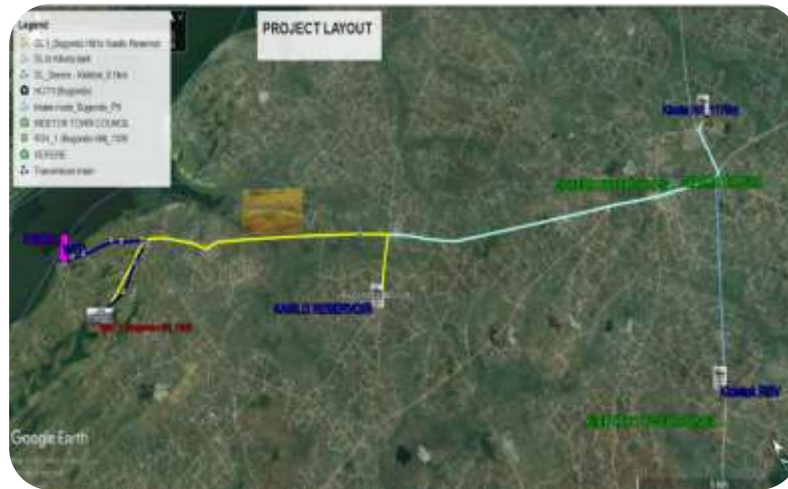


# ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED URBAN WATER SUPPLY SYSTEM IN SERERE DISTRICT



**SUBMITTED BY:**



**Republic of Uganda**

**MINISTRY OF WATER AND ENVIRONMENT**

**Directorate of Water Development  
Water and Sanitation Development Facility - East**

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## ACKNOWLEDGEMENT

We, the undersigned, hereby declare that this ESIA Report represents the facts pertaining to the Proposed Urban Water Supply System in Serere District

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## TABLE OF CONTENTS

<b>AUTHORS OF THE ESIA REPORT .....</b>	<b>ii</b>
<b>ACKNOWLEDGEMENT .....</b>	<b>iii</b>
<b>LIST OF FIGURES .....</b>	<b>ix</b>
<b>LIST OF TABLES.....</b>	<b>x</b>
<b>LIST OF ACRONYMS .....</b>	<b>xii</b>
<b>EXECUTIVE SUMMARY.....</b>	<b>xiii</b>
<b>I INTRODUCTION.....</b>	<b>I</b>
1.1 Project Background.....	1
1.2 Project Overview.....	1
1.3 Objectives of the proposed project.....	1
1.4 Project cost.....	2
1.5 Project location.....	2
1.6 Requirement for an Environmental Impact Assessment.....	2
1.7 Purpose of ESIA.....	3
1.8 Objectives of the ESIA.....	3
1.9 Contact details of the developer.....	3
1.10 Structure of this Report.....	4
<b>2 PROPOSED PROJECT DESCRIPTION .....</b>	<b>5</b>
2.1.1 Lake Kyoga.....	15
2.2 Clear Water Transmission Mains.....	16
2.3 Construction Phase.....	21
2.3.1 Mobilisation of Project Team and Resources to Site.....	21
2.4 Distribution Network.....	22
2.4.1 Main Reservoir.....	22
2.4.2 Distribution Network.....	22
2.4.3 Satellite Reservoirs.....	23
2.4.4 Water supply.....	23
2.4.5 Sanitation.....	25
2.4.6 Construction inputs and equipment.....	25
2.4.7 Site Clearing and Excavations.....	26
2.4.8 Standards.....	26
2.4.9 Transport.....	26

