax Obligation(s) Registration Details

Sr. No.	Tax Obligation(s)	Effective From Date	Effective Till Date	Status
1	Income Tax - Company	15/01/2025	N.A.	Active

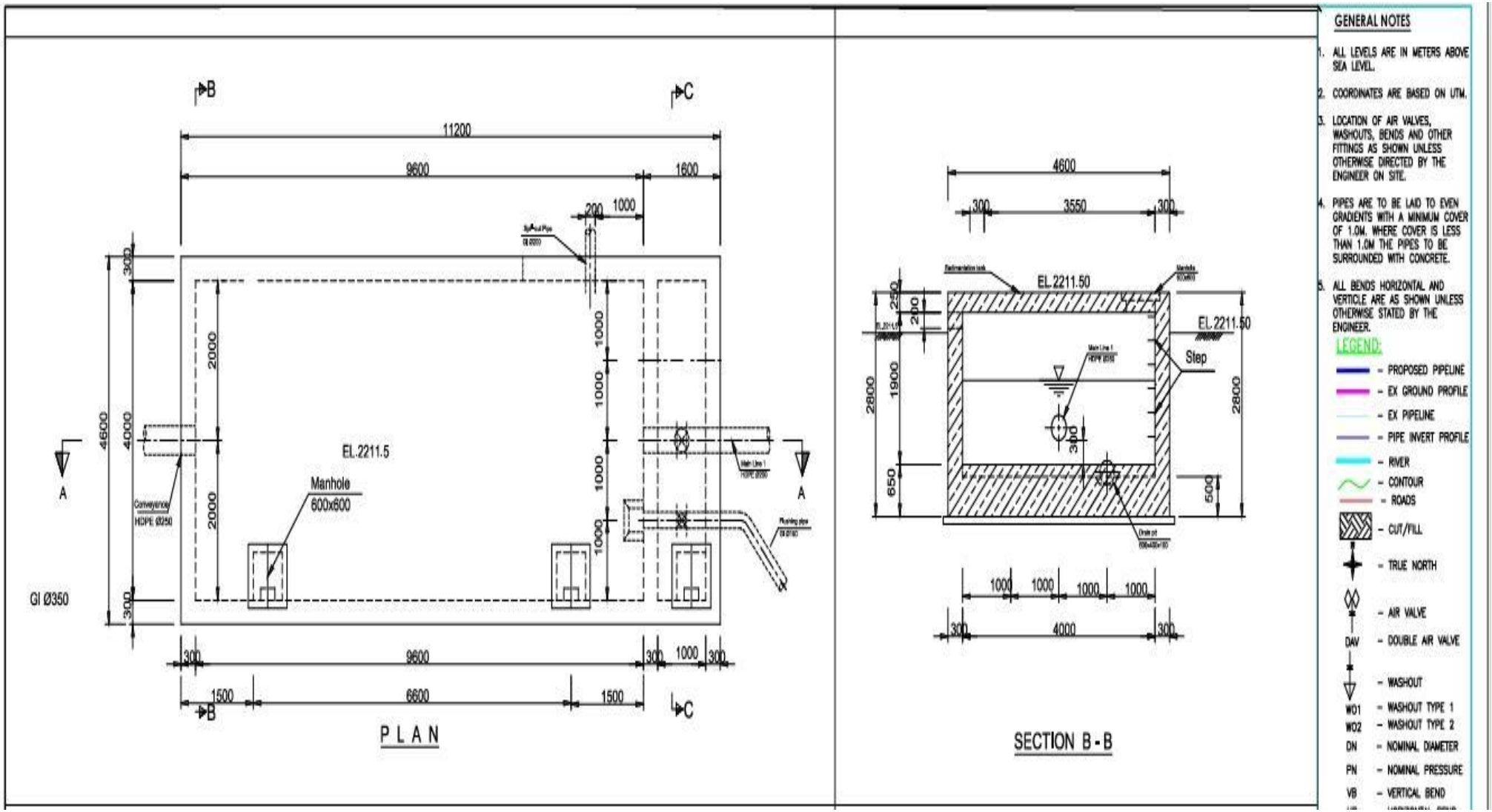
The above PIN must appear on all your tax invoices and correspondences with Revenue Authority. Your accounting end month is December unless a change has been approved by the Commissioner-Domestic Taxes Department. The status of Tax Obligation(s) with 'Dormant' status will automatically change to 'Active' on date mentioned in "Effective Till Date" or any transaction done during the period. This certificate shall remain in force till further updated.

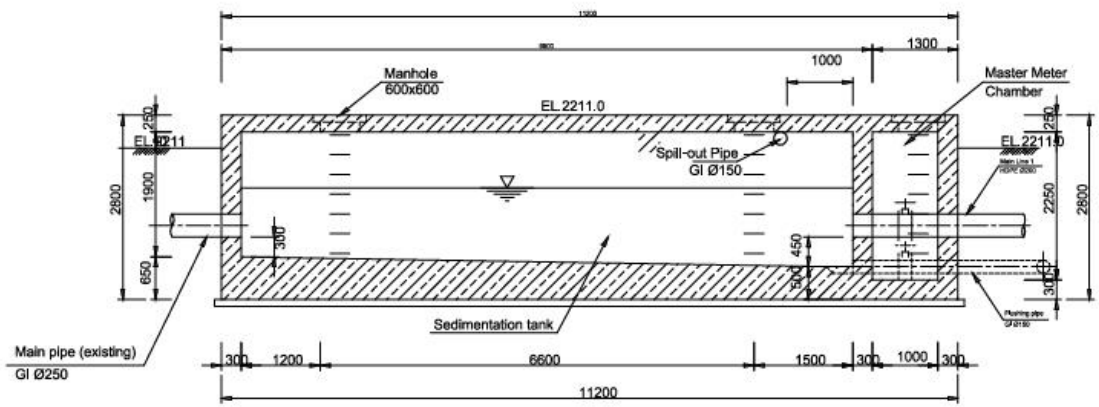
Annex 8: The Layout of the Proposed Kihuyo Irrigation Sub-project



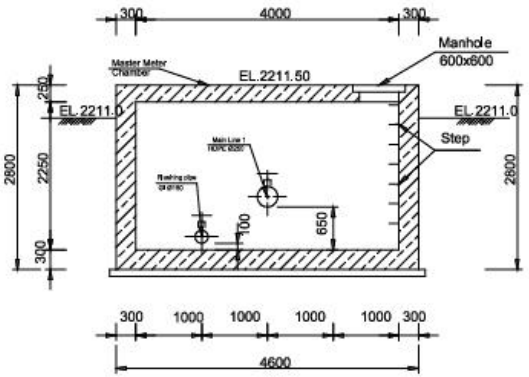
NOTES
EXISTING 8" HDPE MAIN LINE
KIHUYO MAINLINE
GICHAGI LINE
MANGANIRO LINE
KARIA LINE
KAMUCHUGU LINE
KAMUCHUGU LATERAL LINE
LEGEND
DEPARTMENT OF WATER, ENVIRONMENT & CLIMATE CHANGE
NAVCDP
PROJECT
KIHUYO IRRIGATION WATER PROJECT
PLAN &LAYOUT 2
SURVEY WORK
DESIGN WORK
SURVEYED DAVID MUNGA SIGN.
DRAWN NELSON CHAGA SIGN.
CHECKED DENNIS NDAMBIRI SIGN.
DESIGNED BRIAN MWANGI SIGN.
DRAWN NELSON CHAGA SIGN.
CHECKED CHARLES MARIGI SIGN.
TEAM LEAD ANN PURITY WAKIO CAIO-NAVCDP
DATE FEB 2025
SCALE
FIELD BOOK NO.
DWG No

Annex 9: Design of the Sedimentation Basin





SECTION A - A

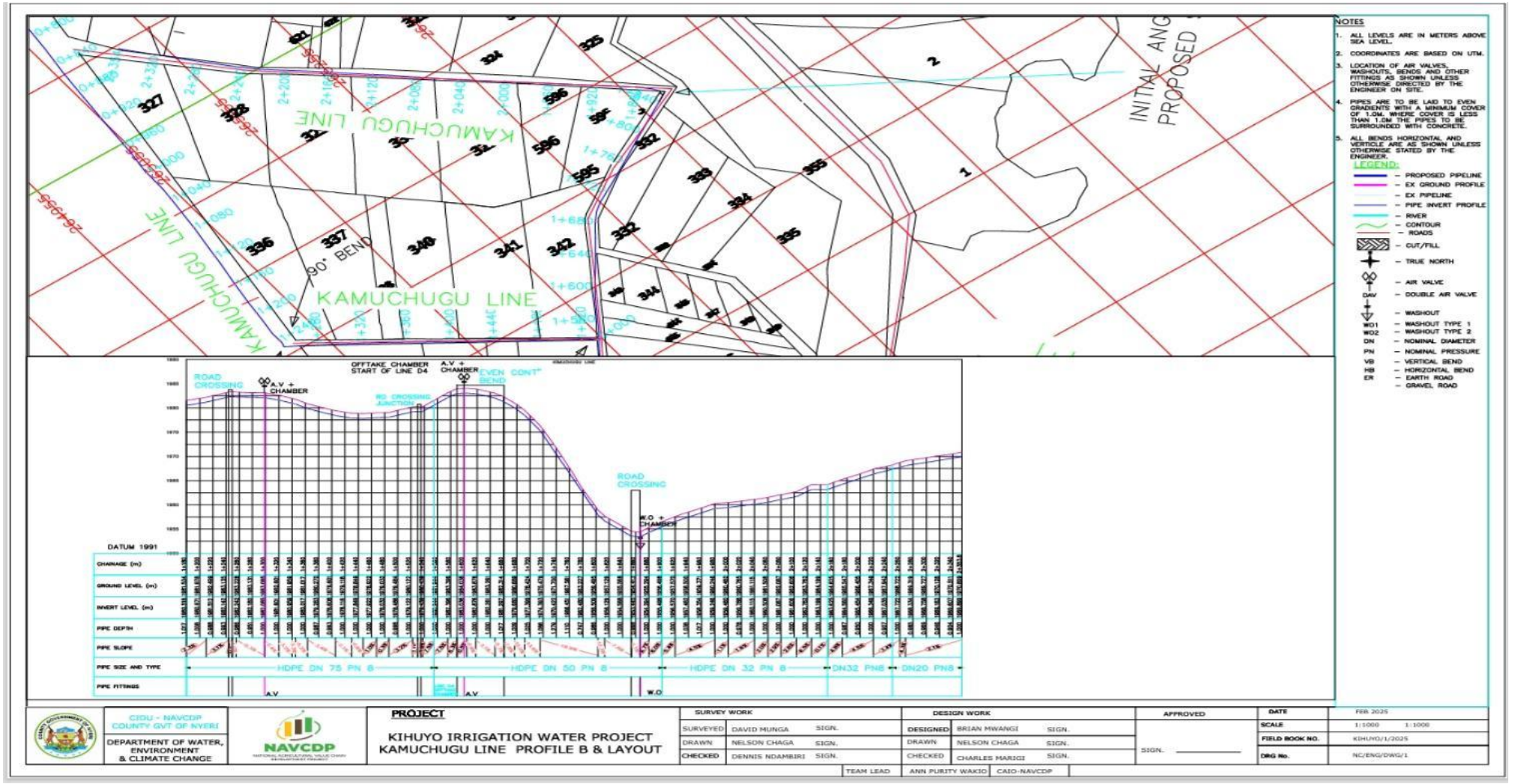


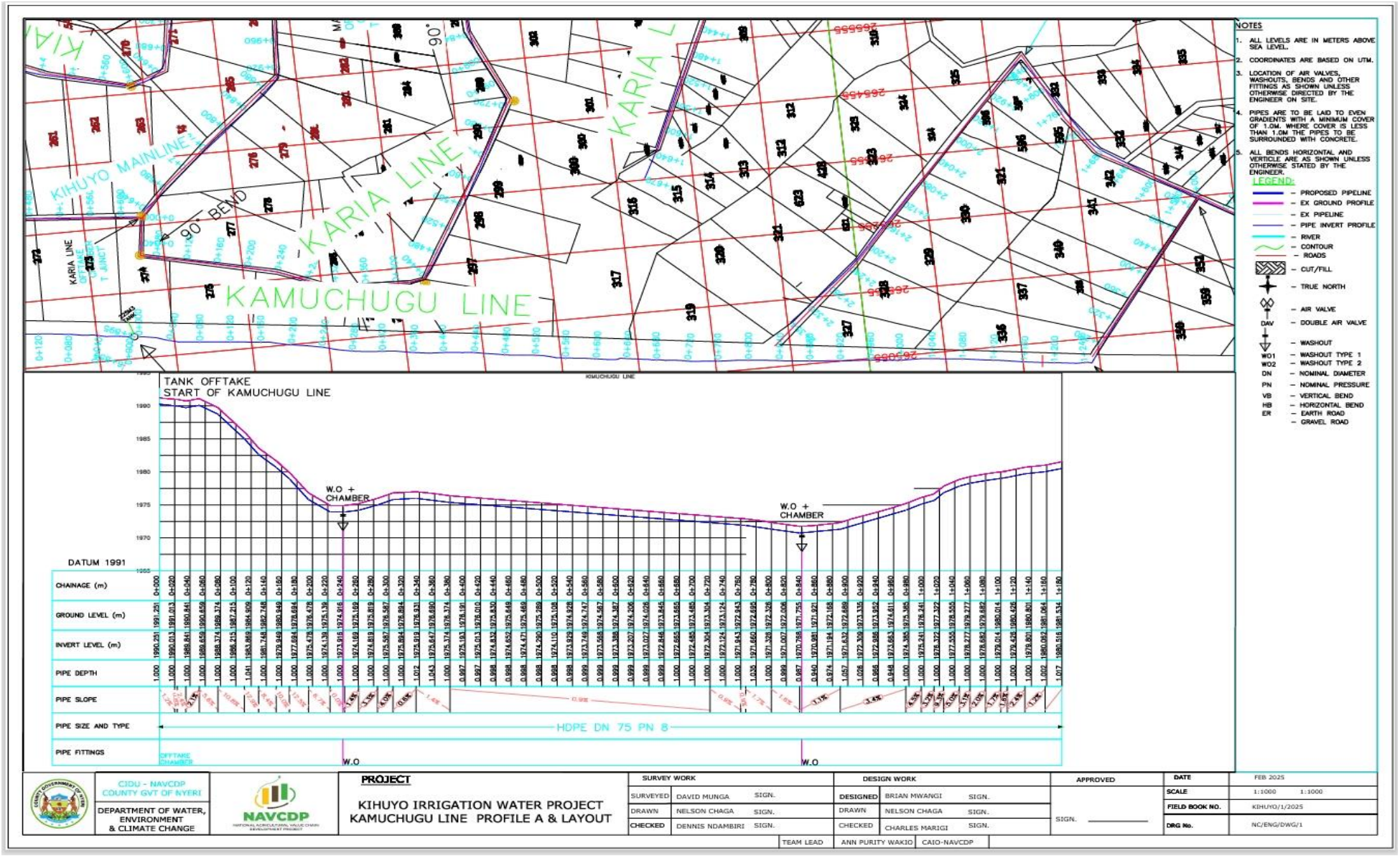
SECTION C - C

HB – HORIZONTAL BEND
ER – EARTH ROAD
– GRAVEL ROAD

CIDU - NAVCDP COUNTY GVT OF NYERI DEPARTMENT OF WATER, ENVIRONMENT & CLIMATE CHANGE	NAVCDP	**PROJECT** KIHUYO IRRIGATION WATER PROJECT SEDMENTATION BASIN & DETAILS	SURVEY WORK		DESIGN WORK		APPROVED	DATE	FEB 2025
			SURVEYED	SIGN.	DESIGNED	DAVID MUNGA SIGN.	SIGN. _____	SCALE	1:150
			DRAWN	SIGN.	DRAWN	NELSON CHAGA SIGN.		FIELD BOOK NO.	KIHUYO/1/2025
			CHECKED	SIGN.	CHECKED	CHARLES MARIGI SIGN.		DRG No.	NC/ENG/DWG/1
			TEAM LEAD	ANN PURITY WAKIO	CAIO-NAVCDP				

Annex 10: Layout of the Pipeline Infrastructure




KIHUYO MAINLINE
KARIA LINE
KAMUCHUGU LINE
90° BEND
KARIA LINE OFFTAKE
T-JUNCT
TANK OFFTAKE
START OF KAMUCHUGU LINE
W.O + CHAMBER
W.O + CHAMBER
DATUM 1991
CHAINAGE (m)
GROUND LEVEL (m)
INVERT LEVEL (m)
PIPE DEPTH
PIPE SLOPE
PIPE SIZE AND TYPE
HDPE DN 75 PN 8
PIPE FITTINGS
OFFTAKE CHAMBER
W.O
W.O
NOTES
1. ALL LEVELS ARE IN METERS ABOVE SEA LEVEL.
2. COORDINATES ARE BASED ON UTM.
3. LOCATION OF AIR VALVES, WASHOUTS, BENDS AND OTHER FITTINGS AS SHOWN UNLESS OTHERWISE DIRECTED BY THE ENGINEER ON SITE.
4. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM COVER OF 1.0M. WHERE COVER IS LESS THAN 1.0M THE PIPES TO BE SURROUNDED WITH CONCRETE.
5. ALL BENDS HORIZONTAL AND VERTICLE ARE AS SHOWN UNLESS OTHERWISE STATED BY THE ENGINEER.
LEGEND:
– PROPOSED PIPELINE
– EX GROUND PROFILE
– EX PIPELINE
– PIPE INVERT PROFILE
– RIVER
– CONTOUR
– ROADS
– CUT/FILL
– TRUE NORTH
– AIR VALVE
DAV – DOUBLE AIR VALVE
– WASHOUT
WO1 – WASHOUT TYPE 1
WO2 – WASHOUT TYPE 2
DN – NOMINAL DIAMETER
PN – NOMINAL PRESSURE
VB – VERTICAL BEND
HB – HORIZONTAL BEND
ER – EARTH ROAD
– GRAVEL ROAD
CIDU - NAVCDP
COUNTY GVT OF NYERI
DEPARTMENT OF WATER, ENVIRONMENT & CLIMATE CHANGE
NAVCDP
PROJECT
KIHUYO IRRIGATION WATER PROJECT
KAMUCHUGU LINE PROFILE A & LAYOUT
SURVEY WORK
SURVEYED DAVID MUNGA SIGN.
DRAWN NELSON CHAGA SIGN.
CHECKED DENNIS NDAMBIRI SIGN.
DESIGN WORK
DESIGNED BRIAN MWANGI SIGN.
DRAWN NELSON CHAGA SIGN.
CHECKED CHARLES MARIGI SIGN.
TEAM LEAD ANN PURITY WAKIO CAIO-NAVCDP
APPROVED
SIGN.
DATE FEB 2025
SCALE 1:1000 1:1000
FIELD BOOK NO. KIHUYO/1/2025
DRG No. NC/ENG/DWG/1

Annex 11: Designs Approval and the Bills of Quantity

Republic of Kenya

NAVCDP

DESIGN REPORT OF KIHUYO IRRIGATION PROJECT

NATIONAL AGRICULTURAL VALUE CHAIN DEVELOPMENT PROJECT

ENG. GICHUKI SIMON G. LICENSED PROFESSIONAL ENGINEER A2307 ENGINEERS BOARD OF KENYA

MARCH 2025

GRAND SUMMARY

Bill No.	Description	Amount (KSh)
1	Preliminaries and General	1,818,500.00
2	Kihuyo Mainline	8,120,256.40
3	Kamichugu Branch	1,489,703.50
4	Kamichugu Lateral Line	433,500.00
5	Kiahiti Branch	809,058.75
6	Karia Branch	583,937.50
7	Mainganiro Branch	3,559,025.00
8	Gichagi Branch	1,611,612.50
9	Thare-ini Branch	2,609,018.75
10	Sedimentation Basin	3,706,250.00
11	Provisional sums	500,000.00
	SUB TOTAL	25,240,862.40
	Add 16^ VAT	4,038,537.98
	GRAND TOTAL	**29,279,400.38**

Annex 12: Minutes of the Public Participation Forum

MINUTES FOR THE PUBLIC PARTICIPATION MEETING ON THE PROPOSED KIHUYO IRRIGATION WATER PROJECT THAT TOOK PLACE ON 20TH MAY,2025 AT OPEN FIELD NEAR KIHUYO DISPENSARY

MEMEBERS PRESENT

As per attached attendance sheet

Agenda

1. Preliminaries
2. Briefing of the proposed projects
3. Environment and Social Concerns
4. Any Other Business

MIN 1/20/05/25: PRELIMINARIES

The meeting was called to order at 1pm by the Chief who welcomed the members present and asked chairperson Kihuyo project to lead the meeting with a word of prayer. He further asked members to do round of introduction.