2.4.10	Occupation Health and Safety.....	26
2.4.11	Materials.....	27
2.5	Operation and Maintenance.....	27
2.5.1	Material Inputs during Operation Phase.....	27
2.5.2	Health, Safety and Emergency systems.....	27
2.5.3	Energy and water usage.....	28
2.5.4	Solid waste management.....	28
2.5.5	Sewage waste handling and hygiene.....	29
2.6	Contractor’s facilities during the construction phase.....	29
<b>3</b>	<b>POLICY, LEGAL, REGULATORY AND INSTITUTIONAL FRAMEWORK.....</b>	<b>30</b>
3.1	Applicable Acts, Regulations, and guidelines.....	36
3.2	International legal and lenders requirements.....	54
3.3	Institutional framework.....	57
3.4	Applicable permits and licences.....	60
<b>4</b>	<b>METHODOLOGY.....</b>	<b>62</b>
4.1	Introduction.....	62
4.2	Impact Assessment Approach.....	63
4.3	Physical Environment.....	64
4.3.1	Land Surface and Visual Impact Assessments.....	65
4.3.2	Air Quality measurements.....	65
4.3.3	Ambient Noise Measurements.....	65
4.4	Biological Environment.....	66
4.4.1	Flora.....	66
4.5	Socio-Economic Environment.....	66
4.6	Impact Assessment and Evaluation Method.....	67
4.7	Identifying Mitigation Measures and ESMP Preparation.....	71
4.8	Identifying Monitoring Measures & Monitoring Plan.....	72
<b>5</b>	<b>ENVIRONMENTAL AND SOCIAL BASELINE CONDITIONS OF THE PROJECT AREA.....</b>	<b>74</b>
5.1	District information.....	74
5.2	Project location.....	74
5.3	Bio-physical Environment.....	76
5.3.1	Lake Kyoga (intake point).....	76
5.3.2	Climate.....	76

5.3.3	Soil.....	76
5.3.4	Topography .....	76
5.3.5	Vegetation and fauna.....	77
5.3.6	Access to safe and clean water.....	77
5.3.7	Water quality .....	78
5.3.8	Air Quality.....	80
5.3.9	Noise emission .....	82
5.4	Socio-Economic Aspects .....	84
5.4.1	Demographic Characteristics .....	84
5.4.2	Sanitation systems.....	85
5.4.3	Administration .....	86
5.4.4	Hygiene improvement at Households .....	87
5.4.5	Energy .....	87
5.4.6	Socio-Economic Profile of the targeted towns.....	87
<b>6</b>	<b>PROJECT ALTERNATIVES.....</b>	<b>92</b>
6.1	Project need .....	92
6.2	The No project Alternative.....	93
6.2.1	Alternative project location .....	93
6.2.2	Alternative water sources .....	93
6.2.3	Project design .....	94
6.2.4	Feecal Sludge Treatment Plant Technological.....	94
6.3	The action alternative.....	95
<b>7</b>	<b>ANTICIPATED ENVIRONMENTAL AND SOCIAL IMPACTS.....</b>	<b>97</b>
7.1	Impact Assessment Methodology.....	97
7.2	Positive impacts .....	101
7.2.1	Creation of employment opportunities .....	101
7.2.2	Generation of revenue .....	101
7.2.3	Income to material / equipment suppliers .....	101
7.2.4	Creation of business opportunities .....	102
7.2.5	Improved access to water .....	102
7.2.6	Clean water supply.....	102
7.2.7	Improved sanitation and hygiene.....	103
7.2.8	Infrastructure improvement.....	103

7.2.9	Impact on Education.....	103
7.2.10	Climate Change and Green Growth .....	104
7.3	Anticipated impacts during site preparation and construction phase .....	104
7.3.1	Clearance of vegetation and crops.....	104
7.3.2	Soil erosion & pollution of surface water .....	105
7.3.3	Air pollution.....	105
7.3.4	Noise emission and vibrations.....	106
7.3.5	Water contamination due to use of chemicals and oil spills.....	107
7.3.6	Sanitary waste disposal .....	108
7.3.7	Aesthetics, visual intrusion .....	109
7.3.8	Occupational health and safety of workers.....	110
7.3.9	Community health and safety .....	111
7.3.10	Solid and hazardous waste management. ....	112
7.3.11	Damage to other utility service installations. ....	113
7.3.12	Temporary loss of access to homes and businesses.....	113
7.3.13	Risk of increased spread of COVID-19 .....	114
7.3.14	Misconduct of workers.....	114
7.3.15	Traffic disruption .....	115
7.4	Anticipated impacts during the operation phase .....	116
7.4.1	Water Quality and Quantity .....	116
7.4.2	Occupational health and safety of workers.....	117
7.4.3	Solid waste management and disposal .....	118
7.4.4	Natural hazards, including floods that may damage the intake, storage tanks and water pipes 118	
7.5	Negative impacts during decommissioning .....	119
7.5.1	Demolition waste.....	119
7.5.2	Noise and vibration.....	120
7.5.3	Deterioration in ambient air quality due to dust emission.....	120
7.5.4	Occupational safety concerns .....	120
7.5.5	Loss of employment.....	121
7.6	Residual Impacts .....	121
<b>8</b>	<b>STAKEHOLDER IDENTIFICATION AND ANALYSIS .....</b>	<b>122</b>
8.1	Objectives of the stakeholder engagement.....	122
8.2	Stakeholder identification and analysis .....	122