MIN 2/20/05/25: BRIEFING ON THE PROPOSED PROJECT

The Project Chairperson provided a background of the Kihuyo Irrigation Water Project, noting that water is currently abstracted from the Muringato River (Aberdare Forest) using a 225mm diameter pipe, with flow occurring by gravity. However, there is a pressing need to install a distribution system to enable farmers to access irrigation water.

The community unanimously supported the proposed project and pledged their commitment to its implementation. The Chairperson thanked both the committee and the community members for their continued support.

MIN 3/20/05/25: ENVIRONMENT AND SOCIAL CONCERNS

The Environmental Specialist invited community members to raise any environmental and social concerns related to the proposed project, so that these could be addressed

through an Environmental and Social Impact Assessment (ESIA). In response, the members noted that the expected positive impacts outweigh the negative ones, and no irreversible negative impacts were anticipated during the implementation of the project.

The summary of the positive impacts includes; Increased availability of water, increased water for irrigation, increased crop production due to increased water availability, increased livestock production due increased water availability,improved economic status/livelihood of the people, improved people health and nutrition, creation of job opportunities ,decreased social crimes.

Some of the negative impacts raised includes; Accidents due to open trenches, absent land owners,vegetation clearance

MIN 4/20/05/25: ANY OTHER BUSINESS

The Assistant Chief encouraged members to remain united and work collectively to ensure the successful implementation of the project.

MIN 5/20/05/25: ADJOURNMENT

The meeting ended at4:00 pm and LMC member Joshua Ndirangu led a closing prayer.

Minutes approved by:

Chairperson Daniel Gatiro **Sign**.....**Date**22/5/25

Minutes confirmed by:

Secretary Faith N. Mwangi **Sign**..... **Date**22/5/25

Annex 13: List of Attendance to the Public Participation Forum

NAVCDP

Nyeri County Project Coordinating Unit

STAKEHOLDER ATTENDANCE LIST

ACTIVITY: Kihuyo Irrigation Project Public participation VENUE: Kihuyo community hall DATE: 22/5/2025

S/NO.	NAME	ORGANISATION/DEPARTMENT	ID NO	GENDER	AGE (18-35)	AGE ABOVE 35 YRS	MOBILE NO.	SIGN
1	John Kimemi Githunji	L.M.C	10146297	M		✓	0726464835	[illegible]
(2)	JOSHUA NDIRANGU R.	LMC	21750262	M		✓	0725 227521	[illegible]
3	DAVID WARE.A	LMC	10579086	M		✓	0716536530	[illegible]
4	DANIEL GITHOUI		2735028	M				
	~~Mercy Muthemba~~		~~23071878~~	F		✓	~~0723882955~~	[illegible]
5	Mercy Muthemba		23071878	F		✓	0723310901	[illegible]
6	Ann Wangui		13725499	F		✓	0723 746 066	[illegible]
7	Nancy Mwende		27762372	F		✓	0728337264	[illegible]
8	Grace W Kigera		13726531	F		✓	0728941200	[illegible]
9	MIRIAM Gitau	N/A	0813782	F		✓	0725455766	mmg
10	Francis MURIMI	N/A	3352740	M		✓	0720297560	[illegible]
11	JOHN [illegible]	ADMINISTRATION	5979176	M		✓	0724715634	[illegible]
12	Daniel Gatia	Chairperson	24766159	M		✓	0721900483	[illegible]

NAVCDP

Nyeri County Project Coordinating Unit

STAKEHOLDER ATTENDANCE LIST

ACTIVITY: Kihuyo ~~Attenda~~ Irrigation Project Public participation VENUE: Kihuyo Community Field DATE: 20/5/2025

S/NO.	NAME	ORGANISATION/DEPARTMENT	ID NO	GENDER	AGE (18-35)	AGE ABOVE 35 YRS	MOBILE NO.	SIGN
1	Joyce Wamuci		9670638	F	[illegible]	✓	0714773601	[illegible]
2	Monchera Wamucjurela		5519334	F			0723642291	[illegible]
3	Jane W. Ndegwa		11252167	F		✓	0722472116	[illegible]
4	Regina Kamunya		13099053	F		✓	0745477135	[illegible]
5	Jackson Gitonga		5794142	F		✓	0723354610	[illegible]
6	John mwangi warui		5794304	M		✓	0728692461	[illegible]
7	Paul wachira		6649673	M		✓	0722475180	[illegible]
8	Duncan wangungu		23770408	M		✓	0725485678 ~~0719477726~~	RXX
9	Benson Muthoni		35681307	M	✓		0719477726	[illegible]
	TITUS MWATHEMBU		9455220	M	✓		0720240885	[illegible]
10	JOHN MWANGI NDIRITU		1178771	M			0727550960	[illegible]
12	Francis MURIMI		3352740	M	✓	✓	0720297560	[illegible]
13	Paul Kamani		8106886	M		✓	0771502486	[illegible]
14	Gabriel Maina		11629618	M		✓	0721875316	[illegible]

Republic of Kenya

NAVCDP

Nyeri County Project Coordinating Unit

STAKEHOLDER ATTENDANCE LIST

ACTIVITY: Kihuyo Public Partipation Irrigation Project. **VENUE:** Kihuyo Community field **DATE:** 20/5/2025

S/NO.	NAME	ORGANISATION/DEPARTMENT	ID NO	GENDER	AGE (18-35)	AGE ABOVE 35 YRS	MOBILE NO.	SIGN
1	CHARLES R. WAIBOCHI	KIHUYO IRRIGATION PROJECT	1428630	MALE		✓	0740166050	[signature]
2	Michael G. Kanove	"	3159355	MALE		✓	0722848722	[signature]
3	WILFRED MWANGI KAGECHA	"	3233594	MALE		✓	0720100269	[signature]
4	FARIS WANJIRU MUSA	"	7322220	FEMALE		✓	[illegible]	[signature]
5	JANE WANGUI NDIGA	"	11321994	FEMALE		✓	0727766472	[signature]
6	NAOMI MUMBI K	"	20758769	FEMALE		✓	0700069142	[signature]
7	Zipporah Muthoni Kimotho	"	5100303	Female		✓	0721701939	[signature]
8	Jackson Ndiritu Nyingi	"	11629604	Male		✓	0725212122	[signature]
9	Veronica Ngatia		3179078	Female		✓	[illegible]	
10	Samuel Muchemi Maina	"	13536283	Mail		✓	0727817090	[signature]
11	David Gitahi Wanjau	"	5507356	Male		✓	07224008[illegible]	[signature]
12	Joseph Gakunju	"	9553422	Male		✓	0712895776	[signature]
13	Caroline Wangari	"	5547719	MALE		✓	07127[illegible]	[signature]
14	Joseph Muriithi	"	5555466	MalE		✓	0710425646	[signature]

Annex 14: Dully Filled Questionnaire

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

PUBLIC PARTICIPATION QUESTIONNAIRE

PROJECT TITLE: PROPOSED KIKUYO IRRIGATION WATER PROJECT

National Agricultural Value Chain Development Project (NAVCDP) -- Nyeri County intends to undertake Kikuyo Irrigation Water project. The World Bank **ESS 1: Assessment and Management of Environmental and Social Risks and Impacts**, requires assessing, managing and monitoring environmental and social risks and impacts associated with such project in order to achieve environmental and social outcomes consistent with the Environmental and Social Standards (ESSs).

National Environmental Management Authority (NEMA) under Environmental Management and Co-ordination Act 1999 (Amendment 2015) section 58 requires that an environmental and Social Impact Assessment be undertaken to enable it make an informed decision in either approving and or/ recommending remedial measures prior to carrying out such development project.

As a member of the local community/project neighborhood, we kindly request for your comments in relation to the proposed project.

Please note that your response will be treated with the confidentiality it deserves.

1. Name: Gabriel Mainga
2. Gender: Male (✓) Female ( )
3. Age: 18-35 years ( ) 35 years and above (✓)
4. Mobile No. 0721 875 366
5. Relationship with the proposed project: Beneficiary (✓) Non-beneficiary ( )

   Others (specify)……
6. Area of residence…… Kikuyo Gichagi
7. Are your aware of the proposed project?

   Yes (✓) No ( )
8. If yes in Q7 above, do you expect any **negative environmental and social economic impacts** as a result of implementation of the proposed project?

   Yes (✓) No ( )

Thank you for your cooperation!

9. If yes in Q8 above, briefly explain……………………………………………………………
There may be gender based, Sexual
harasment Serial eration
acdent May happen

10. In your own option, how can the negative impacts that you have stated above be mitigated? ……………Community to be educated
Commitee members to be involved in work
Those to be employed comes from the area

11. What **positive environmental and social economic impacts** that will result from the implementation of the proposed project?
(*Tick appropriately*)
i) Increased availability of water (✓)
ii) Increased water for irrigation (✓)
iii) Increased crop production due to increased availability of water (✓)
iv) Increased livestock production due to increased availability of water (✓)
v) Improve economic status/livelihood of the people (✓)
vi) Improved peoples' health and nutrition (✓)
vii) Creation of job opportunities (✓)
viii) Increased school enrolment ✓
ix) Decreased early marriages (✓)
x) Decreased social crimes (✓)
xi) Decreased domestic violence (✓)
xii) Others (Specify)………………………………………………………………
……………………Plant more trees……………………
……………………………………………………………………………………

11. Additional remarks………Change of envilonment……………
……………………………………………………………………………………
……………………………………………………………………………………

Signature……[signature]……………………**Date**.20/05/25………………

Thank you for your cooperation!

Nyeri County Department of Agriculture is one of the counties implementing National Agricultural Value Chains Development Project (NAVCDP) in Kenya. The NAVCDP County project coordinating unit (CPCU) is mandated to ensure that all the supported investments within the county comply with the commitments under the Environmental and Social commitment Plan of NAVCDP, Environmental and Social Management Framework (ESMF), the World Bank Environmental and Social Standards (ESS) and the national environmental and social safeguards regulations under the EMCA 1999.

The NAVCDP CPCU in Nyeri county has identified Farmer Led Irrigation Projects (FLID) to be supported. The CPCU has engaged the services of a consultant to help develop Environmental and Social Impact Assessment (ESIA) as per the world bank requirement for such projects and in compliance with Environmental Management and Co-ordination Act (1999).

As a member of the local community to be served by this investment we request your comments on the expected social economic and environmental impacts of the proposed project.

1.1 (Please note that the feedback you give will be held in confidence and will only be used to enrich the E&S recommendations given by the consultant in the ESIA report.)

1. Are you familiar with the proposed project, its objectives and proposed activities?

Yes [✓] No [ ]

2. Will your source of livelihood / income be negatively affected by the proposed project?

Yes [ ] No [✓]

3. Do you think the proposed project is compatible with the surrounding developments?

Yes [✓] No [ ]

4. What positive social and environmental impact do you anticipate during construction and operation stages of this project?

Job Creation
Improved Farm Inputs

upgrading on homestead (wealth creation)
Improved Security (many people will be active in farming)

5. What negative social and environmental impact do you anticipate during construction and operation stages of this project?

Accidents due to open trenches
Sale of idle land (absent landowners)
Damage of existing infrastructure
Domestic violence (G.B.V)

6. What do you think the developer should do to mitigate negative social economic impacts of this project?

Employ locals to dig trenches
Using Reflective materials on trenches
Incoporate Committee Members on Implementation Stages - Employ Security to protect materials

7. Is there any other comment or suggestion you would like to make with regard to environmental and social safeguards?

Farmers to be trained on improved methods
Aggregation Centres for farmers training/sales

Name: Paul Wachiuri Date: 20/05/2025
Residence: Kihuyo/Kamichugu Designation: Committee Member
Contact: 0722 475180 Signature

THANK YOU FOR YOUR RESPONSE

NAVCDP

NATIONAL AGRICULTURAL VALUE CHAIN DEVELOPMENT PROJECT

COUNTY GOVERNMENT OF NYERI

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

PUBLIC PARTICIPATION QUESTIONNAIRE

PROJECT TITLE: PROPOSED KIKUYO IRRIGATION WATER PROJECT

National Agricultural Value Chain Development Project (NAVCDP) – Nyeri County intends to undertake Kikuyo Irrigation Water project. The World Bank **ESS 1: Assessment and Management of Environmental and Social Risks and Impacts**, requires assessing, managing and monitoring environmental and social risks and impacts associated with such project in order to achieve environmental and social outcomes consistent with the Environmental and Social Standards (ESSs).

National Environmental Management Authority (NEMA) under Environmental Management and Co-ordination Act 1999 (Amendment 2015) section 58 requires that an environmental and Social Impact Assessment be undertaken to enable it make an informed decision in either approving and or/ recommending remedial measures prior to carrying out such development project.

As a member of the local community/project neighborhood, we kindly request for your comments in relation to the proposed project.

Please note that your response will be treated with the confidentiality it deserves.

1. Name: David Gitahi Wangai
2. Gender: Male (✓) Female ( )
3. Age: 18-35 years ( ) 35 years and above (✓)
4. Mobile No. 0734008469
5. Relationship with the proposed project: Beneficiary (✓) Non-beneficiary ( )

   Others (specify).....
6. Area of residence. Kikuyo (Thara-ini)
7. Are your aware of the proposed project?
   Yes (✓) No ( )
8. If yes in Q7 above, do you expect any **negative environmental and social economic impacts** as a result of implementation of the proposed project?

   Yes (✓) No ( )

Thank you for your cooperation!

9. If yes in Q8 above, briefly explain……………………………………………………………

…- There may be Gender bassed harrasment

………Sexual harassment - - Soil erosion.

………even accident may happen……………………

10. In your own option, how can the negative impacts that you have stated above be mitigated?

……The community should be educated……………

……committee member to be involved………

……in work - Those to be employed be at project

11. What **positive environmental and social economic impacts** that will result from the implementation of the proposed project?

(*Tick appropriately*)

i) Increased availability of water (✓)

ii) Increased water for irrigation (✓)

iii) Increased crop production due to increased availability of water (✓)

iv) Increased livestock production due to increased availability of water (✓)

v) Improve economic status/livelihood of the people (✓)

vi) Improved peoples' health and nutrition (✓)

vii) Creation of job opportunities (✓)

viii) Increased school enrolment

ix) Decreased early marriages (✓)

x) Decreased social crimes (✓)

xi) Decreased domestic violence (✓)

xii) Others (Specify)……………………………………………………………………

………………………………………………………………………………………………

………………………………………………………………………………………………

11. Additional remarks… The……… environment……… will…………

…be……… ever……… green……… and……… even…

……the……… atmosphere……… will……… b……… ever fresh

Clean air / fresh air /

Signature……[signature]……………………………**Date**…20-5-2025…

Thank you for your cooperation!

NAVCDP

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

PUBLIC PARTICIPATION QUESTIONNAIRE

PROJECT TITLE: PROPOSED KIKUYO IRRIGATION WATER PROJECT

National Agricultural Value Chain Development Project (NAVCDP) – Nyeri County intends to undertake Kikuyo Irrigation Water project. The World Bank **ESS 1: Assessment and Management of Environmental and Social Risks and Impacts**, requires assessing, managing and monitoring environmental and social risks and impacts associated with such project in order to achieve environmental and social outcomes consistent with the Environmental and Social Standards (ESSs).

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As a member of the local community/project neighborhood, we kindly request for your comments in relation to the proposed project.

Please note that your response will be treated with the confidentiality it deserves.

1. Name: Samuel Muchemi Maina
2. Gender: Male (✓) Female ( )
3. Age: 18-35 years ( ) 35 years and above (✓)
4. Mobile No. 0727817098
5. Relationship with the proposed project: Beneficiary (✓) Non-beneficiary ( )
   Others (specify).....
6. Area of residence. Kikuyo - THARA-INI
7. Are your aware of the proposed project?
   Yes (✓) No ( )
8. If yes in Q7 above, do you expect any **negative environmental and social economic impacts** as a result of implementation of the proposed project?
   Yes (✓) No ( )

Thank you for your cooperation!

9. If yes in Q8 above, briefly explain...... There Be Gender ......Harrasment...... Sexual...... Accidents ...... in ...... working...... Of the ...... project......

10. In your own option, how can the negative impacts that you have stated above be mitigated?
......to Empere...... our ...... youth......
......
......

11. What **positive environmental and social economic impacts** that will result from the implementation of the proposed project?
(*Tick appropriately*)
i) Increased availability of water (✓)
ii) Increased water for irrigation (✓) yes
iii) Increased crop production due to increased availability of water ( ) Yes
iv) Increased livestock production due to increased availability of water (✓) yes
v) Improve economic status/livelihood of the people (✓)
vi) Improved peoples' health and nutrition (✓)
vii) Creation of job opportunities (✓)
viii) Increased school enrolment
ix) Decreased early marriages (✓)
x) Decreased social crimes (✓)
xi) Decreased domestic violence (✓)
xii) Others (Specify)...... Mal more ......
......trees......
......

11. Additional remarks...... Good ...... Project......
......
......

Signature...... [signature] ......**Date**...... 20-05-2020......

Thank you for your cooperation!

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

PUBLIC PARTICIPATION QUESTIONNAIRE

PROJECT TITLE: PROPOSED KIKUYO IRRIGATION WATER PROJECT

National Agricultural Value Chain Development Project (NAVCDP) – Nyeri County intends to undertake Kikuyo Irrigation Water project. The World Bank **ESS 1: Assessment and Management of Environmental and Social Risks and Impacts**, requires assessing, managing and monitoring environmental and social risks and impacts associated with such project in order to achieve environmental and social outcomes consistent with the Environmental and Social Standards (ESSs).

National Environmental Management Authority (NEMA) under Environmental Management and Co-ordination Act 1999 (Amendment 2015) section 58 requires that an environmental and Social Impact Assessment be undertaken to enable it make an informed decision in either approving and or/ recommending remedial measures prior to carrying out such development project.

As a member of the local community/project neighborhood, we kindly request for your comments in relation to the proposed project.

Please note that your response will be treated with the confidentiality it deserves.

1. Name: Joseph Rukwaro Mugui
2. Gender: Male (✓) Female ( )
3. Age: 18-35 years ( ) 35 years and above (✓)
4. Mobile No. 0712 393776
5. Relationship with the proposed project: Beneficiary (✓) Non-beneficiary ( )
   Others (specify)……
6. Area of residence Mai-ngarino Kikuyo
7. Are your aware of the proposed project?
   Yes (✓) No ( )
8. If yes in Q7 above, do you expect any **negative environmental and social economic impacts** as a result of implementation of the proposed project?

   Yes (✓) No ( )

Thank you for your cooperation!

9. If yes in Q8 above, briefly explain.....
YES

10. In your own option, how can the negative impacts that you have stated above be mitigated?
WE EMPLOY WHO ONE PEOPLE BUT NOT INCOMERS.

11. What **positive environmental and social economic impacts** that will result from the implementation of the proposed project?
(*Tick appropriately*)
i) Increased availability of water (✓)
ii) Increased water for irrigation ( )
iii) Increased crop production due to increased availability of water ( )
iv) Increased livestock production due to increased availability of water ( )
v) Improve economic status/livelihood of the people ( )
vi) Improved peoples' health and nutrition ( )
vii) Creation of job opportunities ( )
viii) Increased school enrolment
ix) Decreased early marriages ( ) NO
x) Decreased social crimes ( )
xi) Decreased domestic violence ( )
xii) Others (Specify).....
Plant more trees.

11. Additional remarks..... Good Project.

Signature..... **Date**..26/05/2025.....

Thank you for your cooperation!

NAVCDP

NATIONAL AGRICULTURAL VALUE CHAIN DEVELOPMENT PROJECT

COUNTY GOVERNMENT OF NYERI

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

PUBLIC PARTICIPATION QUESTIONNAIRE

PROJECT TITLE: PROPOSED KIKUYO IRRIGATION WATER PROJECT

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National Environmental Management Authority (NEMA) under Environmental Management and Co-ordination Act 1999 (Amendment 2015) section 58 requires that an environmental and Social Impact Assessment be undertaken to enable it make an informed decision in either approving and or/ recommending remedial measures prior to carrying out such development project.

As a member of the local community/project neighborhood, we kindly request for your comments in relation to the proposed project.

Please note that your response will be treated with the confidentiality it deserves.

1. Name: CAROLINE WANJIRU RUKWARO
2. Gender: Male (✓) Female ( )
3. Age: 18-35 years ( ) 35 years and above (✓)
4. Mobile No..... 0712211299 .....
5. Relationship with the proposed project: Beneficiary (✓) Non-beneficiary ( )

   Others (specify).....
6. Area of residence..... GAICHAGA .....
7. Are your aware of the proposed project?
   Yes (✓) No ( )
8. If yes in Q7 above, do you expect any **negative environmental and social economic impacts** as a result of implementation of the proposed project?

   Yes (✓) No ( )

Thank you for your cooperation!

NAVCDP

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

PUBLIC PARTICIPATION QUESTIONNAIRE

PROJECT TITLE: PROPOSED KIKUYO IRRIGATION WATER PROJECT

National Agricultural Value Chain Development Project (NAVCDP) – Nyeri County intends to undertake Kikuyo Irrigation Water project. The World Bank **ESS 1: Assessment and Management of Environmental and Social Risks and Impacts**, requires assessing, managing and monitoring environmental and social risks and impacts associated with such project in order to achieve environmental and social outcomes consistent with the Environmental and Social Standards (ESSs).

National Environmental Management Authority (NEMA) under Environmental Management and Co-ordination Act 1999 (Amendment 2015) section 58 requires that an environmental and Social Impact Assessment be undertaken to enable it make an informed decision in either approving and or/ recommending remedial measures prior to carrying out such development project.

As a member of the local community/project neighborhood, we kindly request for your comments in relation to the proposed project.

Please note that your response will be treated with the confidentiality it deserves.

1. Name: Gabriel Mawa
2. Gender: Male (✓) Female ( )
3. Age: 18-35 years ( ) 35 years and above (✓)
4. Mobile No. 0721 875366
5. Relationship with the proposed project: Beneficiary (✓) Non-beneficiary ( )
   Others (specify).....
6. Area of residence..... Kikuyo Gichagi .....
7. Are your aware of the proposed project?
   Yes (✓) No ( )
8. If yes in Q7 above, do you expect any **negative environmental and social economic impacts** as a result of implementation of the proposed project?
   Yes (✓) No ( )

Thank you for your cooperation!

NAVCDP

Upgrading on homesteads (wealth Creation)
Improved Security (many people will be active in farming)

5. What negative social and environmental impact do you anticipate during construction and operation stages of this project?

Accidents due to open trenches
Sale of idle land (absent landowners)
Damage of existing infrastructure
Domestic Violence (G.B.V)

6. What do you think the developer should do to mitigate negative social economic impacts of this project?

Employ locals to dig trenches
Using Reflective materials on trenches
Incoporate Committee Members on Implementation Stages - Employ Security to protect materials

7. Is there any other comment or suggestion you would like to make with regard to environmental and social safeguards?

~~Farmers~~ to be trained on improved methods
Aggregation Centres for farmers training/sales

Name: Paul Wachiuri Date: 20/05/2025
Residence: Kihuya/Kamichugu Designation: Committee Member
Contact: 0722 475180 Signature

THANK YOU FOR YOUR RESPONSE

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The NAVCDP CPCU in Nyeri county has identified Farmer Led Irrigation Projects (FLID) to be supported. The CPCU has engaged the services of a consultant to help develop Environmental and Social Impact Assessment (ESIA) as per the world bank requirement for such projects and in compliance with Environmental Management and Co-ordination Act (1999).

As a member of the local community to be served by this investment we request your comments on the expected social economic and environmental impacts of the proposed project.

1.1 (Please note that the feedback you give will be held in confidence and will only be used to enrich the E&S recommendations given by the consultant in the ESIA report.)

1. Are you familiar with the proposed project, its objectives and proposed activities?

Yes [✓] No [ ]

2. Will your source of livelihood / income be negatively affected by the proposed project?

Yes [ ] No [✓]

3. Do you think the proposed project is compatible with the surrounding developments?

Yes [✓] No [ ]

4. What positive social and environmental impact do you anticipate during construction and operation stages of this project?

Job Creation
Improved Farm Inputs

9. If yes in Q8 above, briefly explain..
There may be gender based, Sexual harasment Seri erahon
accident may happen

10. In your own option, how can the negative impacts that you have stated above be mitigated? Community to be educated
Commitee members to be involved in work
Those to be employed comes from the area

11. What **positive environmental and social economic impacts** that will result from the implementation of the proposed project?
(*Tick appropriately*)

i) Increased availability of water (✓)
ii) Increased water for irrigation (✓)
iii) Increased crop production due to increased availability of water (✓)
iv) Increased livestock production due to increased availability of water (✓)
v) Improve economic status/livelihood of the people (✓)
vi) Improved peoples' health and nutrition (✓)
vii) Creation of job opportunities (✓)
viii) Increased school enrolment ✓
ix) Decreased early marriages (✓)
x) Decreased social crimes (✓)
xi) Decreased domestic violence (✓)
xii) Others (Specify)..

Plant more trees

11. Additional remarks........ Change of envilonment

Signature............................ **Date** 20/05/25

Thank you for your cooperation!

NAVCDP

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

PUBLIC PARTICIPATION QUESTIONNAIRE

PROJECT TITLE: PROPOSED KIKUYO IRRIGATION WATER PROJECT

National Agricultural Value Chain Development Project (NAVCDP) – Nyeri County intends to undertake Kikuyo Irrigation Water project. The World Bank **ESS 1: Assessment and Management of Environmental and Social Risks and Impacts**, requires assessing, managing and monitoring environmental and social risks and impacts associated with such project in order to achieve environmental and social outcomes consistent with the Environmental and Social Standards (ESSs).

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As a member of the local community/project neighborhood, we kindly request for your comments in relation to the proposed project.

Please note that your response will be treated with the confidentiality it deserves.

1. Name: David Gitahi Wangai
2. Gender: Male (✓) Female ( )
3. Age: 18-35 years ( ) 35 years and above (✓)
4. Mobile No..... 0734008469 .....
5. Relationship with the proposed project: Beneficiary (✓) Non-beneficiary ( )

   Others (specify).....
6. Area of residence.... Kikuyo (Thara-ini) .....
7. Are your aware of the proposed project?
   Yes (✓) No ( )
8. If yes in Q7 above, do you expect any **negative environmental and social economic impacts** as a result of implementation of the proposed project?

   Yes (✓) No ( )

Thank you for your cooperation!

9. If yes in Q8 above, briefly explain……………………………………………………………
…– There may be Gender bassed harrasment
……Sexsual harrasment – – Soil erosion
……even accident may happen……………

10. In your own option, how can the negative impacts that you have stated above be mitigated?
……The Community should be educated……………
……committee member to be involved………
……in work – Those to be employed be at project

11. What **positive environmental and social economic impacts** that will result from the implementation of the proposed project?
(*Tick appropriately*)

i) Increased availability of water (✓)
ii) Increased water for irrigation (✓)
iii) Increased crop production due to increased availability of water (✓)
iv) Increased livestock production due to increased availability of water (✓)
v) Improve economic status/livelihood of the people (✓)
vi) Improved peoples' health and nutrition (✓)
vii) Creation of job opportunities (✓)
viii) Increased school enrolment
ix) Decreased early marriages (✓)
x) Decreased social crimes (✓)
xi) Decreased domestic violence (✓)
xii) Others (Specify)……………………………………………………………………

……………………………………………………………………………………………

……………………………………………………………………………………………

11. Additional remarks… The ……environment ……will……
…be ……ever ……green ……and ……even……
……the ……atmosphere ……will ……be ……ever fresh
Clean air / Fresh air /

Signature……[signature]…………………………**Date**… 20-5-2025…

Thank you for your cooperation!

NAVCDP

NATIONAL AGRICULTURAL VALUE CHAIN DEVELOPMENT PROJECT

COUNTY GOVERNMENT OF NYERI

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

PUBLIC PARTICIPATION QUESTIONNAIRE

PROJECT TITLE: PROPOSED KIKUYO IRRIGATION WATER PROJECT

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As a member of the local community/project neighborhood, we kindly request for your comments in relation to the proposed project.

Please note that your response will be treated with the confidentiality it deserves.

1. Name: Samuel Muchemi Maina
2. Gender: Male (✓) Female ( )
3. Age: 18-35 years ( ) 35 years and above (✓)
4. Mobile No.....0727817098.....
5. Relationship with the proposed project: Beneficiary (✓) Non-beneficiary ( )

   Others (specify).....
6. Area of residence.....Kikuyo - THARA-INI.....
7. Are your aware of the proposed project?
   Yes (✓) No ( )
8. If yes in Q7 above, do you expect any **negative environmental and social economic impacts** as a result of implementation of the proposed project?

   Yes (✓) No ( )

Thank you for your cooperation!

9. If yes in Q8 above, briefly explain...... There Be leaded Harrasment Sexual accidents in working of the project

10. In your own option, how can the negative impacts that you have stated above be mitigated?
to Empere our youth

11. What **positive environmental and social economic impacts** that will result from the implementation of the proposed project?
(*Tick appropriately*)
   i) Increased availability of water (✓)
   ii) Increased water for irrigation (✓) yes
   iii) Increased crop production due to increased availability of water ( ) yes
   iv) Increased livestock production due to increased availability of water (✓) yes
   v) Improve economic status/livelihood of the people (✓)
   vi) Improved peoples' health and nutrition (✓)
   vii) Creation of job opportunities (✓)
   viii) Increased school enrolment
   ix) Decreased early marriages (✓)
   x) Decreased social crimes (✓)
   xi) Decreased domestic violence (✓)
   xii) Others (Specify)...... mad more trey

11. Additional remarks...... Good Project

Signature...... **Date**...... 20-05-2020

Thank you for your cooperation!

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

PUBLIC PARTICIPATION QUESTIONNAIRE

PROJECT TITLE: PROPOSED KIKUYO IRRIGATION WATER PROJECT

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As a member of the local community/project neighborhood, we kindly request for your comments in relation to the proposed project.

Please note that your response will be treated with the confidentiality it deserves.

1. Name: Joseph Rukwaro Migui
2. Gender: Male (✓) Female ( )
3. Age: 18-35 years ( ) 35 years and above (✓)
4. Mobile No........0712 393776..........
5. Relationship with the proposed project: Beneficiary (✓) Non-beneficiary ( )

   Others (specify)..........
6. Area of residence.......Mai-Ngarino Kikuyo..........
7. Are your aware of the proposed project?

   Yes (✓) No ( )
8. If yes in Q7 above, do you expect any **negative environmental and social economic impacts** as a result of implementation of the proposed project?

   Yes (✓) No ( )

Thank you for your cooperation!

9. If yes in Q8 above, briefly explain .....
.....YES.....
.....
.....

10. In your own option, how can the negative impacts that you have stated above be mitigated?
.....WE Employ our one people.....
.....But not Incomers.....
.....

11. What **positive environmental and social economic impacts** that will result from the implementation of the proposed project?
(*Tick appropriately*)
i) Increased availability of water ( )
ii) Increased water for irrigation ( )
iii) Increased crop production due to increased availability of water ( )
iv) Increased livestock production due to increased availability of water ( )
v) Improve economic status/livelihood of the people ( )
vi) Improved peoples' health and nutrition ( )
vii) Creation of job opportunities ( )
viii) Increased school enrolment
ix) Decreased early marriages ( ) NO
x) Decreased social crimes ( )
xi) Decreased domestic violence ( )
xii) Others (Specify).....
.....Plant aloe as trees.....
.....

11. Additional remarks.....Good Project.....
.....
.....

Signature.....**Date**..26/05/2025.....

Thank you for your cooperation!

NAVCDP

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

PUBLIC PARTICIPATION QUESTIONNAIRE

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As a member of the local community/project neighborhood, we kindly request for your comments in relation to the proposed project.

Please note that your response will be treated with the confidentiality it deserves.

1. Name: CAROLUS WANJIRU RUKWARO
2. Gender: Male ( ) Female ( )
3. Age: 18-35 years ( ) 35 years and above ( )
4. Mobile No.....0712211299.....
5. Relationship with the proposed project: Beneficiary ( ) Non-beneficiary ( )
   Others (specify).....
6. Area of residence.....GICHAGI.....
7. Are your aware of the proposed project?
   Yes ( ) No ( )
8. If yes in Q7 above, do you expect any **negative environmental and social economic impacts** as a result of implementation of the proposed project?
   Yes ( ) No ( )

Thank you for your cooperation!

NAVCDP

COUNTY GOVERNMENT OF NYERI

5. What negative social and environmental impact do you anticipate during construction and operation stages of this project?

- Digged trenches will might destroy our roads
- Our youth lack job opportunities if the constructor come with his people for the work.
- unwanted pregnancies

6. What do you think the developer should do to mitigate negative social economic impacts of this project?

- Should the constructor come with well disciplined people
- constructor to engage our youths

7. Is there any other comment or suggestion you would like to make with regard to environmental and social safeguards?

- Contructor to take precaution with our roads while digging the trenches

Name: Mercy Wairimu Muthemba Date: 20/5/25

Residence: Kihuyo Designation: Committee Member

Contact: 0723310901 Signature

THANK YOU FOR YOUR RESPONSE

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As a member of the local community to be served by this investment we request your comments on the expected social economic and environmental impacts of the proposed project.

(Please note that the feedback you give will be held in confidence and will only be used to enrich the E&S recommendations given by the consultant in the ESIA report.)

1. Are you familiar with the proposed project, its objectives and proposed activities?

Yes [✓] No [ ]

2. Will your source of livelihood / income be negatively affected by the proposed project?

Yes [ ] No [✓]

3. Do you think the proposed project is compatible with the surrounding developments?

Yes [✓] No [ ]

4. What positive social and environmental impact do you anticipate during construction and operation stages of this project?

The project will create job opportunities to our youths when implementing the projects of constructions

NAVCDP

COUNTY GOVERNMENT OF NYERI

5. What negative social and environmental impact do you anticipate during construction and operation stages of this project?

- Kuharibu barabara zetu
- contractor kuja na watu wake vijana wetu wakose kazi

6. What do you think the developer should do to mitigate negative social economic impacts of this project?

- Aelimishe watu kuhusu maji na kulima
-

7. Is there any other comment or suggestion you would like to make with regard to environmental and social safeguards?

- Kijiji chetu kitaweza kuendelea kupata maji

Name: Francis Murimi Kirelai Date: ....

Residence: Kihuryo Designation: ....

Contact: 0720297560 Signature: [signature]

THANK YOU FOR YOUR RESPONSE

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As a member of the local community to be served by this investment we request your comments on the expected social economic and environmental impacts of the proposed project.

(Please note that the feedback you give will be held in confidence and will only be used to enrich the E&S recommendations given by the consultant in the ESIA report.)

1. Are you familiar with the proposed project, its objectives and proposed activities?

Yes [✓] No [ ]

2. Will your source of livelihood / income be negatively affected by the proposed project?

Yes [ ] No [✓]

3. Do you think the proposed project is compatible with the surrounding developments?

Yes [✓] No [ ]

4. What positive social and environmental impact do you anticipate during construction and operation stages of this project?

- Itasaidia kupea watoto ueru kazi

NAVCDP

COUNTY GOVERNMENT OF NYERI

5. What negative social and environmental impact do you anticipate during construction and operation stages of this project?

(1) Leaving the tunnels uncovered for a long time.
(2) employment of minors
(3) Harassing of workers

6. What do you think the developer should do to mitigate negative social economic impacts of this project?

(1) To cover the tunnels as soon as the risks are fixed.
(2) To follow the regulations of employment as over 18 yrs of age
(3) Be friendly to the workers and residence.

7. Is there any other comment or suggestion you would like to make with regard to environmental and social safeguards?

(1) Beneficiaries to be taught how to prevent soil erosion by building gambions

Name: PAUL KIMANI Date: 20/6/2025

Residence: KIHUYO - MAINGANIE Designation: MAINGANIE

Contact: 0711502457 Signature

THANK YOU FOR YOUR RESPONSE

NAVCDP

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As a member of the local community to be served by this investment we request your comments on the expected social economic and environmental impacts of the proposed project.

(Please note that the feedback you give will be held in confidence and will only be used to enrich the E&S recommendations given by the consultant in the ESIA report.)

1. Are you familiar with the proposed project, its objectives and proposed activities?

Yes [✓] No [ ]

2. Will your source of livelihood / income be negatively affected by the proposed project?

Yes [ ] No [✓]

3. Do you think the proposed project is compatible with the surrounding developments?

Yes [✓] No [ ]

4. What positive social and environmental impact do you anticipate during construction and operation stages of this project?

(1) Create of employment

(2) No farming

(3) reduce ~~[illegible]~~ Crimes as many

People will be busy busy.

5. What negative social and environmental impact do you anticipate during construction and operation stages of this project?

Taking of materials for Construction without Permission

6. What do you think the developer should do to mitigate negative social economic impacts of this project?

Security should be included/provided to take care of the Construction materials.

7. Is there any other comment or suggestion you would like to make with regard to environmental and social safeguards?

Educate Community on Precautions to handle water hazards (ie) when pipe bursts.

Name: MIRIAM WAIRIMU Date: 20/5/2025

Residence: KIHU.TO Designation: N/A

Contact: 0725455766 Signature: Mwgitalu

THANK YOU FOR YOUR RESPONSE

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As a member of the local community to be served by this investment we request your comments on the expected social economic and environmental impacts of the proposed project.

(Please note that the feedback you give will be held in confidence and will only be used to enrich the E&S recommendations given by the consultant in the ESIA report.)

1. Are you familiar with the proposed project, its objectives and proposed activities?

Yes [✓] No [ ]

2. Will your source of livelihood / income be negatively affected by the proposed project?

Yes [ ] No [✓]

3. Do you think the proposed project is compatible with the surrounding developments?

Yes [✓] No [ ]

4. What positive social and environmental impact do you anticipate during construction and operation stages of this project?

Employment of the local community.

NAVCDP

COUNTY GOVERNMENT OF NYERI

5. What negative social and environmental impact do you anticipate during construction and operation stages of this project?

The new worker will socialise with our youth properly have new unwanted pregnancies and S.T.Ds to our youths

6. What do you think the developer should do to mitigate negative social economic impacts of this project?

Before the project start the developer should first educate the community the impact which can occure or appear,

7. Is there any other comment or suggestion you would like to make with regard to environmental and social safeguards?

It's better for the county goverment to have profecionals to collect our datas.

Name: Grace W. Kigera Date: 20/5/2025

Residence: KIRIA Designation: .....

Contact: 0728941206 Signature .....

THANK YOU FOR YOUR RESPONSE

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As a member of the local community to be served by this investment we request your comments on the expected social economic and environmental impacts of the proposed project.

(Please note that the feedback you give will be held in confidence and will only be used to enrich the E&S recommendations given by the consultant in the ESIA report.)