8.3	Methodology for stakeholder engagement .....	122
8.4	Summary of stakeholder views and concerns .....	125
8.5	Stakeholder views and concerns .....	125
8.6	THE STAKEHOLDER ENGAGEMENT PLAN (SEP) .....	128
8.6.1	Stakeholder Identification and Analysis .....	128
8.6.2	DISCLOSURE OF INFORMATION AND STAKEHOLDER ENGAGEMENT .....	130
<b>9</b>	<b>ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN .....</b>	<b>132</b>
9.1	Introduction.....	132
9.2	Management Plan Principles.....	132
9.3	The Monitoring and Reporting Arrangements.....	132
9.3.1	Role of the developer (MWE) in ESMP implementation.....	133
9.3.2	Role of civil contractor in the implementation of ESMP .....	134
9.3.3	Construction Supervision Consultant (CSC).....	135
9.3.4	Role of system operator (operation and maintenance phase).....	136
9.3.5	Monitoring Approach.....	137
9.3.6	Penalties for non-conformance with ESMP requirements .....	138
9.4	ESMP Structure .....	138
<b>10</b>	<b>INSTITUTIONAL CAPACITIES AND STRENGTHENING PLAN .....</b>	<b>163</b>
<b>11</b>	<b>GRIEVANCE REDRESS MECHANISM.....</b>	<b>166</b>
<b>12</b>	<b>CONCLUSION AND RECOMMENDATIONS.....</b>	<b>169</b>
12.1	Conclusion .....	169
12.2	Recommendation .....	169
<b>13</b>	<b>REFERENCES.....</b>	<b>170</b>
<b>14</b>	<b>APPENDICES.....</b>	<b>171</b>
	<b>APPENDIX 1: APPROVED TERMS OF REFERENCE FOR UNDERTAKING THE ESIA</b> .....	<b>172</b>
	<b>APPENDIX 2: SITE LAYOUT PLAN FOR THE PROPOSED DEVELOPMENT .....</b>	<b>175</b>
	<b>APPENDIX 3: WATER ANALYSIS.....</b>	<b>177</b>
	<b>APPENDIX 4: STAKEHOLDER COMMENTS.....</b>	<b>182</b>
	<b>APPENDIX 5: PICTURES FOR STAKEHOLDER ENGAGEMENT MEETINGS.....</b>	<b>200</b>
	<b>APPENDIX 6: ATTENDANCE LISTS OF STAKEHOLDERS CONSULTED .....</b>	<b>203</b>
	<b>APPENDIX 7: LAND OWNERSHIP DOCUMENTS AND MEMORANDUM OF</b> <b>UNDERSTANDING BETWEEN MWE AND SERERE DLG .....</b>	<b>212</b>