1. Are you familiar with the proposed project, its objectives and proposed activities?

Yes [✓] No [ ]

2. Will your source of livelihood / income be negatively affected by the proposed project?

Yes [✓] No [ ]

3. Do you think the proposed project is compatible with the surrounding developments?

Yes [✓] No [ ]

4. What positive social and environmental impact do you anticipate during construction and operation stages of this project?

After the project, the lands buyers will be higher (ESS)

NAVCDP

COUNTY GOVERNMENT OF NYERI

5. What negative social and environmental impact do you anticipate during construction and operation stages of this project?

Soil erosion

6. What do you think the developer should do to mitigate negative social economic impacts of this project?

New productivity

7. Is there any other comment or suggestion you would like to make with regard to environmental and social safeguards?

development in the area.

Name: Titus Muthomba Date: 20/5/05

Residence: ..... Designation: .....

Contact: ..... Signature .....

THANK YOU FOR YOUR RESPONSE

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(Please note that the feedback you give will be held in confidence and will only be used to enrich the E&S recommendations given by the consultant in the ESIA report.)

1. Are you familiar with the proposed project, its objectives and proposed activities?

Yes [✓] No [ ]

2. Will your source of livelihood / income be negatively affected by the proposed project?

Yes [✓] No [ ]

3. Do you think the proposed project is compatible with the surrounding developments?

Yes [✓] No [ ]

4. What positive social and environmental impact do you anticipate during construction and operation stages of this project?

Creating Employment

5. What negative social and environmental impact do you anticipate during construction and operation stages of this project?

⇒ Increased conflicts due to land management & long to go [illegible]

⇒ Increased influx of [illegible]

⇒ Increased insecurity due non community members ⇒

6. What do you think the developer should do to mitigate negative social economic impacts of this project?

⇒ Training of the management committee on conflict management

⇒ Community sensitization and education on how to solve & approach issues

7. Is there any other comment or suggestion you would like to make with regard to environmental and social safeguards?

Request for community training on soil conservation.

Name: Daniel Gatu Date: 20/5/2025

Residence: [illegible] zone Designation: Chairperson

Contact: 0721 900 483 Signature: [signature]

THANK YOU FOR YOUR RESPONSE

NAVCDP

COUNTY GOVERNMENT OF NYERI

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(Please note that the feedback you give will be held in confidence and will only be used to enrich the E&S recommendations given by the consultant in the ESIA report.)

1. Are you familiar with the proposed project, its objectives and proposed activities?

Yes [✓] No [ ]

2. Will your source of livelihood / income be negatively affected by the proposed project?

Yes [ ] No [✓]

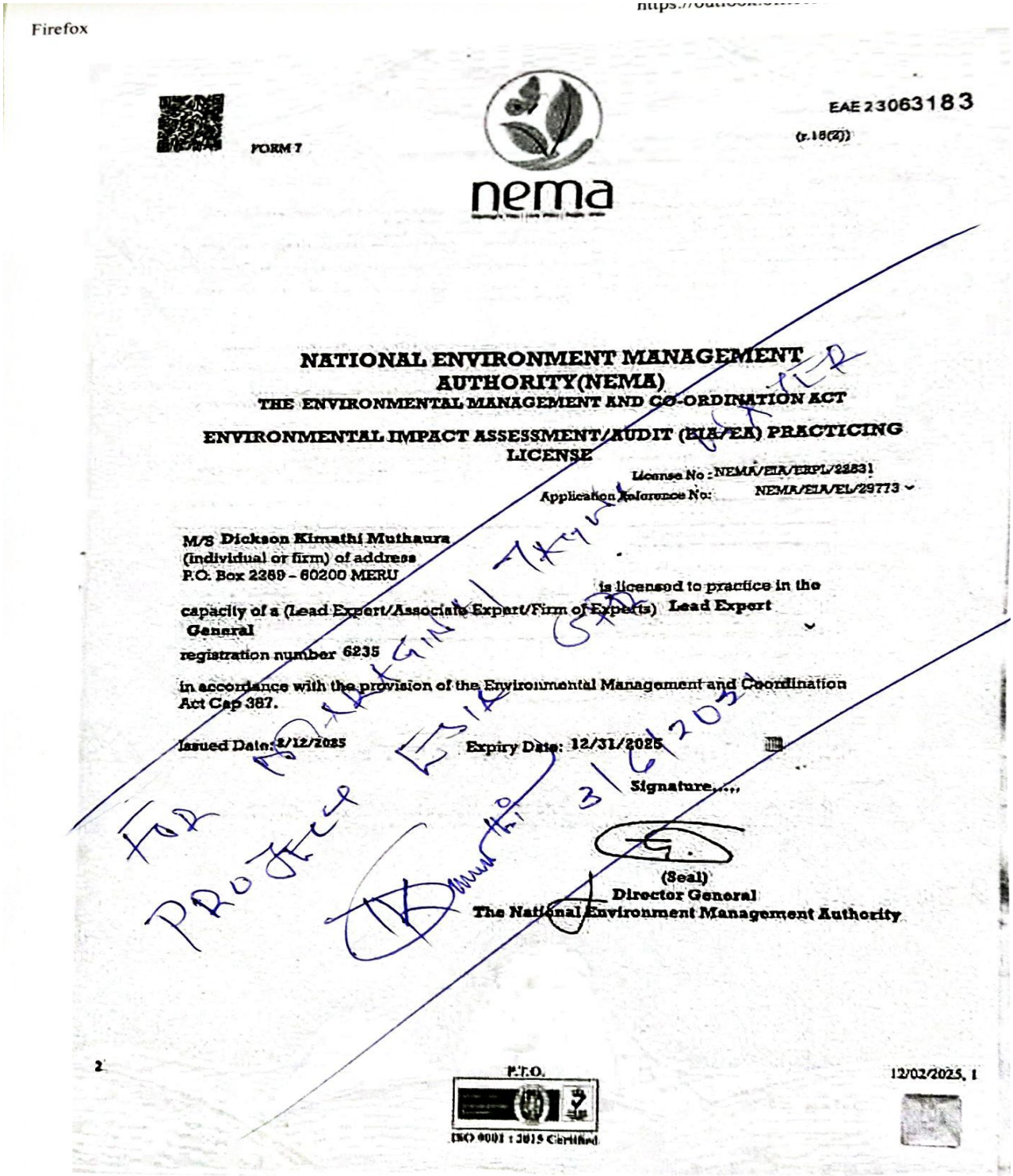
3. Do you think the proposed project is compatible with the surrounding developments?

Yes [✓] No [ ]

4. What positive social and environmental impact do you anticipate during construction and operation stages of this project?

→ Increased food production
→ Improved diet due variety crops
→ Improved socio economic due job opportunities

Annex 15: EIA/EA Practicing License Lead Expert 2025



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FORM 7

EAE 23063183

(r.18(2))

nema

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY(NEMA)

THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT

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

License No : NEMA/EIA/EAPL/22831

Application Reference No: NEMA/EIA/EL/29773

M/S Dickson Kimathi Muthaura
(individual or firm) of address
P.O. Box 2389 – 60200 MERU

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

registration number 6235

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

Issued Date: 2/12/2025 Expiry Date: 12/31/2025

Signature....,

(Seal)
Director General
The National Environment Management Authority

2

P.T.O.

ISO 9001 : 2015 Certified

12/02/2025, 1

Annex 16: Hydrological Study Report of Nyameru River

HYDROLOGICAL ASSESSMENT REPORT OF NYAMERU RIVER, TRIBUTARY OF MURINGATO RIVER FOR KIHUYO WATER PROJECT

DECEMBER 2024

CLIENT: *KIHUYO WATER PROJECT* *PO BOX 1112-10100* *NYERI*	*CONSULTANT HYDROLOGIST:* *CYNTHIA AKINYI ODHIAMBO,* *P. O. BOX 512-40400* *SUNA*

Acronyms

^0C	-	Centigrade
Km	-	Kilometres
M	-	Meters
m.a.s.l.	-	Above Sea Level
m^3/d	-	Cubic meters per day
m^3/s	-	cubic meters per second
mm	-	Millimetres
WRA	-	Water Resources Authority
WRUA	Water Resources Users Association	

1 Introduction and Background Information

1.1 Details of the Applicant

KIHUYO WATER
PROJECT

P. O. Box 1112-
10100, ***NYERI***

Type of Applicant - Association

Type of Water Use - Domestic

1.2 Introduction

The Kihuyo water project has been initiated by a group of more than 200 members (5persons per household,4 cattle and 8 goat and sheep) for the harvesting and storage of flood waters within Nyameru River for domestic purposes as. The project beneficiariesintends to use water for domestic purposes during the dry season. The project will involve the construction of an abstraction point (intake) along the river course and gravity mains to the supply area located 7km from the source.

The Kihuyo Water project group need water for domestic and subsistence irrigation. The group of 2500 members intends to use water in subsistence irrigation and for domestic requirements. The domestic water requirement will take care of 1000 people, 500 cattle and 1,000 goats/sheep since each member/ family has 5 persons, 2 cattle and 1 goats/ sheep. The subsistence irrigation will cover about $^1/_8$ acres per family while through rotational practices by irrigating each portion twice per week; about $^1/_{16}$ acre will be the daily coverage. The subsistence irrigation will target horticultural crops and maize.

The expected domestic water demand will be **50.75** m^3 per day (50litres per person per day and 50 litres per livestock unit per day(equivalent to 15 goats)) The subsistence irrigation requirement for 125 acres (as per WRA guidelines for water allocation – 20 m^3 per acre per day), will be 2500 m^3 per day. The total water requirement for the **Kihuyo Water project** is **2550.75 m^3 per day** which includes **50.75 m^3** per day for domestic purposes and **2500**m^3 per day for subsistence irrigation

The applicant intends to make an application to the Water Resources Authority,Tana Basin Area for a water permit to harvest and store **2550.75 m^3** per day from the runoff of Nyameru river valley, at a point marked by coordinates area **UTM 37M 259567.61 m, E9958644.58 m S and an altitude 2175m asl** and from which the water will gravitate to the water scheme.

This hydrological assessment report is intended to form part of the documentation in support of the application for a water harvesting and storage permit from the Water Resources Authority, Tana Basin Area, as per the requirements of the Water Act 2016 and the Water Resources Management Rules

2007 with regard to the issuance of water harvesting and storage permits.

1.3 Location

The proposed abstraction point is in Kihuyo location of KiganjoMathari ward within Nyeri County. The supply area is in the upper parts of Kihuyo location within Nyeri Town sub County of Nyeri County. The nearest town is Kihuyo Town. The abstraction point site location is about 8 km from Njengu gate (Aberdare national park). The figure below shows site location map.

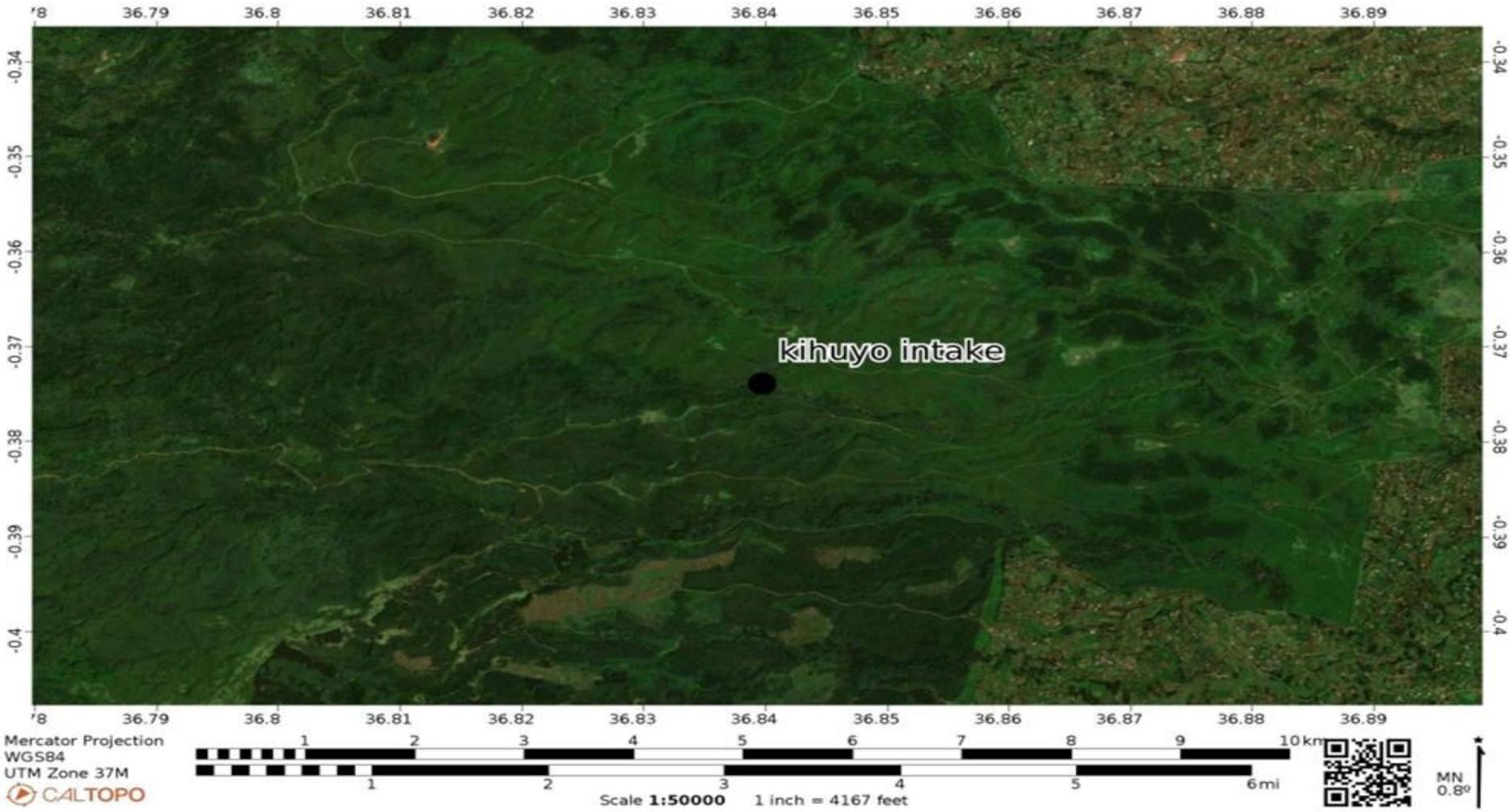

Figure 1 : ***Proposed intake site***

1.4 Drainage of the Area

A drainage basin is an extent or area of land where surface runoff from precipitation and melting snow/ice converge to a single point, usually the exit of the basin, where the waters join another water-body, such as a river, lake, reservoir, estuary, wetland, sea, or ocean.

The drainage basin includes both the streams and rivers that convey the water as well as the land surfaces from which water drains into those channels. It is separated from adjacent basins by a drainage divide.

The drainage of the project area is dictated by Aberdare Range, which is the main water tower in the region. The project area is within the 4AD Basin (Sagana-Gura Management Unit) which covers an area of about 2073 km^2.

1.5 Vegetation and Land Use

The land use of an area is determined by its agricultural potential which is mainly the interplay of geology and climate - which influences the formation of soils, and their fertility and quality; altitude - which determines temperatures that in turn, influences plant growth rates; and rainfall which determines plant growth and production.

The land use includes cultivated agriculture by terraces leading to proper land use management. Horticultural crops like kales, cabbage and potatoes are some of the crops grown in the area. Other land uses in the area include grasslands and indigenous and exotic forests, which contributes to the conservation of the catchment and ensures that reduced runoff from the farms is experienced during rains.

---

2 Climate

2.1 Climate

The project area lies to the south of Mt Kenya and Southeast of Aberdare range and consequently records high rainfall despite the medium altitude.

The major governing factor controlling the climate of the area is the Inter-Tropical Convergence Zone (ITCZ). The ITCZ movement results in four distinguishable seasons in the study area, namely:

- **Dry Season** in January, February and early March when the ITCZ is positioned south of the Equator pulling dry winds from the north. During this period, almost no rainfall is observed in the study area.

- **Long Rains** from mid-March to May when the ITCZ is crossing the equator resulting in high-reaching convection that causes heavy rains.
- **Continental Rains** from July to September when the ITCZ is located north of the equator pulling winds from the Indian Ocean. The southern flanks of Mt. Kenya receive more precipitation than the leeward side during this season.
- **Short Rains** from October to December when again the ITCZ moves towards the south and causes convectional rains.

Besides the seasonal changes, the local topography causes large variations in the climate. The mountainous areas of Mt Kenya and Aberdare ranges cause orographic effects as the humid air is lifted and falls as rainfall. Maximum precipitation occurs at altitudes of around 3000 to 3500 m.a.s.l. The climate of the area is classified as Aw under the Köppen and Geiger climate classification system.

2.2 Temperature

The mean maximum temperature is 24.5°C based on Aberdare national park hydromet station.

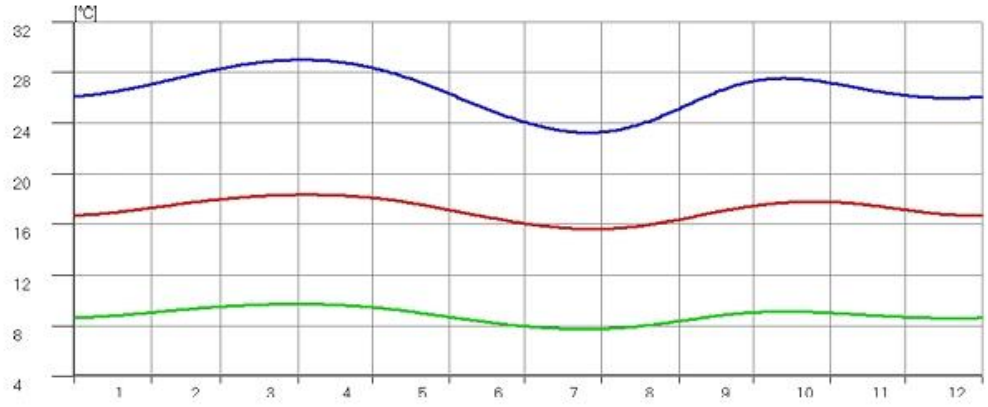

Figure 2*; *Graph showing the mean maximum temperature of the proposed site

2.3 Rainfall

The nearest rainfall station to the project area is located at Aberdare national park. Analysis of rainfall records from this station indicates that the rainfall exhibits an almost bimodal pattern with two rainy peaks in April and November and without an absolute dry period in between. Table 1 and Figure 2 depict the long-term mean monthly rainfall recorded at the Aberdare national park hydromet Station. The area experiences a mean annual rainfall of 1,400-1700 mm.

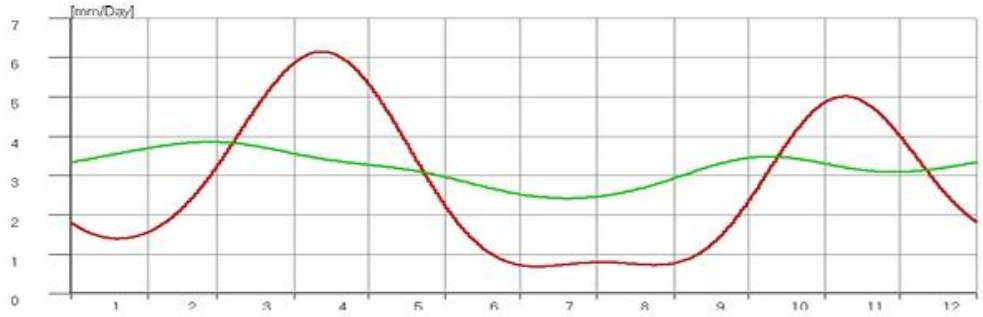

Figure 3: Mean monthly rainfall at* Aberdare national park *hydromet station

3 Hydrological Investigations and Analysis

3.1 Desk study

The work involved the collection and analysis of river flows and rainfall data to generate the possible surface water flow scenarios at the proposed abstraction site. The flow was then compared with the water abstraction data to determine the water balance and hence the likely effects of the abstraction on the ecology and surface water availability downstream of the abstraction point.