## LIST OF FIGURES

Figure 2-1: Proposed project layout .....	7
Figure 2-2: Proposed intake point and water treatment plant .....	8
Figure 2-3: Showing the intake point of the water at Bugondo landing site.....	9
Figure 2-4: The proposed intake point at coordinates 36N 531168 179391 in Bugondo landing.....	9
Figure 2-5: People within the project area fetching water at Bugondo landing site.....	9
Figure 2-6: Showing crop gardens and the neighbouring community settlements near the proposed site for water treatment plant.....	10
Figure 2-7: Showing the access route to the intake point and the proposed site for the water treatment point.....	10
Figure 2-8: Showing the view of the Budongo hill where the tank will be installed that will supply the whole of Serere District .....	10
Figure 2-9: Showing access route where piped water will pass. ....	11
Figure 2-10: Homesteads near the West of the proposed site .....	11
Figure 2-11: Proposed site for Kadungulu site for storage tank (36N 0523487 0168519) .....	11
Figure 2-12: One of the routes where the pipes will be laid in Serere Town Council.....	12
Figure 2-13: One of the routes where the pipes will be laid in Budongo Sub-County .....	12
Figure 2-14: pipeline route in Kasilo Town Council .....	12
Figure 2-15: Showing one of the existing water reservoir/ tank at Kidetok Girls SS which will be used as the supply point for Kidetok Town Council.....	13
Figure 2-16: Showing the access route where piped water system will pass, the tank in Kidetok Town Council, Serere District. ....	13
Figure 2-17: Existing tank for Kasilo (36N 0539088 0171895) which will be used for Kasilo.....	14
Figure 2-18: Kikota Hill in Serere Town Council where the water reservoir will be installed for water supply (36N 551685.56mE 169240.59mN) .....	14
Figure 2-19: Route to Kikota Hill .....	15
Figure 2-20: Existing tanks at Kikota Hill in Serere Town Council where the water reservoir will be installed .....	15
Figure 2-21: Proposed project layout.....	17
Figure 2-22: Layout plan for the proposed Water Treatment Plant.....	18
Figure 4-1: ESIA process that was adopted as provided for under the Laws of Uganda .....	64
Figure 5-1: Shows project layout.....	75
Figure 6-1: Sectional view of the Sludge stabilization and separation tank.....	95
Figure 14-1: Showing the inspection team engaging with the local community within Bugondo Landing site.....	200
Figure 14-2: Showing consultative meeting with the leadership of Bugondo Sub-county.....	200
Figure 14-3: Showing an engagement and consultative meeting at Kidetok Town Council.....	201
Figure 14-4: Showing consultative meeting at Serere Town Council.....	201
Figure 14-5: Consultations with stakeholders in Serere.....	202

## LIST OF TABLES

Table 0-1: Summary of Maximum Day Demand for Kasilo .....	xiii
Table 0-2: Summary of Maximum Day Demand for Kidetok.....	xiv
Table 0-3: Summary of Maximum Day Demand .....	xiv
Table 0-4: Summary of Maximum Day Demand for Kadungulu.....	xiv
Table 0-5: Reservoir Storage Capacity.....	xv
Table 0-6: Key institutions / agencies relevant for the project.....	xix
Table 0-7: List of relevant stakeholders .....	xxi
Table 0-8: Summary of stakeholder views and concerns.....	xxii
Table 0-9: Summary of environmental and social impacts.....	xxiii
Table 1-1: Targeted Urban Centres.....	2
Table 1-2: ESIA Report Structure.....	4
Table 2-1: Summary of Maximum Day Demand for Kasilo .....	5
Table 2-2: Summary of Maximum Day Demand for Kidetok.....	5
Table 2-3: Summary of Maximum Day Demand .....	5
Table 2-4: Summary of Maximum Day Demand for Kadungulu.....	6
Table 2-5: Reservoir Storage Capacity.....	6
Table 2-6: Clear Water Transmission Network.....	16
Table 2-7: Summary of parameters used in the designing of the components of the water treatment works.....	19
Table 2-8: Summary of Maximum Day Demand for Kasilo .....	21
Table 2-9: Summary of Maximum Day Demand for Kidetok.....	21
Table 2-10: Summary of Maximum Day Demand .....	22
Table 2-11: Reservoir Storage Capacity.....	22
Table 2-12: Greater Serere Distribution Mains .....	23
Table 2-13: Satellite Reservoirs' Storage Capacity .....	23
Table 2-14: Proposed project waste Management .....	28
Table 3-1: Summary of applicable Policies .....	30
Table 3-2: Summary of Acts and Regulations .....	36
Table 3-3: The Safeguard policies and Performance Standards relevant to the Project .....	54
Table 3-4: Key institutions / agencies relevant for the project.....	57
Table 3-5: Permits, certificates, and licences potentially required by the project.....	60
Table 4-1: Impact Assessment and Evaluation .....	68
Table 4-2: Quantitative rating of impacts.....	69
Table 4-3: Overall Impact Rating and Description .....	69
Table 4-4: Summary Template for Monitoring Requirements.....	72
Table 5-1: Access to safe water by Sub County .....	78
<b>Table 5-2: Results for water quality at the intake point (See Appendix 3 for water quality results) against drinking water standards. ....</b>	<b>79</b>
Table 5-3: WHO Air quality guidelines and interim targets for particulate matter: 24hr concentrations	80
<b>Table 5-4: Air quality measurements taken at the proposed site.....</b>	<b>81</b>
Table 5-5: Shows baseline noise measurements within the proposed project area.....	82
Table 5-6: Total Population and Growth rates as Compared to the Eastern Region by year .....	84
Table 5-7: Demographics of Target urban areas in Serere district .....	85

Table 5-8: Availability of toilets at household.....	85
Table 5-9: Types of toilet facility.....	86
Table 5-10: Number of Administrative Units by County.....	86
Table 5-11: Targeted Urban Centres .....	87
Table 5-12: Hygiene improvement practices Status.....	87
Table 5-13: Most dominant income source.....	88
Table 5-14: Commercial and Industrial Base at the towns.....	88
Table 5-15: Commercial and Industrial Base at the towns – Bakeries and Oil extracting Plants .....	88
Table 5-16: Market Days.....	89
Table 5-17: Number of Health Facilities – Serere .....	89
Table 5-18: Number of Health Centers at urban centers .....	90
Table 5-19: Education Institutions .....	90
Table 5-20: Communication Infrastructure.....	90
Table 6-1: Targeted Urban Centres.....	92
Table 7-1: Determination of Impact Significance .....	98
Table 7-2: Impact Assessment Matrix.....	98
Table 8-1: Stakeholder engagement and analysis .....	122
Table 8-2: Summarized Views and concerns raised by stakeholders.....	126
Table 8-3: Project stakeholders .....	128
Table 9-1: Environmental and Social Management Plan.....	139
Table 10-1: Key institutions / agencies relevant for the project .....	163

## LIST OF ACRONYMS

NEMA	National Environment Management Authority
TOR	Terms of Reference
ESIA	Environmental and Social Impact Assessment
UBOS	Uganda Bureau of Statistics
ESMMP	Environmental and Social Management and Monitoring Plan
IUCN	International Union for Conservation of Nature
NEA	National Environment Act
MoWE	Ministry of Water and Environment
WSDF	Water and Sanitation Development Facility
UWSD	Urban Water and Sewerage Department
RGCs	Rural Growth Centres
O&M	Operation and Maintenance
ND	Normal Diameter
UNRA	Uganda National Roads Authority
DWRM	Directorate of Water Resources Management
WTP	Water Treatment Plant
O/M	Operation and Maintenance
AIDS	Acquired Immune Deficiency Syndrome
UNESCO	United Nations Education Scientific Organisation

## EXECUTIVE SUMMARY

### Background

The Government of Uganda is committed to increase provision of safe water supply and appropriate sanitation to the whole population. Access to safe water and hygienic sanitation facilities provides a solid foundation for prosperity for all.

In line with the commitment, the Ministry of Water and Environment intends to establish urban water supply systems geared towards ensuring that as many communities as possible get to benefit. Previous interventions targeted single towns/rural growth centers that were found to have eligible requirements for construction of a piped water supply system. However, the new approach of designing and subsequently constructing large schemes interconnecting Urban centers and rural growth centers ensures that even the small communities enrooted between towns to benefit from the services of safe water.

The MoWE through Water and Sanitation Development Facility intends to develop four (04) large urban water supply systems in Eastern Uganda - Lot 4: in Serere district. The water is to be abstracted from Lake Kyoga. This is part of Government commitment to provide clean, safe, adequate, reliable and affordable water and sanitation systems in urban centres.

### Project scope

The scope of the technical works for the proposed has been categorized into three phases, including; Design and planning, Construction, and Operation phase.