3.2 Fieldwork

A reconnaissance survey of the area was carried out in order to assess the resource, note other relevant issues on the ground, and get a first-hand overview of the area under consideration, key issues including the location of the proposed abstraction point and supply area, the soil types, the general topography and current land uses. The proposed abstraction site is located at coordinates **UTM 37M 259567.61 m, E9958644.58 m S and an altitude 2175m asl.**

3.3 River Water Body

The river water body under reference is Nyameru River, which is perennial and flows throughout the seasons. It rises from elevated areas around Aberdare Ranges and flows in an easterly direction to drain into Muringato River.

Nyameru River is part of the Sagana Water Management Unit (MU). This unit is classified as of high livelihood importance, where Livelihood important units are areas with predominant rural characteristics i.e. rural and scattered settlements with low population density and small-scale subsistence-oriented economic activities that include small-scale irrigation, fisheries and livestock.

This class targets protection of water resources to ensure livelihood of rural population. Sustainable regional water resources management of these units focus on cooperation with WRUAs and other stakeholders within the management unit.

3.4 Surface water data availability

Nyameru valley is a perennial River that carries water throughout. The river is not gauged for its entire length and the nearest regular gauging station to the project area is Muringato River RGS 4AB01. The station is rated and stable for the duration of its existence and provides continuous flow. The data obtained from the station has been used in the following analysis as this period best represent the naturalized flows as abstractions are well documented.

The long-term mean monthly flow for the river as analyzed from the records at RGS 4AB01 is depicted graphically in Figure 4.

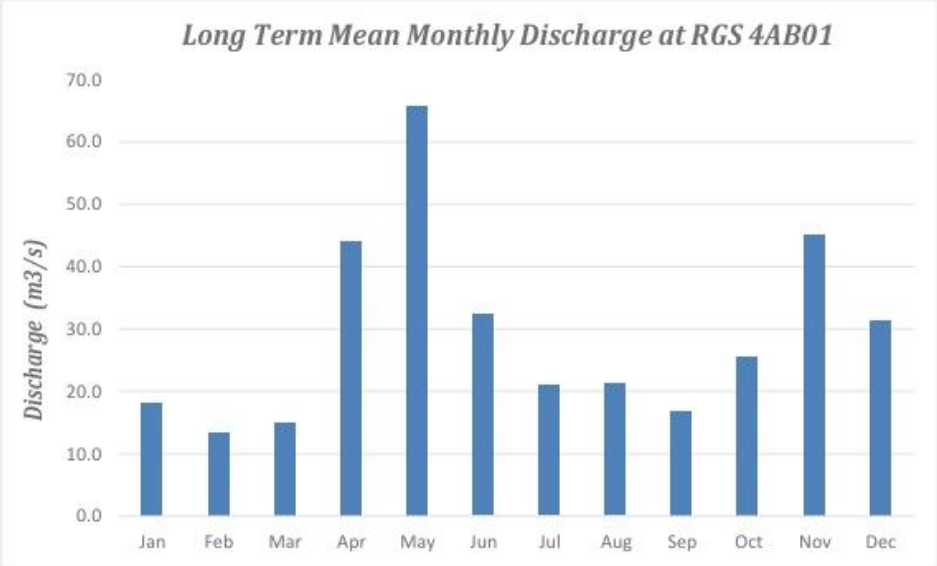

***Figure 4**: Mean monthly discharge of Muringato River at RGS 4AB01*

3.5 Hydrological characteristic

To assess the availability of water resources for the purposes of allocation, flow frequency analysis establishing frequency of occurrence of specific river flows are undertaken. In this case, flow duration analysis using the daily discharge data available for RGS 4AB01 was undertaken.

In flow duration curve analysis, naturalized or present-day historical discharge records are analyzed over specific durations to produce curves displaying the relationship between the range of discharges and the percentage of time each of them is equaled or exceeded. This analysis establishes the catchment yields at various percentage reliabilities upstream of the gauging station with particular emphasis on the 95%, 80% and 50% reliability yields.

The water resources management rules define flood flow as any flow that exceeds the Q80 flow value, i.e. the flow that is equaled or exceeded eighty percent of the time and, normal flow as that flow which is less than the Q80 flow value.

The Q95 flow value currently represents the Reserve, i.e. that quantity and quality of water required to satisfy basic human needs for all people who are or may be supplied from the water resource and, for the protection of aquatic ecosystems, in order to secure ecologically sustainable development.

Nyameru river is monitored at RGS 4AB01 (Muringato River) which is downstream of the proposed intake site. Therefore the flows at RGS 4AB01 – Muringato river can be used for the flow duration analysis at this section of the river for this case. The daily flow discharges as in the WRA data base were analysed and the flow duration values developed. The Q50, Q80, and Q95 were established. Q50 = 3.966 m3/s, Q80 = 1.763 m3/s while Q95 = 0.868 m3/s.

The catchment area upstream of the RGS 4AB01 is about 420 km^2 while upstream of proposed site is about 182 km^2 hence assuming equal contribution by the catchment area, the flow at proposed site would be about 43% of the flow at the RGS 4AB01. However, the catchment upstream of the proposed site is in the forest zone and the area experiences more rain than the rest of the areas hence contributes more to the river flow than the average areas.

The estimated flow at the proposed intake site would be Q_{50} = 1.574 m^3/s, Q_{80} = 0.758 m^3/s while Q_{95} = 0.373 m^3/s. The normal flow at proposed site is Q_{80} - Q_{95} which is 0.385m^3 per second which translates to **33,264.0 m^3 per day**. The flood flow is Q_{50} – Q_{80} which is 0.816 m^3 per second which translates to **70,502.4 m^3 per day**. This project needs **2550.75 m^3 per day** for subsistence irrigation use. According to the locals the flow regime has not changed for quite some time. Bearing in mind the normal and flood flow values (Q_{80} - Q_{95} and Q_{50} – Q_{80}) given, there is an indication of adequate flow.

3.6 Analysis of reserve

The Water Resources Management Rules 2007 defines the environmental flow or reserve as equivalent to the Q95 value based on the naturalized daily discharge data at a gauging station. The Q95 represent the flow that is equalled or exceeded 95% of the time. The reserve is mainly for

maintenance of the good health of the environment.

- Ecological vulnerability
- Vulnerability of populations dependent on that water resource

The RGS 4AB01 - Muringato River monitoring the river downstream of the proposed intake can be used for this case. Based on the facts as discussed above, the flows available for allocation can be used as the guiding figures.

The normal flow is **33,264.0 m^3 per day** while the flood flow is **70,502.4 m^3 per day**. This project needs **2550.75 m3 per day** for subsistence irrigation use.

This project will only abstract about 7.6% of flood flow while over 92% will be left to flow downstream for other users from the Nyameru River. Important to note is that the main Muringato river has abstraction of about 5,214.94 m^3 per day from normal flow and about 5,330.68 m^3 per day from flood flow and this does not strain the river. The competition for water by the potential abstractors is currently moderate hence no strain to Nyameru River.

There is need for all abstractors to have **effective control devices and meters** to ensure only authorised/ permitted amount is abstracted.

3.7 Hydrochemistry

The runoff along Nyameru river valley appears fairly clean due to conservation within the catchment. However, during rainy season, runoff from the roads, tracks and paths change quality of water due to dirt washed away by the runoff and dropped into nearby streams or rivers.

In this catchment, settlements are moderately few based on the catchment size. However serious attention needs to be taken on effluent management from homes while silt/ sediment conservation from roads, paths and farms needs to be addressed effectively. Farmers use fertilizers and this may find its way to the rivers when there is heavy runoff from the farms. However, the current farming practices do not allow any significant runoff.

4 Water Allocation and Abstraction

4.1 Permitted Abstractions

Some of the abstractions are at authorisation stage and are already using water. Authorisation is a go ahead to put up works while permit is for allowing the use of water, according to the water resources authority. There are about 25 abstractors with water permits while about 19 abstractors have authorizations and about 11 projects have their applications being processed. There may be some abstractors who are yet

to start the process of legalising the operations of the projects.

There is need to ensure that all illegal abstractors are legalised while authorised abstractors are issued with permits when they comply with the rules while fixing of measuring and regulating devices must be encouraged. There seems to be a trend of projects drawing more water than authorised especially in the absence of measuring devices. An up to date abstraction survey is very necessary to put in place a good abstraction plan or water use plan for the sub catchment.

4.2 Permits Related to the Application

This application is related to another permit from this water source. The stakeholders get waterfrom other sources while livestock use available water sources. The group wants to legalize the process and be law abiding.

4.3 Impacts on the River Regime and Downstream Users

The proposed abstraction point will harvest flood water. Considering the river is perennial, and flows are permitted, it is not expected to have an adverse impact on the downstream users. The design of the abstraction point will be such that provision for compensation flow is made to enable water flow downstream of the abstraction chambers and this will positively impact on the river regime downstream.

5 Conclusions and Recommendations

5.1 Conclusions

Kihuyo town is a high agricultural potential area but farmers have been relying on rainfall, which is nowadays erratic, and unreliable occasioning frequent crop losses. Thus, the implementation of this project would greatly improve on the socio-economic status for the project proponents. It would also create employment opportunities for the community within the area.

It is advisable for abstractors to put concerted effort in the management and conservation of the riparian land in order to assure sustainable availability of water resources to meet their demands. This can best be achieved by strengthening the Muringato WRUA of which the project should be an active member.

5.2 Recommendations

It is recommended that, subject to the project proponents meeting the general and specific permit conditions, the applicant:

i) be allocated **2550.75 m^3** per day from the Nyameru River Valley for domestic and subsistence irrigation use.

ii) be authorized to construct the proposed abstraction reservoir to provide **2550.75 m^3 per day** domestic and subsistence irrigation use.

iii) installs a measuring device to ensure the abstraction of the permitted volume from the river;

iv) Implements water demand management measures to improve water use efficiency by reducing wastage and thus minimize the water demand from the river.

6 References

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Annex 17: Chance Finds Procedure (CFP)

Proposed Chance Finds Procedure for the Kihuyo Water Project

1. Introduction and Purpose

This Chance Finds Procedure provides the formal protocol to be followed if archaeological, paleontological, historical, or culturally significant materials are unexpectedly encountered during construction of the Kihuyo Irrigation Water Project.

The CFP ensures full compliance with:

- World Bank ESS8: Cultural Heritage, which requires projects to identify, protect, and manage cultural heritage and maintain a mandatory chance finds procedure for all excavation works; and
- National Museums and Heritage Act 2006, which establishes legal obligations for the discovery, reporting, and protection of heritage resources and mandates immediate notification to the National Museums of Kenya (NMK).

The procedure applies to all contractors, subcontractors, field personnel, and supervision teams engaged in earth-moving, excavation, trenching, or land disturbance activities.

2. Definition of a Chance Find

A *chance find* is any unanticipated discovery of material with potential cultural, historical, scientific, or spiritual significance. This includes, but is not limited to:

- Archaeological objects (ceramics, bones, beads, tools, metals);
- Structural remains (foundations, walls, cairns);
- Fossils or paleontological materials;
- Burial sites or human remains;
- Sacred sites, shrines, ritual spaces, or culturally significant natural features.

3. Objectives of the Procedure

The CFP aims to:

1. Prevent damage to cultural heritage discovered during project works;
2. Ensure lawful and respectful handling of any finds in accordance with ESS8 and National Museums and Heritage Act, 2006;
3. Provide clear steps for reporting, securing, and managing discoveries;
4. Establish coordination with the NMK, the legally mandated authority; and
5. Allow safe resumption of works only after clearance is issued by NMK.

4. Roles and Responsibilities

Contractor

- Stops work immediately upon discovery of a potential cultural object.
- Secures the site to prevent disturbance or interference.
- Notifies the Supervising Engineer immediately.
- Ensures workers follow this procedure and are trained accordingly.

Supervising Engineer

- Verifies the report and secures the area.

- Notifies the Proponent within two hours.
- Ensures the Contractor does not resume work until clearance is received.

Project Proponent

- Notifies the National Museums of Kenya within 24 hours, as required by the National Museums and Heritage Act, 2006.
- Facilitates NMK access to the site for inspection and assessment.
- Maintains documentation and ensures records are archived.

NMK

- Assesses the significance of the find.
- Determines required safeguarding measures.
- Provides written instructions on removal, preservation, or protection.
- Issues clearance for works to resume.

5. Chance Finds Procedure

Step 1: Stop Work Immediately

The moment a potential find is discovered, all construction and excavation activities must stop within at least 50 m of the find. Machinery is shut down and the area is isolated.

Step 2: Secure and Protect the Site

- Erect a temporary barrier or fence.
- Restrict access to authorized personnel only.
- Do not touch, remove, clean, or disturb the find in any way.

Step 3: Internal Reporting

Contractor notifies the Supervising Engineer, who informs the Proponent. Basic documentation should include photographs, GPS location, and a short description, without disturbing the find.

Step 4: Notification of NMK

The Proponent reports the discovery to NMK within 24 hours, fulfilling the legal obligations under the National Museums and Heritage Act, 2006 (Sections 30 - 33).

Step 5: Assessment by NMK

NMK specialists assess the find and decide whether it:

- Has no heritage significance;
- Requires salvage and documentation;
- Must be preserved in situ; or
- Requires redesign of project works to avoid impact.

Step 6: Guidance and Clearance

NMK issues written instructions.

The Contractor may only resume work after formal written clearance is received and all instructions have been implemented.

6. Special Provisions for Human Remains

If human remains are encountered:

- Stop work and secure the site immediately.
- Treat the discovery with utmost respect and confidentiality.
- Notify NMK and local authorities without delay.

- Follow NMK and cultural protocols for assessment, removal, or reburial.

No work may resume until NMK provides written authorization.

7. Training and Awareness

All workers must receive training on:

- Recognizing potential heritage materials;
- Immediate steps to take upon discovery;
- Prohibitions against tampering or unauthorized removal;
- Penalties under National Museums and Heritage Act (2006) for damaging heritage resources.

Refresher briefings ("toolbox talks") will be integrated into excavation-related activities.

8. Record Keeping

The Proponent will maintain a Chance Finds Register including:

- Date, location, and nature of find;
- Photographs and GPS coordinates;
- Reports submitted to NMK;
- NMK assessment and correspondence;
- Clearance documentation.

These records will form part of the project's ESMMP and monitoring reports.

9. Integration into Contractual Obligations

This Chance Finds Procedure will be:

- Included in all construction contracts and tender documents;
- Reflected in the Contractor's ESMP;
- Enforced through supervision and compliance audits;
- Linked to penalties for non-compliance.

10. Conclusion

The Chance Finds Procedure ensures that any unexpected cultural heritage discoveries are handled lawfully, respectfully, and in accordance with national legislation and international best practice. Its implementation will safeguard cultural values while ensuring responsible project delivery for the Kihuyo Irrigation Water Project.

Annex 18:

Annex 19: Minutes of Kihuyo Irrigation project annual General Meeting-January 2025

1

MEETING HELD ON 26th JANUARY 2025 AT KIHUYO FACTORY GROUNDS.

COMMITTEE MEMBERS PRESENT.

1. DANIEL GATIU - CHAIRMAN
2. JACKSON MBIRITU - SECRETARY
3. JANE NJEGWA - TREASURER
4. PAUL WAKHIURI - ZONAL REP - KAMICHUGU
5. BENSON WANGECHI - " " - MAINGANIRO.
6. MERCY MUTHEMBA " " - KIAHITI.

ABSENT WITH APOLOGY

1. MOSES GATERE - ZONAL REP NINGUE
2. MARTIN KIATHUA - " " THARE-INI

ABSENT WITHOUT APOLOGY

1. MOSES MUNYIRI - ZONAL REP - KIRIA.

IN ATTENDANCE WERE:

1. SENIOR CHIEF MR WAMBUGU
2. CHIEF RAPHAEL WANYEKI.
3. BRIAN - COUNTY IRRIGATION DEPARTMENT
4. ANN - " " "

MEMBERS PRESENT: Attached ~~Copy~~ Copies.

~~AGENDA~~ AGENDAS

(i) Opening prayers
(ii) Introduction of the Meeting
(iii) Project progress.
(iv) I.W.U.A Registration.
(v) Members registration.
(vi) Quiz & Answers (vii) SUB County Irrigation officer Delivery
AOB
Closing prayers.

Minutes Meeting Started with prayers Led by Mr Julius Maina thereafter Hon Secretary read previous Minutes where they were proposed by Madam Zipporah

Area MCA was very eager to know the progress of the project and said that she was ready to assist until every household gets water.

PROGRESS OF THE PROJECT

Min 01/2025 Chairman and Committee Members visited Tana Water offices at Kamakuru and had a discussion with Engineer Madam Norah and Arrangement was made for the Confirmatory Survey to be done and also BQ preparations which was done and approved by the County ~~Government~~ government office.

Min 02/2025 – After Survey and preparation of BQ who done a proposal was ~~made~~ prepared. All these were handed over to N.V.C.D.P. officials, as they were the requirements needed. It was a long process though Committee worked very hard.

Min 03/2025: N.V.C.D.P. officials visited our project and Committee members on 22nd Jan 2025 where they said they were happy with members Co-operation and Recommended for the project to be funded with almost ksh 27.4 Million and the amount to be located in distribution of the Main Lines in all our 8 zones.

Min 04/2025 – Our progress also Chairman welcomed and introduced our area chief Mr Raphael Wanjeki who also introduced Senior Chief Mr Wambugu who had accompanied him. Both were happy with the progress of the project and the current Committee where they emphasised Co-operation between members.

Min 05/2025 – They asked the Members present to work hard when they get water and produce enough food which will help them economically and eradicate poverty in village. Members Maintained they were ready to

(3)

5

I.W.U.A. REGISTRATION

Min 04/2025 Chairman and Committee Members present told members present the importance of registering the group to Irrigation Water users Association (I.W.U.A) through the office of Attorney General. They all agreed and said they were ready for registration at whatever cost as it will be important to them.

Min 03/2025- Members raised their hand in support and a group of photo taken who there for them to know much concerning registration they were informed that a team comprising Chairman and Committee had a bench marking at Ndiriti Ngutha Water users of Embu officer.

REGISTRATION OF MEMBERS

Min 05/2025- All members need to register themselves with Ksh 600/= for one to be given a membership card and nobody should be connected with water without that contributions.

Min 02/2025. Members were told that Registration Money are the ones maintains the project. Also we Committee members were tasked to register as many as possible members.

SUB COUNTY IRRIGATION OFFICERS BELIEFS

Min 06/2025 - The Sub county officer believed members presents that World Bank Through the NAV.C.S.D.P will fund Kilinyo Irrigation Water project remaining work to include Laying down of the distribution pipes from the Storage tank to various zones. He also informed the members that they will be responsible for the connection fees to their farms from the distribution pipes, passing alone their farms. Members agreed unanimously that they were ready to incurr the cost for the installation

(4)

(4) Qn's & Answers

Moreover Before Conclusion few questions were asked and also comments.

Mr Gachagua from Kiriti zone commented about the Eucalyptus trees surrounding the tank and that's a point noted.

Mr Kariuki asked Where do the registration money go or the work they do (ii) How many phases of water distribution

Answer: Registration Money always Maintain the work that's done in the project and also in office maintanance (ii) All Zones will be distributed with water.

Mr Ndirangu Wanjiru - How can we eliminate those Eucalyptus trees once and for all

Answer: Committee are doing everything possible to eliminate these trees

Mr Ndirangu Kimani asked will there be rationing of water. Answer We are anticipating water will be enough to all members.

Ngovan Kimotho - you said project will be gazeted who are eligible to tender. Answer everybody is free to tender.

M. Ndirangu Mwangi - will our member get the water as he is almost in the tank. Answer there will be contingencies for that.

Before Conclusion chairman cautioned members to be very carefull in tampering with the projects property which he said it will be termed as vandalism and one will be liable to be questioned.

There being no other business our meeting ended at 06:00hrs with prayers led by Mrs Muriithi Wanjiku.

JOHN K. WAIBOCHI
ASSISTANT CHIEF
KIHUYO SUB-LOCATION

SECRETARY — ID No 11629606

CHAIRMAN — ID No 24766159

KIHUYO WATER IRRIGATION PROJECT
KIHUYO SUB-LOCATION
ATTENDANCE FORM

VENUE: Kihuyo Factory Grounds DATE: 26/1/2025

No.	NAME	ID	PHONE	AREA	SIGN
1.	Moses Kabe	30878645	0746638121	NA	
2.	Joe Maina	13394472	0727902696	"	
3.	Justus Ndaruiia	2310697	0720803756		
4.	Gitau Wachuiru	5507435	0720358126		
5.	John K. Waibochi	8979176	0724718624	NTAINGACIRI	
6.	Robert W. Waiboch	7635737	0720205910	"	
7.	George B Gichohi	13883991	0796383369	THARE-INI	
8.	[illegible]	5520086	0723405298		
9.	Samuel Nderi Gitonga	8649806	0721696789	MAINGANIRO	
10.	John Maina Gichuki	9117434	0726443258	Kihuyo	
11.	Francis Kagumba Ngari	1424846	0720569265	Kihuyo	
12.	Stephen Muthengu Ndungu	15397629	0768618438	Kihuyo	
13.	Samuel Maina	17280076	0759952483	KIHUYO	
14.	Raphael Wanderi Waiharo	3179047	0790580745	Kihuyo	
15.	Julius Murithi	29639211	0702[illegible]	Kihuyo	
16.	Peter Wangui Githinji	0234321	0717655438	MAINGANIRO	PETER
17.	Francis Wanjohi Muriithi	4186446	0701192153	MURARIA	
18.	Josephine Njeri Rukaro	20267466	0720856025	Nyangunu	
19.	[illegible] Maina	13764626	0721906060	Kihuyo	
20.	Charles Njogu Wanyeki	7822259	0723901259	Nyangunu	
21.	James Kabiru	5547255	0727027688	Nturoiro	
22.	Mary Wairimu	0230500	0724521487	Nyangunu	
	[illegible]	30488[illegible]	0726[illegible]	[illegible]	
	[illegible] Wasiku	6519106	07[illegible]	[illegible]	
	Mbuthia Isaac	9323769	0720617[illegible]	[illegible]	Isaac
	John C Mundia	10334626	0792145055	Nyangunu	
	Elijah Mugambi Mbaabu	22148501	0713516053	Nyangunu	
	George [illegible]	22971072	0791495575	[illegible]	
	Harrison Ndegwa	12476476	0726451094	Kihuyo	
	Festus Githinji Ndirika	9230	0717769251	Kihuyo	
	David Gichohi [illegible]	1453020	0716512482	Kihuyo	
	Joshua R Kinyare	8269709	0722997968	Kihuyo	
	Johnson Kibathi Kabia	6838765	0710468185	Kihuyo	
	John Gathambo Kariuki	11770917	0791165050	Nyangunu	
	Michael Nduati	10136521	0721922181	Kihuyo	
	Michael C Kabore	3159355	0722848722	Kihuyo	
	James Githinji Muriuki	8979177	0722119828	NYARUGUMU	
	[illegible]	[illegible]	0720[illegible]	Nyarugumu	
	Rosemary Kanyori	13500079	0720105179	Nyaruhiu	
	Lydiah M Muriithi	21939232	0701026769	Kihuyo	
	Zipporah Muthoni	5100303	0721701937	Kihuyo	
	Eunice Wagura	10581577	0711565509	NYARIGOPO	
	Charles Ndirangu Kimani	0236427	0728402002	NYARUGUMU	

KIHUYO WATER IRRIGATION PROJECT
KIHUYO SUB-LOCATION
ATTENDANCE FORM

VENUE: Kihuyo Factory Grounds DATE: 26/1/2025

No.	NAME	ID	PHONE	AREA	SIGN
1.	Gabriel N Nyingi	13320726	0722501439	Kihuyo	
2.	Samuel Maina [illegible]	3224957	0720624785	Kihuyo	
3.	Benson Njenga	21506110	0721378441	Kihuyo	
4.	Beatrice Wanjiru	10325617	0713091342	Kanyuto	
5.	Joseph Nyingi Kibicho			Kihuyo	
6.	Paul Wahome Wachira	13800095	0715905007	Kihuyo	
7.	Stephen Maina Wanjohi	23951204	0712850403	Kihuyo	
8.	Daniel Kaburia Muraguri	5519725	0721159175	Kihuyo	
9.	Gabriel Maina Ngambi	11629618	0721[illegible]	Kihuyo	
10.	Charles [illegible]	13055431	0707[illegible]	Kihuyo	
11.	Godfrey Ndegwa Gordon	3450035	0722763229	Kihuyo	
12.	Joel Wanjohi Gitau	13720272	0720287410	Kihuyo	
13.	David Wagura Njoroge	[illegible]	[illegible]	Nyangunu	
14.	John Kamau Kariuki	[illegible]	0715553707	Nyangunu	
15.	Joseph Rukwaro Miguru	9632422	0712595776	Kihuyo	
16.	Michael Mwai Gathingu	10571055	0712[illegible]565	Kihuyo	
17.	Bruce Mwangi [illegible]	11470210	0721217022	Kihuyo	
18.	[illegible]	6855551	0720[illegible]	Kihuyo	
19.	Irene Wangui Muragi	3346544	0797748098	Kihuyo	
20.	James Bira Nderi	3254737	0701362224	Kihuyo	
21.	Jackline Wangechi Ndegwa	25326025	0727700096	Kihuyo	
22.	[illegible]	[illegible]	0729559057	Kihuyo	
23.	[illegible] Gathoni				
24.	Samuel Nderitu Thitai	13320802	0710859879	Kihuyo	
25.	Charles Ndirangu [illegible]	9117805	0720383764	Nyarugumu	
26	Alice Wangugu Maro	3338519	0720810501	Thareini	
27	[illegible]	[illegible]2352	0725857166	Thareini	
28	Dennis Gachagua Maina	[illegible]	0729016291	Ntoburuini	
29	[illegible] Gathaka	3059123	0710679535	Nyangunu	
30	Mary Wairimu Gathu	10134090	0796049176	Nyangunu	
31	David Githinji Wanjau	5577357	0729006460	Kihuyo	
32	Joseph Mbugo Gachaga	7685923	0721[illegible]	Kihuyo	
33	Josphat Wachira Bundi	3178026	0727703642	Kabiruini	
34	Jane W. Mbau	8114367	0720365591	Kihuyo	
35	Stephen Gitari Waibochi	13453427	0714898480	Kihuyo	
36	Caroline Wambui Rukaro	5547719	0713211299	Kihuyo	
37	Nancy Wangui Muthoni			Kihuyo	
38	Jackson [illegible]	11629604	0725212122	[illegible]	

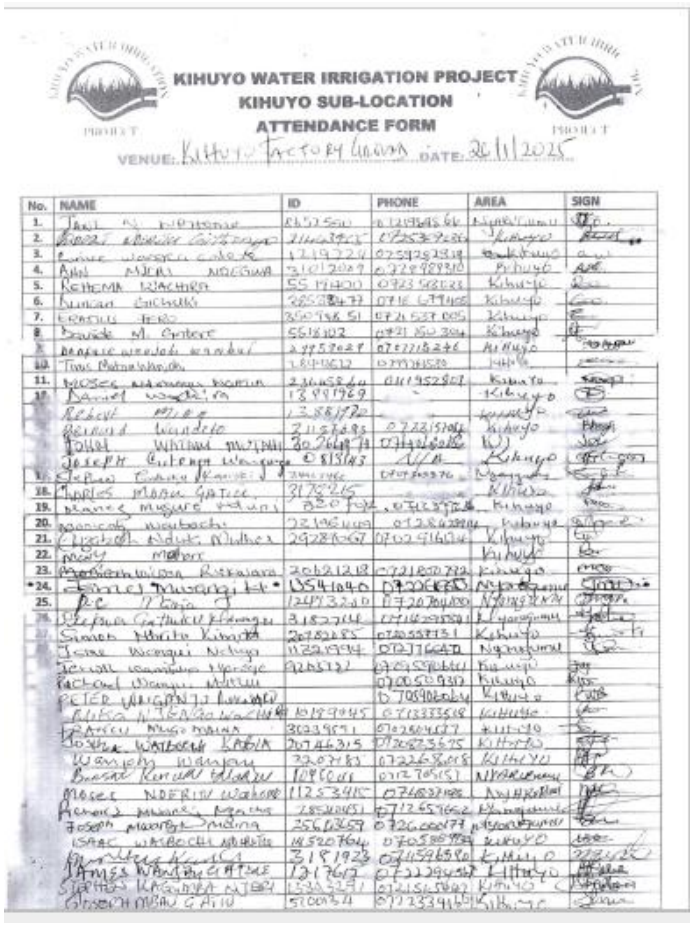
KIHUYO WATER IRRIGATION PROJECT

KIHUYO SUB-LOCATION

ATTENDANCE FORM

VENUE: Kihuyo Factory Grounds DATE: 2/1/2025

No.	NAME	ID	PHONE	AREA	SIGN
1.	Daniel Wangige Karuga	21148292	0701582324	Kihuyo	[illegible]
2.	Dorcas Maina	36458727	0740251843	Kihuyo	[illegible]
3.	Naomi Mumbi	20758769	070006[illegible]	Nyaruguru	[illegible]
4.	Joyce Wamuchi	4670638	0719773601	Kihuyo	
5.	Martha Nyambura Wanjiru	9143070	0742233768	Kihuyo	[illegible]
6.	Beatrice Muriithi	3759156	0722[illegible]	Nyaruguru	[illegible]
7.	Mercy Ndiani	27010531	[illegible]	Kihuyo	[illegible]
	Irene Wanjiru/Wamaina	31[illegible]	0792457666	Kihuyo	[illegible]
	Simon Muthembe	36821241	[illegible]	Nyaruguru	[illegible]
	Nancy Ndungu	[illegible]	[illegible]	Kihuyo	[illegible]
	Rachel Kimani	33277525	0711933553	Kihuyo	R
	David Maina	21129955	0724056631	Nyaruguru	[illegible]
	Martin Mwangi	3178073	0711242642	Nyaruguru	[illegible]
	David Mathenge	[illegible]	072235580[illegible]	Kihuyo	[illegible]
	Lydia Wambui Gathua	3227352	0725408849	Kihuyo	[illegible]
	[illegible] Kirabi	[illegible]2645	072[illegible]	Kihuyo	[illegible]
	James Gitahi Kimita	1247[illegible]	0701245437	Kihuyo	[illegible]
	James N. [illegible]	[illegible]	0721[illegible]		[illegible]
	Jackson G. [illegible]	2024[illegible]	0726069[illegible]	Kihuyo	[illegible]
	Ellen Waithera Kimotho	2[illegible]03	[illegible]	Kihuyo	[illegible]
	Erasmus Githaiga	[illegible]	07[illegible]8390	Kihuyo	[illegible]
	John M. Ndegwa	[illegible]	[illegible]	Kihuyo	[illegible]
	James N. Kabukia	12198[illegible]	0721[illegible]	Kihuyo	[illegible]
	Charles Kariuki Githinji	3230020	0721673911	Kihuyo	[illegible]
	Julius Maina Muriuki	31707223	0710336585	Kihuyo	[illegible]
	Regina Wangari Kamotho	1[illegible]	0745477125	Kihuyo	[illegible]
	Agnes Wanjiku Muriithi	113[illegible]	072[illegible]	Kihuyo	[illegible]
	Charles Wachira	12544743	0727156[illegible]	Kihuyo	[illegible]
	Jane Ann Wangui Maina	12762230	0724067[illegible]	Kihuyo	[illegible]
	Margaret Nditu Wamaina	5544453	0740[illegible]	Kihuyo	[illegible]
	Joshua Waikochi Gatere		0723104583	Kihuyo	[illegible]
	Teresa Muthoni Gitau	54[illegible]	0721[illegible]	Kihuyo	M
	Benson [illegible]	22821235	[illegible]	Kihuyo	[illegible]
	Chris Kimaru Waigwa	0850061	0722254404	Nyaruguru	[illegible]
	Wilfred Mwangi Kagecha	8293594	0720[illegible]	Nyaruguru	[illegible]
	John Mwangi Wanjohi	57943[illegible]	07[illegible]	Nyaruguru	[illegible]
	[illegible] Gitonga Muthoni	13583713	0701193167[illegible]	Nyaruguru	[illegible]
	Esther Wanjiku Wahome				[illegible]
	David [illegible]	5490262	0701[illegible]75	[illegible]	
	Kimani Gikonyo	10[illegible]98	072[illegible]	Kihuyo	[illegible]
	Daniel Gichohi	27351029	0[illegible]	Kihuyo	[illegible]
	Simon Nguyo Gachuru	1[illegible]	07[illegible]	Kihuyo	[illegible]
	Grace Nyawira	23572294	0712338100	Kihuyo	[illegible]
	Jackson Kariuki	5[illegible]	07135[illegible]	Nyaruguru	[illegible]



KIHUYO WATER IRRIGATION PROJECT
KIHUYO SUB-LOCATION
ATTENDANCE FORM

VENUE: Kihuyo Factory Ground DATE: 26/1/2025

No.	NAME	ID	PHONE	AREA	SIGN
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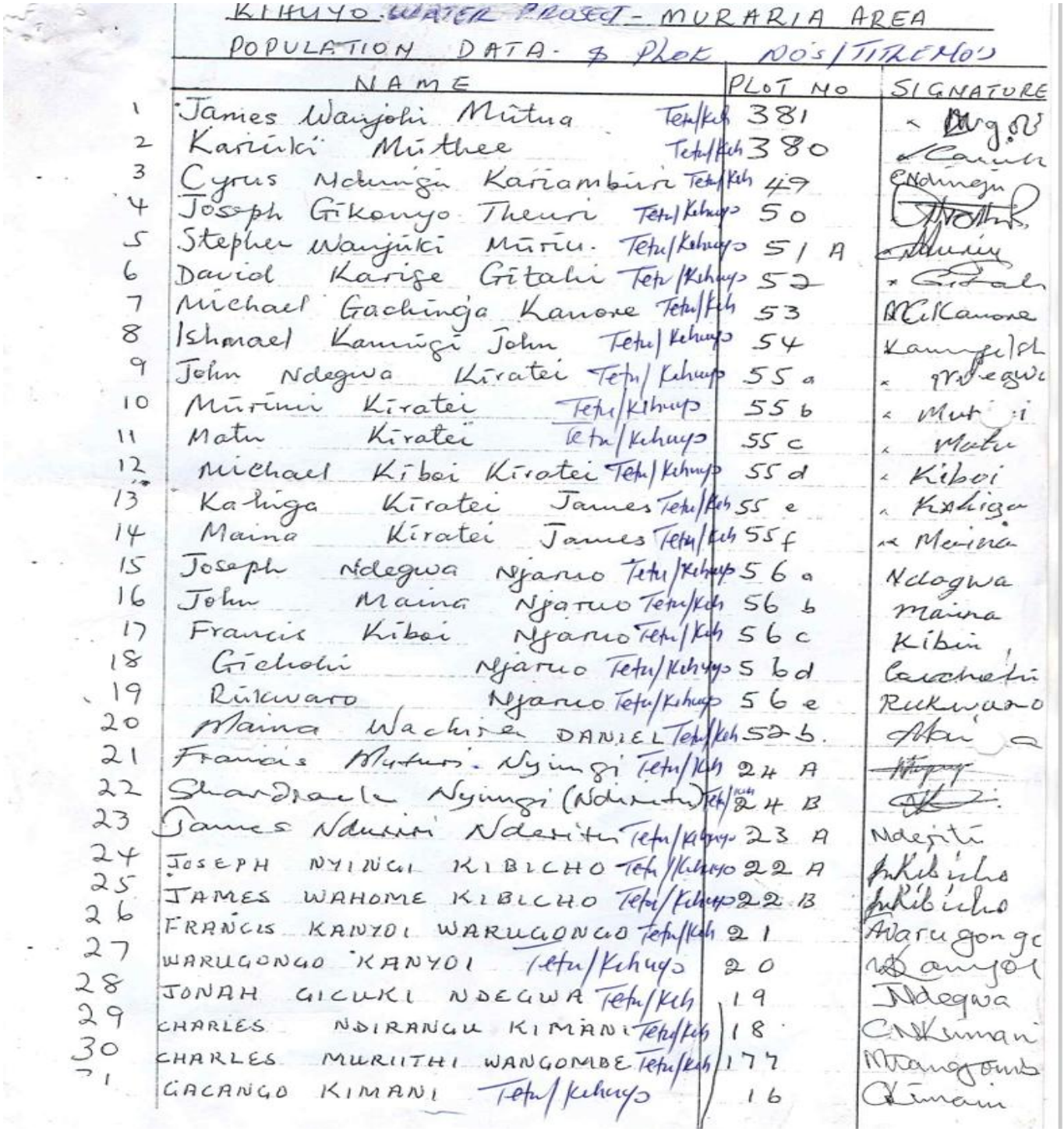
Total members present 123-95M,28F

Annex 20: List of Target Beneficiaries for the proposed Kihuyo Irrigation Sub-Project



KIHUYO WATER PROJECT - MURARIA AREA

POPULATION DATA - & PLOT NO's / TITLE NO's

	NAME	PLOT NO	SIGNATURE
1	James Wanjohi Mutua Tetu/Kih	381	
2	Kariuki Muthee Tetu/Kih	380	
3	Cyrus Mbuingu Kariambiu Tetu/Kih	49	
4	Joseph Gikonyo Theuri Tetu/Kihuyo	50	
5	Stephen Wanjuki Muriu. Tetu/Kihuyo	51/A	
6	David Karige Gitahi Tetu/Kihuyo	52	
7	Michael Gachinga Kamore Tetu/Kih	53	
8	Ishmael Kamuigi John Tetu/Kihuyo	54	
9	John Ndegwa Kiratei Tetu/Kihuyo	55 a	
10	Murimi Kiratei Tetu/Kihuyo	55 b	
11	Matu Kiratei Tetu/Kihuyo	55 c	
12	Michael Kibai Kiratei Tetu/Kihuyo	55 d	
13	Kahiga Kiratei James Tetu/Kih	55 e	
14	Maina Kiratei James Tetu/Kih	55 f	
15	Joseph Ndegwa Njamo Tetu/Kihuyo	56 a	Ndegwa
16	John Maina Njamo Tetu/Kih	56 b	Maina
17	Francis Kibai Njamo Tetu/Kih	56 c	Kibai
18	Gicholi Njamo Tetu/Kihuyo	56 d	Gicholi
19	Rukwaro Njamo Tetu/Kihuyo	56 e	Rukwaro
20	Maina Wachira DANIEL Tetu/Kih	52 b.	
21	Francis Mutuo. Nyingi Tetu/Kih	24 A	
22	Shadrack Nyingi (Ndiritu) Tetu/Kih	24 B	
23	James Ndiritu Ndeiritu Tetu/Kihuyo	23 A	Ndeiritu
24	JOSEPH NYINGI KIBICHO Tetu/Kihuyo	22 A	Kibicho
25	JAMES WAHOME KIBICHO Tetu/Kihuyo	22 B	Kibicho
26	FRANCIS KANYOI WARUGONGO Tetu/Kih	21	Warugongo
27	WARUGONGO KANYOI Tetu/Kihuyo	20	Kanyoi
28	JONAH GICUKI NDEGWA Tetu/Kih	19	Ndegwa
29	CHARLES NDIRANGU KIMANI Tetu/Kih	18	Kimani
30	CHARLES MURIITHI WANGOMBE Tetu/Kih	177	Wangombe
31	GACANGO KIMANI Tetu/Kihuyo	16	Kimani