**A. Design and planning phase:** The Piped Water supply and sanitation system was based on the conducted Feasibility Studies and Preliminary Design of Four (04) Large Urban Water Supply Systems in Eastern Uganda – Lot 4: Greater Serere, 2019, Previous Studies / Projects, DWD Water Supply design Manual (2013), DWD Water Supply design Guidelines (2013) and Uganda Drinking Water Standard (US - 201: 1994), following which the following recommendations were made;

- i. The water supply and sanitation system will rely on one water source, Lake Kyoga, water treatment plant, command reservoir and independent distribution networks.

**Table 0-1: Summary of Maximum Day Demand for Kasilo**

Supply Area	Served	2019 (Base Year)	2024 (Initial Year)	2034 (Future Year)	2044 (Ultimate Year)
Kasilo	Popn.	4304	5236	7751	11473
	Domestic	158	197	306	475
	Govt/Inst	56	61	70	82
	Ind/Com	0	0	0	0
	UFW	54	64	94	139
	ADD	268	322	470	696
	<b>MDD (m3 /d)</b>	<b>348</b>	<b>419</b>	<b>611</b>	<b>90</b>
Source: Draft Feasibility Study and Preliminary Design Report for Serere, 2019					

**Table 0-2: Summary of Maximum Day Demand for Kidetok**

Supply Area	Served	2019 (Base Year)	2024 (Initial Year)	2034 (Future Year)	2044 (Ultimate Year)
Kidetok	Popn.	41520	50514	74776	110686
	Domestic	1522	1900	2950	4582
	Govt/Inst	62	73	85	99
	Ind/Com	0	0	0	0
	UFW	396	493	759	1170
	ADD	1980	2466	3794	5850
	<b>MDD (m3 /d)</b>	<b>2574</b>	<b>3206</b>	<b>4932</b>	<b>7606</b>
Source: Draft Feasibility Study and Preliminary Design Report for Serere, 2019					

**Table 0-3: Summary of Maximum Day Demand**

Supply Area	Served	2019 (Base Year)	2024 (Initial Year)	2034 (Future Year)	2044 (Ultimate Year)
Serere	Popn.	9438	11484	16999	25162
	Domestic	346	430	665	1028
	Govt/Inst	78	84	98	114
	Ind/Com	0	0	0	0
	UFW	106	129	191	285
	ADD	530	643	954	1427
	<b>MDD (m3 /d)</b>	<b>690</b>	<b>836</b>	<b>1240</b>	<b>1855</b>
Source: Draft Feasibility Study and Preliminary Design Report for Serere, 2019					

**Table 0-4: Summary of Maximum Day Demand for Kadungulu**

Supply Area	Served	2019 (Base Year)	2024 (Initial Year)	2034 (Future Year)	2044 (Ultimate Year)
Kadungulu	Popn.	32894	40019	59237	87683
	Domestic	1206	1499	2317	3582
	Govt/Inst	89	68	79	91
	Ind/Com	0	0	0	0
	UFW	324	392	599	918
	ADD	1618	1958	2994	4592
	<b>MDD (m3 /d)</b>	<b>2103</b>	<b>2545</b>	<b>3892</b>	<b>5969</b>
Source: Draft Feasibility Study and Preliminary Design Report for Serere, 2019					

The system will therefore be sized on the basis of the design demand of 26,486m<sup>3</sup> /day

## Main Reservoir

The required storage capacity has been computed as 30% of the MDD. The required storage capacity is therefore 7,946m<sup>3</sup>. A 7,986m<sup>3</sup> main reservoir has been adopted representing 30.2% storage capacity of the ultimate year maximum day demand. The reservoir's storage capacity at various stages of the design period is reflected in the table below.

**Table 0-5: Reservoir Storage Capacity**

Item	2019	2024	2034	2044
MD Demand- m3 /day	9,285	10,272	17,369	26,486
Storage Capacity (m3 )	7,986	7,986	7,986	7,986
Hours of Storage	21	19	11	7
Storage Capacity (%)	86%	78%	46%	30%
Source: Project Estimates				

**B. Construction phase:** The proposed piped water supply and sanitation system project will involve construction of the following components:

### Water supply:

- i. Intake structures on Lake Kyoga
- ii. A conventional water treatment plant
- iii. Installation of pumping mains and, transmission and distribution pipe work
- iv. Construction of the main reservoir to be located in Bugondo sub county. The storage capacity of the main reservoir will be 7,986m<sup>3</sup>
- v. Construction of storage reservoirs as follows; at Serere Town Council, Kasilo Town Council, Bugondo, Kadungulu Sub County & Kidetok RGC;
- vi. Construction of booster station will be done in Bugondo Hill to feed the reservoirs

The reservoirs in each of the towns and centres will feed the distribution networks by gravity.

### Sanitation

The proposed interventions in sanitation are centred on the construction of a total of 5No. Water borne public toilets in Serere, Kasilo Town Council, Kadungulu, Bugondo & Kidetok RGC. The proposed public water borne toilets are to be seven (7) stances with a urinal and this has been proposed for each of the project target towns/ RGCs.

### Operation and maintenance phase

This phase will involve water supply to the end users, tariff collection and system maintenance.

The operation phase of this project basically refers to the time after construction is completed. About 20 workers will be employed during the operation phase of the project. The maintenance activities include both routine and periodic maintenance works. Routine maintenance works for Serere Water Supply System include cleaning the project components such as treatment plant, transmission pipes among others, waste management, repair of damaged lines, pothole patching, cleaning of drainages, among others. The periodic maintenance items are carried out after a scheduled period of time. Other post-construction

activities shall involve enforcement of environmental and social requirements and enforcement of occupational safety rules and procedures.

The following issues are deemed significant for the safe operation of project and these include; Health and Safety, Fire control and Emergency Response, Energy and Water Use, Solid Waste Management, Sanitary Waste Management and Storm water management.

### **Decommissioning Phase**

At the end of the facility lifespan, a decommissioning plan will be developed and shared with the relevant authorities. Key issues to consider in this plan will include, workers' and community health and safety, proper waste management of rubble generated during demolition, identification of waste disposal sites and setting up of a re-development plan for the site regarding the new project at that time and obtaining all the necessary approvals from the relevant authorities.

### **Objectives of the proposed project**

- a) To improve the socio economic situation and the opportunities for people living in Urban Centers and Rural Growth Centres targeted by the project through;
  - The provision of safe, adequate, reliable and accessible water supply
  - The promotion of sanitation facilities
- b) To improve general health conditions through the reduction of water borne diseases in the targeted RGCs and urban centers.
- c) Empower communities in the targeted urban centers through the nature of the management of the WSDF (decentralized, participatory, bottom up approach)
  - High degree of community organization as prerequisite for funding
  - Strong capacity building component for O&M of installed facilities
- d) To contribute to environmental protection through the use of appropriate technologies in water and sanitation interventions, such as renewable solar energy and ecological sanitation.
- e) To ensure that gender issues are addressed in such a way that women are empowered and both sexes are involved as decision makers.

### **Requirement of Environmental Assessment**

The fifth schedule of the National Environment Act 2019 lists projects for which an environmental and social impact study is mandatory. Section (4) ((a) Abstraction or utilisation of surface water for agricultural, industrial or urban use of more than 1000 m<sup>3</sup>/day.

Undertaking an Environmental Assessment and preparation of the Environmental Statement for the proposed development of the Urban Water Supply and Sanitation system by Ministry of Water and Environment is in line with national requirements.

### **Objectives of the ESIA**



This Environment and Social Impact Study provides a description of the water supply project, presents baseline conditions in the project areas and results of stakeholder consultations and engagement, identifies project impacts and proposes mitigation measures. The report also proposes an Environment and Social Management and Monitoring Plan for the project implementation and operations phase.

### Project description:

The water system will comprise of; an intake, raw water pumping station, conventional water treatment plant with throughput of 31,800m<sup>3</sup>/day, 5.60km of treated water pumping main, to Bugondo main tank and 65.96km of distribution network

The ministry proposes to abstract water from Lake Kyoga and will be treated at a water treatment plant which will be constructed 0.24km away from the lake. The water treatment process shall involve aeration, coagulation, flocculation, sedimentation, filtration and disinfection. From the water treatment plant, water will go through pipes to Bugondo main tank; from there, the water will be supplied to the communities.

### Baseline information for the project area

**Climate:** The climate of the District is modified by the large swamp area surrounding it. Of recent rainfall, has been unreliable and unpredictable hence affecting the activities of people e.g. agriculture, livestock rearing etc.