Mitaa

32	JOHN NYINGI KARIUKI	Teta/Kah	224/225	JNKariuki
33	ANNA WANJA MAINGI	Teta/Kahyo	221	AWmaingi
34	JACKSON NDIRITU NYINGI	Teta/Kahyo	23	JNyingi
35	FRANCIS WANJOHI NDIRITU	"	23	FNdiritu
36	CHARLES WANGOMBE WANJUKI	Teta/Kahyo	51 B	Cwanjuki
37	CHARLES KIBICHO KARIUKI	Teta/Kahyo	223	Kibicho
38	SHADRACK NDIRITU KARIUKI	Teta/Kahyo	222	Shandrack
39	STEPHEN KIMANI KARIUKI	Teta/Kahyo	226	SKimani
40	JOHN KIRIUNGI MUSA	Teta/Kahyo	190	JKmusa
41	RUTH NYANJAU MUSA	Teta/Kahyo	191	Ruth
42	PERIS WANJIRU MUSA	Teta/Kahyo	193	P.W.Musa
43	JEREMIA KARIUKI MUSA	Teta/Kahyo	194	JKmusa
44	ELIJAH WAICHANGURU MBAU	Teta/Kahyo	162 A	EMbau
45	JOHN KAGUMBA MBAU	Teta/Kahyo	162 B	JKmbau
46	EPHARUS WANJIRU MBAU	Teta/Kah	162 C	EMbau
47	PATRICK MUHOYA MBAU	Teta/Kah	10	Pmbau
48	NDIRANGU NGATIA	Teta/Kahyo	175	NDIRANGU
49	WAHOME NDIRANGU	"	175	WNdirangu
50	MUTHEE NDIRANGU	"	175	Muthee
51	MOLLY NYAWIRA KIUNGA	Teta/Kahyo	174 A	
52	MOSES NGATIA GITAHI		174 B	
53	JOSEPH KIBICHO NYINGI	Teta/Kahyo	9	JKNyingi
54	MARGARET WANJIKU MBURU	Teta/Kahyo	8 A	Mwanjiku
55	HAMPREY NJOROGE KARIUKI	"	8 B	N.Kariuki
56	ISACK MBURU KAMUNYA	Teta/Kahyo	7 A	
57	PETER KARIUKI KAMUNYA	"	7 B	
58	WILSON RUKWARO NGARI	Teta/Kahyo	6	WRNgari
59	JOHN NGARI RUKWARO	"	6	JNRukwaro
60	KAMUTU NGARI	"	6	KNgari
61	GITHINJI NGARI	"	6	CNgari
62	WANGOMBE RUKWARO	"	6	WRukwaro
63	ELIZABETH WANJIRU NYINGI		24 C	

Murang'a

64	NANCY	WANJIKU	RUKWARO	Tetu/Kihuyo	6	
65	WANGUI	RUKWARO		Tetu/Kihuyo	6	
66	GAKUU	RUKWARO		Tetu/Kihuyo	6	
67	STEPHEN	WANGOMBE	RUKWARO	Tetu/Kih	6	
68	RUKWARO	WANGOMBE		Tetu/Kihuyo	6	
69	MUNDIA		NDEBURA	Tetu/Kih	3	
70	EUNICE	WANGECHI	NGUNJU	Tetu/Kih	4	
71	MUNDIA	MATHENGE		Tetu/Kihuyo	8	
72	WAIKWA	MUGO		Tetu/Kihuyo	1C	
73	PHARIS	GITONGA		Tetu/Kihuyo	2	
74	GICIGI	MUGO		Tetu/Kihuyo	1B	
75	ZAKAYO	WANJOHI		Tetu/Kihuyo	1A	
76	Harun	Kimani	Musa	Tetu/Kihuyo	192	

NINEVE

					P/NO	SIGN
77	SAMUEL	MURIU	KARIRU	Tetu/Kh	57A	
78	JOSEPH	MBOGO	KARIRU	Tetu/Kh	57B	
79	MURUTHI	KARIRU		Tetu/Kihuyo	57C	
80	ONESMUS	G.K	MBOGO	Tetu/Kh	57D	
81	TERESA	N	KIBOI	Tetu/Kh	57E	
82	MAINA	G.	MBOGO	Tetu/Kh	57F	
83	HEZRON	NDEGWA	MBOGO	Tetu/Kh	58A	
84	JOHN	NDIRANGU	NDEGWA"		58B	
85	FRANCIS	MAINA	NDEGWA"		58C	
86	NGUNYI	NDEGWA		Tetu/Kihuyo	58D	
87	EVELY	MUTHONI	M	Tetu/Kh	59A	
88	AMOS	KARIUKI	M	Tetu/Kh	59B	
89	E. MAINA	MURUTHI		Tetu/Kihuyo	59C	
90	ISAAC	WAIBOCHI	M.	Tetu/Kihuyo	60A	
91	JOHN	WANJOHI	N	Tetu/Kihuyo	60B	
92	VERONICA	NYOKABI	N	Tetu/Kihuyo	60C	
93	PAUL	KARIRU	WAIBOCHI"		60D	
94	ISAAC	W.	NDIRITU	Tetu/Kh	60E	
95	JONAH	GICHUKI	MBOGO	Tetu/Kh	61A	
96	NDIRITU	GICHUKI	MBOGO	Tetu/Kh	61B	
97	GATERE	GICHUKI	MBOGO	Tetu/Kh	61C	
98	DAVID	MWANGI	GATERE	Tetu/Kh	62A	
99	JOHN	NDIRITU	MBOGO	"	62B	
100	R.	MAINA	MBOGO	"	62C	
101	MILIKA	WANGUI	GATERE	"	62D	
102	ESTHER	KIRIGO	WATANI	"	63A	
103	FRANCIS	MUTAHI	WATANI	"	63B	
104	JAMES	MUTHUNGU	WATANI	"	63C	
105	JORUM	MUTAHI	WATANI	"	63D	
106	JOSEPH	NDIRITU	WATANI	"	63E	
107	WACIRA	WATANI		Tetu/Kihuyo	63F	
108	GATERE	WATANI		Tetu/Kihuyo	63G	
109	MBOGO	WATANI		Tetu/Kihuyo	63H	

NINEVE

					P/NO	SIGN
110	PAUL	HUNGU	MUCHIRI	Tetu/Kiburu	68 A	E.M.
111	ESTON	M.	HUNGU	Tetu/Kib	68 B	
112	JAMES	WANJAU	GATERE	"	64 A	
113	ISAAC	WAIROCHI	GATERE	"	64 B	
114	ANN	WACIRIGA	GATERE	"	64 C	
115	MOSES	GATERE	MBOGO	"	64 D	
116	JOSEPH	MBOGO	GATERE	"	64 E	
117	DANIEL	WANGECI	GATERE	"	64 F	
118	JOSHUA	WAIROCHI	GATERE	"	64 G	
119	TERESA	MUTHONI	THITAI	"	65 A	
120	JACKSON	GITONGA	THITAI	"	65 B	
121	DAVID	GICHERU	THITAI	"	65 C	
122	JOHN	MWANGI	THITAI	"	65 D	
123	GATERE	MUNYIRI	MBOGO	"	67 A	
124	JOHN	RUKWARO	MUNYIRI	"	67 B	
125	GORDON	MUNGAI	MBOGO	"	70 A	
126	GODFREY	NDEGWA	M.	Tetu/Kiburu	70 B	
127	MARGRET	MUTHONI	M.	Tetu/Kiburu	70 C	
128	CHARLES ~~CHARLES~~	NGANGA	M	Tetu/Kiburu	70 D	
129	TITUS	MAINA	M	Tetu/Kib	70 E	
130	ABEL	KAMAU	MBOGO	Tetu/Kib	71 A	Abel
131	STEPHEN	R.	KAMAU	Tetu/Kib	71 B	
132	JAMES	MBOGO	KAMAU	"	71 C	
133	MOSES	THUMBI	KAMAU	"	71 D	

	NAMES	KIRIA-INI	PLOT NO	SIGANATURE
134	SIYMON GICHUKI KIGERA	Tetu/Kihuyo	302	S. GICHUKI
135	STEPHEN KIGERA GICHUKI	Tetu/Kihuyo	302	
136	JOSEPH MAINA GICHUKI	Tetu/Kihuyo	302	
137	JAMES MWANIKI GICHUKI	Tetu/Kihuyo	302	
138	GEOFFERY WACHIURI WACHIRA	Tetu/Kih	304	
139	DAVID WACHIRA WACHIURI	Tetu/Kihuyo	304	
140	PETER GICHUKI MACHARIA	Tetu/Kihuyo	314	
141	SAMUEL WATURU WAHOME	Tetu/Kihuyo	306	S N Wahoma
142	LOISE WANJIRU MUNDIA	Tetu/Kihuyo	291	LOISE WANJIRU
143	SOLOMON RUKWARO NDUNYU	Tetu/Kihuyo	281	
144	JOSEPH KAGUNDA RUKWARO	Tetu/Kihuyo	367	
145	PETER GACHU GICHOHI	Tetu/Kihuyo	282	
146	BEATRICE WANGUI GICHOHI	Tetu/Kihuyo	282	
147	JACKSON KARIUKI NDIRANGU	Tetu/Kihuyo	285	
148	HARUN NDIRANGU GICHOHI	Tetu/Kihuyo	296	
149	STEPHEN GATHUKU NDIRANGU	Tetu/Kih	285	
150	APPOLLO WANGONDU MUTAHI	Tetu/Kih	286	
151	JOSPHAT NJOMO MUTAYI	Tetu/Kihuyo	286	
152	JACKSON WARURU MUTAHI	Tetu/Kihuyo	287	
153	JORAM KURUGA KABARA	Tetu/Kihuyo	288	
154	ANASTASIA NJERI WANERU	Tetu/Kihuyo	238	
155	DAVID NDIRITU MUTAHI	Tetu/Kihuyo	37	
156	GITHINJI MUTAHI	Tetu/Kihuyo	37	
157	HELINA WANJIRU MUNYIRI	Tetu/Kihuyo	267	Helina Wanjiru
158	HELINA WANJIRU MUNYIRI	Tetu/Kihuyo	277	
159	HARDAD WACHIRA NDAI	Tetu/Kihuyo	278	
160	OBED KINGORI KARIUKI	Tetu/Kihuyo	293	
161	JOHN MWANGI KINGORI	Tetu/Kihuyo	293	
162	ZABRON WANYEKI KARIUKI	Tetu/Kihuyo	410	
163	JAMES KARIUKI MUTHEE	Tetu/Kihuyo	409	
164	JOHN MWANGI GITHINJI	Tetu/Kihuyo	295	
165	PETER GATHIRU GITHINJI	Tetu/Kihuyo	294	
166	PETER WANGONDU KIANJAU	Tetu/Kih	297	

P.T.O

KIAHITI

	NAME			PLOT NO.	SIGNATURE
184	JOSEPH	KIHIA	KIONI Tetu/Kihuyo	7	Kihia
185		NJAWIRA	GATIMU. Tetu/Kih	9	Nyawira
186	JOHN	GICHOHI	NDIRANGU. "	271	
187	JOSPHAT	WACHIRA	KIONI Tetu/Kihuyo	7	
188	SAMUEL	MAINA	WARUI Tetu/Kihuyo	6	Samuel maina
189	NELSON	WARUI	MACHARIA. Tetu/Kih	6	Nelson Warui
190		KARIUKI	WARUI Tetu/Kihuyo	6	Benson Kariuki
191		MWANGI	WARUI Tetu/Kihuyo	6	John mwangi
192		NDIRITU	WARUI Tetu/Kihuyo	6	peter Ndiritu
193	LUCY	WAKIURU	KANJARI Tetu/Kihuyo	3	
194	JOYCE	WAIRIMU	MUTHEMBA	" 253	J. Wairimu
195	TITUS	MACHARIA	MUTHEMBA	" 253	
196	JOSEPH	NDIGA	KOMU.	" 257	
197	CHARLES	MURAGA	WANJOHI	" 254	
198		KIAMA	KARIUKI	" 259	
199	ZELIPAH	WANGU	KARIUKI	" 258	
200	DAVID	NDIRITU	Tetu/Kihuyo	258	
201	JAMES	MAINA	GACHAGUA	" 260	James
202	SIMON	GAKUMU	MUTAHI	" 162	
203	ROBERT	WACHIRA	MUTAHI	" 162	Eunice W
204	RAMADHAN	MACHARIA	NJOROGE	" 261	
205	MOHAMMED	WAIGWA	NJOROGE	" 261	
206	WILFRED	MWANGI	KAGECHA	" 263	
207	MICHAEL	NDUNGU	KAGECHA	" 263	NDUNGU
208	JOHNSON	MAINA	KAGECHA	" 263	
209	JOSEPH	KIBANYA	MWANIKI	" 265	Kibanya
210	EPHRAIM	MWANIKI	KIBANYA	" 265	Ephmwaniki
211	NATHAN	NDIRITU	GATHIRU	" 262 A	
212	SAMUEL	GICHUHI	MUKUNDI	" 272	Susan Nyaguthii
213	EPHANTUS	WANJERE	MACHARIA	" 273	Susan Nyaguthii
214	MOSES	MWANGI	MBUTHIA	" 274	moses
215	DORCAS	WAMAITHA	MATHENGE	" 275	Dorcas
216	WANDERI	NGURU	KIAUCHI	" 252	Wanderi
217	Stephen	Mwangi	Ndiritu	" 262 B	Mwangi

KIHUHO WATER PROJECT - GICHAGI

	NAME	PLOT NO.	SIGN.
218	PETER NGAMBI GATIU	218 Tetu/Kihuyo	
219	CHARLES MBAU GATIU	217 Tetu/Kihuyo	
220	JOSEPH MUTHARA GATIU	216 Tetu/Kihuyo	
221	JOHN GACHARA GATIU	213 Tetu/Kihuyo	
222	~~CHARLES~~ JOSEPH MBAU GATIU	212 Tetu/Kihuyo	
223	JAMES KABURIA	211 Tetu/Kihuyo	
224	FRANCIS IRUNGU	1 Tetu/Kihuyo	
225	CHARLES NDERITU	2 Tetu/Kihuyo	
226	JOYCE WANGUI	3 Tetu/Kihuyo	
227	EUNICE WANGARI	4 a) Tetu/Kihuyo	
228	JOHN MBOGO	b) Tetu/Kihuyo	
229	DAVID KURIA	c) Tetu/Kihuyo	
230	MWANGI NDIRANGU	5 Tetu/Kihuyo	
231	JOHN NDIRANGU KIRONGO	6 Tetu/Kihuyo	J Kirongo
232	JOSEPH NGATIA	7 a) Tetu/Kihuyo	Ngatia
233	NDIRANGU NGATIA	b) Tetu/Kihuyo	
234	IRUNGU MACHARIA	9 a) Tetu/Kihuyo	
235	MACHARIA IRUNGU	b) Tetu/Kihuyo	
236	MAINA IRUNGU	c) Tetu/Kihuyo	
237	WAMBUGU IRUNGU	d) Tetu/Kihuyo	
238	PETERSON KIMOTHO	8 Tetu/Kihuyo	
239	WILFRED GATHECHA	10 a) Tetu/Kihuyo	
240	MARY WANGECHI	b) Tetu/Kihuyo	
241	CHARLES THUITA	11 Tetu/Kihuyo	GW home
242	EZEKIEL GITHINJI	12 Tetu/Kihuyo	
243	JOHN WAGURA KUMARA	13 Tetu/Kihuyo	
244	CHRISTOPHER MATU	14 Tetu/Kihuyo	
245	PAUL THEURI KAHIGIA	16 Tetu/Kihuyo	
246	CHARLES WACHIRA	15 Tetu/Kihuyo	
247	HARRISON IRUNGU	17 Tetu/Kihuyo	GW
248	MUTHONI WANJERI	18 Tetu/Kihuyo	GW

KIHUGO WATER PROJECT

GICHAGI

	NAME	PLOTNO	SIGN
249	PETRO NYAGA	19 Tetu/Kihuyo	
250	MUTAHI NYAGA	b) Tetu/Kihuyo	
251	SAMUEL WANDII	c) Tetu/Kihuyo	
252	KANYINGI NGERI	20 Tetu/Kihuyo	
253	HARUN WAIBOCHI	21 Tetu/Kihuyo	
254	BONIFACE WAIRIUKO	22 Tetu/Kihuyo	
255	MBOGO KAMAU	23 Tetu/Kihuyo	
256	CHARLES NDUNGU MAKARIA	24 Tetu/Kihuyo	
57	STEPHEN NGATIA GACHUNGI	25 Tetu/Kihuyo	
58	PAUL NDEGWA	26 Tetu/Kihuyo	
259	CHARLES NDUNGU MUTUA	27 Tetu/Kihuyo	
260	CHARLES MBINA GICHUHI	28 Tetu/Kihuyo	Jane
261	JOSEPH THAITHI	29 Tetu/Kihuyo	Joseph
262	NDERITU THAITHI	b) Tetu/Kihuyo	Samuel
263	FESTUS WANJOHI	30 Tetu/Kihuyo	
264	EDITH NYAGURA	31 a) Tetu/Kihuyo	
265	JOHN WAITHAKA	b) Tetu/Kihuyo	
266	RUKWARO GICHUKI	c) Tetu/Kihuyo	
267	NJUGI GICHUKI	d) Tetu/Kihuyo	
268	LUIS MUCHIRI GICHOHI	32 a) Tetu/Kihuyo	
269	MACHIRA MUCHIRI	b) Tetu/Kihuyo	
270	JAMES MAINA MUCHIRI	d) Tetu/Kihuyo	
271	JACINTA WAMUCII KIRAGU	33 Tetu/Kihuyo	J. Wamucii
272	JOSHUA NDERITU KINGARU	34 Tetu/Kihuyo	
273	GODFREY GITARI KIAMA	35 a) Tetu/Kihuyo	
274	JAMES MAINA GITARI	b) Tetu/Kihuyo	James
275	MUNYIRI GITARI	c) Tetu/Kihuyo	
276	BENSON MWANGI	36 Tetu/Kihuyo	
277	LEAH WACHEKE KIRAGU	37 a) Tetu/Kihuyo	
278	PAUL KIBANDI KIRAGU	b) Tetu/Kihuyo	
279	WANJETO KIRAGU	c) Tetu/Kihuyo	

GACHAGI

	NAME		PLOT NO.		SIGN.
280	ISHMAEL	KAMUGI	1	Tetu/Kihuyo	
281	PAUL	WAIBOCHI	2	Tetu/Kihuyo	
282	JOSEPH	GIKONYO THEURI	3	Tetu/Kihuyo	
283	MICHAEL	GACHINGA	4	Tetu/Kihuyo	
284	JOSEPH	GIKONYO THEURI	5	Tetu/Kihuyo	
285	JOHN	WAIBOCHI	6	Tetu/Kihuyo	
286	ELENA	WANJIKU	7	Tetu/Kihuyo	E Wanjiku
287	JAMES	MUIRI	36/87	Tetu/Kihuyo	
288	STEPHEN	KIMANI	10	Tetu/Kihuyo	
9	CYRUS	WAHOME	11	Tetu/Kihuyo	
290	JOSEPH	NYINGI KIBICHO	12	Tetu/Kihuyo	
291	CHARLES	KIBICHO	13	Tetu/Kihuyo	
292	JAMES	NJUNGU THEURI	51	Tetu/Kihuyo	
293	FULL GOSPEL	CHURCH	50	Tetu/Kihuyo	
294	CATTLE	DIP	45	Tetu/Kihuyo	
295	P.C.E.A	CHURCH	147	Tetu/Kihuyo	
296	KIHUYO	NURSERY SCHOOL	149	Tetu/Kihuyo	
297	KIHUYO	CATHOLIC CHURCH	170	Tetu/Kihuyo	
298	KIHUYO	DISPESARY	42	Tetu/Kihuyo	
99	AIPCA	CHURCH KIHUYO	168	Tetu/Kihuyo	
300	KIHUYO	COFFEE FACTORY	203	Tetu/Kihuyo	
301	KIHUYO	SECONDARY SCHOOL	172	Tetu/Kihuyo	

KIHUYO WATER PROJECT.

GICHAGI	NAMES OF WATER USERS	TITLE	PLOT NO		SIGNATURE
302	PETER KIRUTHU NYATITH	TETU/KIHUYO	229	C	
303	NGIRUBIU NYATITH	"	"	229	D
304	WAICHIHE NYATITH	"	"	229	E
305	JOHN RUKWARO NYATITH	"	"	229	F
306	LUCY WANJIA RUKWARO	TETU/KIHUYO	228	A	
307	STEPHEN KAGUMBA RUKWARO	"	"	228	B
308	WILLIAM NDEGWA KAGUMBA	"	"	228	C
309	JOSEPH NDUNGU KAGUMBA	"	"	228	D
310	RICHARD RUKWARO KAGUMBA	"	"	228	E
311	ROBERT NDIRITU KAGUMBA	"	"	228	F
312	JOHN NGAMBI KABURIA	TETU/KIHUYO		127	A
313	MWANGI NGAMBI	"	"	127	B
314	STEPHEN KAGUMBA NJERI	TETU/KIHUYO		161	C.
315	KIHUYO PRIMARY SCHOOL	TETU/KIHUYO		134	

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KIHUYO WATER PROJECT.

Githagi

ICHAGI	NAME OF USERS	TITLE	PLOT NO.		SIGNATURE
5316	PATRICK KAIHU GITHONGO	TETU/KIHUYO	161	E	
317	MARY NJERI GITHONGO	"	" 161	F	Njeri
318	JOSEPH KABACHIA GACHIRA	TETU/KIHUYO	160	A	M.N Kabachia
319	JOHN MWANGI KABACHIA	"	" 160	B	
320	CHARLES KIRAGURI KABACHIA	"	" 160	C	
321	ROBERT NDIRITU KABACHIA	"	" 160	D	
322	~~KIRAGURI~~ WAMBUGU KABACHIA	"	" 160	E	
323	MUTHUI KABURIA	TETU/KIHUYO	47	A	
324	FRANCIS MWANGI MUTHUI	"	" 47	B	
325	JOSEPH WANJAMA MUTHUI	"	" 47	C	
326	RICHARD WANYIRI MUTHUI	"	" 47	D	R W Muthui
327	CHRISTOPHER RUKWARO KABURIA	TETU/KIHUYO	43	A	
328	WAMBUGU RUKWARO	"	" 43	B	
329	WANYIRI RUKWARO	"	" 43	C	
330	JOHN NGIRIBU NDIGINI	TETU/KIHUYO	142	A	
331	WILLIAM THIONGO	"	" 142	B	
332	MR PETER MURIITHI	"	" 142	C	
333	RUTH NYAKAHIN RUKWARO	TETU/KIHUYO	231	A	
334	JAMES WAIBUCH RUKWARO	TETU/KIHUYO	230	A	
335	PAUL WAIBUCH RUKWARO	TETU/KIHUYO	229A		
336	MARATANYATH RUKWARO	TETU/KIHUYO	229B		

KIHUYO WATER PROJECT

Gichagi Page. 1

GICHAGI	NAMES OF WATER USERS.		TITLE PLOT NO		SIGNATURE.
337	PAUL WAIBOCHI IRUKWARO	TETU	KIHUYO / 141	A	
338	PETER KIRUTAU WAIBOCHI	"	" 141	B	
339	SIMON CITEGE WAIBOCHI	"	" 141	C	
340	JOHN KIRATU WAIBOCHI	"	" 141	D	
341	BONIFACE GICHUKI NDIGINI	TETU	KIHUYO / 140	A	
342	JOHN MAINA GICHUKI	"	" 140	B	Esther
343	STEPHEN WAIBOCHI GICHUKI	"	" 140	C	
344	ROBERT RUKWARO GICHUKI	"	" 140	D	
345	MIGWI NDIGINI	TETU	KIHUYO 46	A	
346	CHARLES NJOROGE MIGWI	"	" 46	B	
347	FLORENCE WANJIRU MIGWI	"	" 46	C	
348	JOSEPH RUKWARO MIGWI	"	" 46	D	
349	JOHN NGIRUBIU MIGWI	"	" 46	E	
350	PETER MWANGI MIGWI	"	" 46	F	
351	JAMES WAIBOCHI MIGWI	"	" 46	G	
352	MAINA NJOROGE	"	" 46	H	
353	MIGWI NJOROGE	"	" 46	I	
354	GODFREY GITHONGO NDIGINI	TETU	KIHUYO 161	A	
355	CHARLES KABERERE	"	" 161	B	
356	FRANCIS WANJEMA	"	" 161	C	
357	MICHAEL MIGWI GITHONGO	"	" 161	D	

IHAKEINI WATER USERS MEMBERS.

	NAMES	PLOT NOS	SIGNATURES.
358	FRANCIS NDEGWA THIURI Tetu/Kihuyo	48	Virginia W. Ndegwa
359	FRANCIS KAHE KABIA Tetu/Kihuyo	"	
360	CHARLES KAHE WANGARIRIA "	"	
361	FRANCIS MURGRIA Tetu/Kihuyo	122	
362	GITONGA MARINE Tetu/Kihuyo	118	
363	JOHN WACHIRA MATHENGE "	115	
364	GITAHI RUGA Tetu/Kihuyo	114	
365	STEPHEN NDIRITU NJUGI "	113	
366	JOHN RUGA Tetu/Kihuyo	121	John Ruga.
367	KARIUKI NDANDA "	112	
368	WANGOMBE NDANDA "	"	
369	WAGURA NDANDA "	"	
370	DAVID WANJOHI KIMONDO "	91	
371	GITAHI NJENGO Tetu/Kihuyo	89	M. WAMBUI
372	MUCHEMI WACHIRA "	"	
373	NJENGO GITARI Tetu/Kihuyo	90	
374	TAIKU MATHENGE "	87	
375	MATHENGE WANJAU "	85	
376	WANJAU MATHENGE "	86	
377	WANJAU MATHENGE "	84	
378	MUNJIRI KIAMA "	~~83~~ 196	
379	MUNJIRI KIHARA "	82	
380	MICHAEL KIBOI NDEGWA	77	Ruth W Kiboi
381	WAHOME KINTERE Tetu/Kihuyo	78	
382	GIKONYO THIURI Tetu/Kihuyo	80	
383	GITONGA KANJI "	76	M. KAHITO
384	NDERI BIRU Tetu/Kihuyo	126	
385	GICHANGI KIBOI Tetu/Kihuyo	75	
386	STEPHEN WAKAHE Tetu/Kihuyo	"	
387	JUSTUS NDUNGU KIBOI "	"	
388	GABRIEL KARIUKI GICHUHI	85	MRS Kariuki
389	STEPHEN KIMANI KARIUKI	74	
390	GICHOHI WAGURA "	249	

THARE-INI

391	GITAHI MUHUGU	Tetu/Kihuyo	93
392	FRANCIS GATHUA WANGUNGU	Tetu/Kih	182
393	NDIRANGU MUHUGU	Tetu/Kihuyo	98+69
394	JOSEPHE NDIRITU WERUNGA	Tetu/Kihuyo	97
395	JOSEPH NDIRITU KIRAGURI	Tetu/Kihuyo	123
396	DAVID WANJOHI GITAHI	Tetu/Kihuyo	96
397	MOKO GATHUA	Tetu/Kihuyo	99+95
398	WANGUNGU NDUHIU	Tetu/Kihuyo	100
399	GITHUI BIRU	Tetu/Kihuyo	101
400	WANGUNGU BIRU	Tetu/Kihuyo	104
401	PETER KIRETAI MATHENGE	Tetu/Kih	106
402	WACHIRA KIRETAI	Tetu/Kihuyo	106
403	MWANGI KIRETAI	Tetu/Kihuyo	106
404	MICHAEL NDUNGU WAMBUGU	"	107
405	WANJOHI MUHUHU	Tetu/Kihuyo	164
406	MAINA MUHUHU	Tetu/Kihuyo	164
407	GITAHI MUHUHU	Tetu/Kihuyo	164
408	GICHUKI MUHUHU	Tetu/Kihuyo	164
409	MARGRET NGINA WANJAU	Tetu/Kih	164
410	CECILIA WANGECHI NDUNGU	"	165
411	MURIITHI NDUNGU	Tetu/Kihuyo	165
412	MURERU NDUNGU	Tetu/Kihuyo	165
413	NAAMAN WAITHANJI KABIA	Tetu/Kihuyo	104
414	MURIITHI MUTHOMI	Tetu/Kih	104
415	NAHASHON GITAHI KABIA	Tetu/Kihuyo	103
416	JOHN WANJOHI GITAHI	Tetu/Kihuyo	103
417	NDUMIA NYAINGETHA	Tetu/Kihuyo	109
418	DANIEL KIMORIA NDUMIA	Tetu/Kih	"
419	FRANCIS RUKWARO NDUMIA	Tetu/Kih	"
420	SAMUEL KAMUNYA NDUMIA	Tetu/Kih	"
421	FESTUS WANJOHI NDUMIA	Tetu/Kih	"
422	JUSTUS THURI NDUMIA	Tetu/Kih	"
423	DAVID CHENGECHA NANGOMBE	"	110
424	STEPHEN KIBUKU CHENGECHA	"	110

~~KIT~~ KIHUYO WATER PROJECT (8)

ZONE KAMICHUGA

					Plot No	Sign
430	JOHN	KAMAU	NDUNGU	Tetu/Kihuyo	383	
431	ISAAC	WARETA	KIRAGURI	Tetu/Kih	325	Wareta
432	ANNAH	WARUKIRA	KANYI	Tetu/Kihuyo	324	Kanyi
433	SAMUEL	MUTURI	KIMARU	"	323 A	Samuel
434	CHRISTOPHER	KIMARU	WAIGWA	"	323 B	
435	EVAN	WAGURA	WAIGWA	"	323 C	
436	PURITY	NYAKINYUI	MUNYIRI	"	322	Nyakinyui
437	JOSEPH	MAINA	NDUNGU	"	321 A	Mugo
438	GABRIEL	MUGO	NDUNGU	"	321 B	
439	JAMES	MUGO	KAMAU	"	320 A	
440	PETER	KARIRI	KAMAU	"	320 B	Kariri
441	CHARLES	NDUMIA	GITHINJI	"	319B	
442	PHILIP	GACHANGI	Tetu/Kihuyo		321	
443	MARY	WAIRIMU	NGUNJIRI	"	328	
444	STEPHEN	WANGOMBE	Tetu/Kihuyo		413	
445	MERCY	WANJIKU	MUNYARI	"	329	
446	ESTHER	NJOKI	NDIGITHE	"	331 A	
447	PATRICK	MAINA	NJOKI	Tetu/Kihuyo	331 B	P.N.N
448	CHARLES	MAINA	GAITA	Tetu/Kihuyo	332	
449	DACSON	MWANGI	Tetu/Kihuyo		333 A	
450		MURAGE	Tetu/Kihuyo		333 B	
451	MARY	WANGARI	GACHOKI	Tetu/Kihuyo	334 A	Mary.
452	MARTIN	MWANGI	GACHOKI	Tetu/Kihuyo	334 B	
453	PETER	GACHIRI	GACHOKI	"	334 C	
454	JOSEPH	MAINA	GAKUNGU	"	335	Maina.
455	DANIELS	KABURIA	MURAGURI	"	339C	
456	CHARLES	MWANGI	NGUNJIRI	"	328	
457	FRANCIS	WANJOHI	THEURI	"	337	
458	MOSES	NDIRITU	KIBICHO	"	386	Moses
459	DANIEL	WACHIRA	WAHOME	"	338	
460	SISTO	WACHIURI	WACHIRA	"	340	
461	ELOSE	NJERI	MURAGURI	"	339 A	ELOSE
462	DANIEL	KIBURIA	MURAGURI	"	339 B	

Kamichigiri Area 59 (9)

					Plot NO	Sign
463	WILLIAM	NDIRITU	MUCHERE	Tetu/Kihuyo	337	
464	NICHOLAS	GITHINJI	GAKURU	Tetu/Kihuyo	336	
465	JOSEPH	MAINA	KARIUKI	Tetu/Kihuyo	350	
466	JOHN	GACHOMBA	KARIUKI	Tetu/Kihuyo	350	
467	GERALD	KIMANGA	NJOROGE	Tetu/Kihuyo	351 D	
468	JOHN	NJUGUNA	KIMANGA	Tetu/Kihuyo	351. A	
469	JOSEPH	NJOROGE	KIMANGA	Tetu/Kihuyo	351 B	
470	JAMES	MUTA	KIBICHO	Tetu/Kihuyo	351 C	
471	ALICE	MURUGI	KIROMO	Tetu/Kihuyo	354	
472	ELIKETTA	WANGERI	TATUA	Tetu/Kihuyo	355 A	
473	JOSEPH	WAMBUGU	TATUA	Tetu/Kihuyo	355 B	
474	CHARLES	MAINA	JATUA	"	355 C	
475	GEOFREY	MURIUKI	MATINDA	"	359 A	
476	JAMES	MWANGI	MURIUKI	"	359 B	
477	FRANCES	WAWERU	MUYA	"	362	
478	ROSE	WANJARA	MUYA	"	34	
479	CHARLES	MWANGI	MUYA	"	360	
480	JOHN	KIMUNYI	NDIRANGA	"	365 A	
481	PETER	MAINA	KIMUNYI	"	365 B	
482	ESTHER	GATHONI	GATIGI	Tetu/Kihuyo	364	
483	JOHN	WAMUGUNDA	GATHAKA	"	363	
484	RUTH	NYAMBURA	KIBICHO	"	353	
485	DANIEL	MUTERU	KIBICHO	"	387	
486	JOHN	KIMOTE	KIMAKI	"	357 A	
487	MARY	WANGUI	MWANGI	"	357 B	
488	AGNES	WANGUI	KAMAU	Tetu/Kihuyo	320	
4						

Kamichigiri Area 59 (9)

					Plot NO	Sign
463	WILLIAM	NDIRITU	MUCHEKE	Tetu/Kihuyo	337	
464	NICHOLAS	GITHINJI	GAKURU	Tetu/Kihuyo	336	
465	JOSEPH	MAINA	KARIUKI	Tetu/Kihuyo	350	
466	JOHN	GACHOMBA	KARIUKI	Tetu/Kihuyo	350	
467	GERALD	KIMANGA	NJOROGE	Tetu/Kihuyo	351 D	
468	JOHN	NJUGUNA	KIMANGA	Tetu/Kihuyo	351. A	
469	JOSEPH	NJOROGE	KIMANGA	Tetu/Kihuyo	351 B	
470	JAMES	MUTA	KIBICHO	Tetu/Kihuyo	351 C	
471	ALICE	MURUGI	KIROMO	Tetu/Kihuyo	354	
472	ELIKETTA	WANGERI	TATUA	Tetu/Kihuyo	355 A	
473	JOSEPH	WAMBUGU	TATUA	Tetu/Kihuyo	355 B	
474	CHARLES	MAINA	JATUA	"	355 C	
475	GEOFREY	MURIUKI	MATINDA	"	359 A	
476	JAMES	MWANGI	MURIUKI	"	359 B	
477	FRANCES	WAWERU	MUYA	"	362	
478	ROSE	WANJARA	MUYA	"	34	
479	CHARLES	MWANGI	MUYA	"	360	
480	JOHN	KIMUNYI	NDIRANGA	"	365 A	
481	PETER	MAINA	KIMUNYI	"	365 B	
482	ESTHER	GATHONI	GATIGI	Tetu/Kihuyo	364	
483	JOHN	WAMUGUNDA	GATHAKA	"	363	
484	RUTH	NYAMBURA	KIBICHO	"	353	
485	DANIEL	MUTERU	KIBICHO	"	387	
486	JOHN	KIMOTE	KIMAKI	"	357 A	
487	MARY	WANGUI	MWANGI	"	357 B	
488	AGNES	WANGUI	KAMAU	Tetu/Kihuyo	320	
4						

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					DLOT NO	SIGN
490	MARY	MUTHONI	WAIBOCHI	Teta/Kihuyo	26A	Mary muthoni
491	DAMIANO	NGATIA	WAIBOCHI	Teta/Kihuyo	26B	NGatia
492	PAUL	WAIBOCHI	KARIA	Teta/Kihuyo	27A	WBC
493	COSMAS	MAINA	KARIA	Teta/Kihuyo	27B	MAina
494	JOSEPHINE	WAIRIMU	KARIA	Teta/Kihuyo	27C	Wairimu
495	BERNAD	MAINA	RUKWARO	Teta/Kihuyo	28A	Bmaina
496	CHARLES	RUKWARO	NGIRUBU	Teta/Kihuyo	28B	Rukwaro
497	JOHN	KARIA	WAIBOCHI	Teta/Kihuyo	29A	[illegible]
498	RAPHAEL	WANDEGO	WAIBOCHI	Teta/Kihuyo	29B	[illegible]
499	STEPHEN	GITAHI	WAIBOCHI	"	153	[illegible]
500	ROBERT	GITAHI	KARIA	Teta/Kihuyo	154A	[illegible]
501	JANE	NGIMA	KARIA	Teta/Kihuyo	154B	Ngima
502	JOSHUA	WAIBOCHI	KARIA	"	154C	[illegible]
503	PAUL	MWANGI	KIMITA	"	155A	Mwangi
504	ERASTUS	WAIBOCHI	KIMITA	"	155B	Waibochi
505	PATRICK	GITAHI	KIMITA	"	155C	Pgikuyo
506	MARY	WANJIKU	KIMITA	"	155D	Mwanjiku
507	SIMON	NDIRITU	KIMITA	"	155E	NDiritu
508	JAMES	GITAHI	KIMITA	"	155F	[illegible]
509	FESTUS	GICHUKI	RUKWARO	"	39A	FGIchuki
510	PETER	WAIGANJO	RUKWARO	"	39B	[illegible]
511	FRANCIS	WAIBOCHI	RUKWARO	"	39C	Rukwaro
512	DOMINIC	GACHUCHA	THEURI	"	37A	[illegible]
513	JAMES	NDUNGU	THEURI	"	37B	[illegible]
514	ANTHONY	MAINA	NDUNGU THEURI	"	37C	[illegible]
515	LINUS	THEURI	NDUNGU	"	37D	[illegible]
516	FRANCIS	KAGUMBA	NGARI	"	219A	[illegible]
517	STEPHEN	KARIMI	NGARI	"	219B	[illegible]
518	JOHNSON	WACHIRA	NGARI	Teta/Kihuyo	219C	[illegible]
519	JUSTUS	NDEGWA	NGARI	"	220	[illegible]
520	WILSON	NDEGWA	NDIRITU	"	37A	WNdegwa
521	BONIFACE	MUREITHI	NDIRITU	"	37B	Mureithi
522	MURIUKI	NDIRITU	Teta/Kihuyo		37C	Muriuki

523	James Wanyiri Gatiri	Tetu	Kihuyo	Plot	NO 211
524.	Joseph Mbau Gatiri	Tetu	Kihuyo	plot	NO 212
525	John Gachora Gatiri	"	"	"	No 213
526	Daniel Gatiri Wanyiri	"	"	"	NO 214
527.	Daniel Wanyiri	"	"	"	No 215 A
528.	Charles Mbau Gatiri	"	"	"	NO 217
529.	Joseph Muthara Gatiri	"	"	"	NO 216
530.	Peter Nganga Gatiri	"	"	"	No 218
531	Joseph Muthara Wanyiri	"	"	"	NO 215B
532.	Joseph Kabachia Wanyiri	"	"	"	No 215C
533	Pauline Gathoni Ngiritu	"	"	"	NO 648

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