Lake Kyoga has enough water, because of two rainy seasons, the first from the months October to December and the second between March and May. In the dry period from December to February, the temperatures in the North of Uganda are higher than in the South

**Soil:** The soils fall mainly under four major units; Serere catena; Metu complex series. These are mainly of the ferrallitic type (sandy sediments and sandy loams). They are well drained and friable. Bottomlands contain widespread deposits of alluvium.

**Vegetation:** Serere has vegetation, which can best be described as wooded savannah, grass savannah, forests and riparian vegetation. The wooded savanna mainly comprises moist Acacia savanna associated with *hyparrhenia spp* and *combretum* savanna associated with *hyparrhenia spp*. These are mainly found in southwestern part of the District i.e. Kasilo County.

The riparian category comprises certain scattered tree grasslands associated with *Setaria incrassate* *Hyparrheria rufa*, *Accacia sayel* *Accacia fistula*, *Balanities aegyptica* and *Terminalia spp*.

Serere also has expansive wetlands, which cover vast areas including Apujan from Kyere Sub County in Serere district to Ngora County in Kumi District. Further to the Northeast is a vegetation characteristic of semi-arid type with thorny shrubs

**Access to safe and clean water:** The Serere district Safe Water coverage has increased from the previous 72.15 % to 74.23 % as compared to the national average of 68% from boreholes, shallow wells springs, and piped water. The district has a potential of expanding its major sources of water for the provision of piped water system. This service coverage has met the challenge of high population growth rate whose impact in terms of the average number of persons per improved water source automatically increases the rate of breakdown of the facility.

**Water quality:** Water samples from Lake Kyoga were tested in accordance with the MWE/DWD design manual and guidelines (2013-second edition) with close reference to Uganda Drinking Water Quality

standards and World Health Organisation standards. The water quality of the selected water source was analyzed for the following pollution parameters:

- Bacteriological (microbiological) parameters;
- Chemical parameters directly related to health;
- Chemical parameters indirectly related to health;
- Physical and chemical parameters related to aesthetic and technical effects; and
- Physical and chemical parameters affecting building and pipe materials.

**Demography:** According to UBOS, 2014, the population of Serere was 283,630, of these 137,657 were male and 145,973 were female.

**Administration:** The District Council is the highest political authority, with 22 members under the headship of the District Chairperson. It has a technical team headed by the Chief Administrative Officer, distributed in 11 departments. Each of the department has a head and under each department, there are a number of sections.

**Energy:** In Serere district, the main source of energy used for cooking is wood fuel i.e. 91% of the households use firewood as the main source of fuel for cooking and this is followed by charcoal at 13% and electricity and solar energy at 3%. 43% of the households in Serere district use 'tadooba' for lighting and the category of 22% mostly specified torch as commonly used form of lighting.

**Economic activity:** In Serere District, the major economic activity is farming although other people depend on trade. Serere is among the districts with least biomass cover in Uganda this results from indiscriminate tree felling for charcoal, timber, firewood and brick baking for income to meet HH needs. The indiscriminate tree felling has had a direct effect on the weather conditions of Serere district and food security in Serere district. However, agriculture remains the main economic activity 76.1 %, trade 4.4 %, manufacturing 0.1 %, Services 2.4 % in the district.

For the towns visited, the activity is farming with 63% of the town's population, 13% business and 24% in general agriculture activities.

## Review of Legal and Institutional Framework

This chapter describes environmental legislation of Uganda that in one way or the other will be relevant to the proposed development. Relevant institutional framework is also highlighted. The chapter also discusses international conventions to which Uganda is a signatory and which may be relevant to the project.

### Institutional framework

The table below highlights some of the key institutions or agencies that are closely linked to water resources and environment management in Uganda. This is necessary for coordination of the different activities related to the proposed project.

**Table 0-6: Key institutions / agencies relevant for the project.**

Institution	Roles and Responsibilities
<b>National level</b>	
Department of Occupational Safety and Health, Ministry of Gender, Labour and Social Development	<ul style="list-style-type: none"> <li>• Responsible for implementing the Occupational Safety and Health Act (2006) and carrying out statutory inspections to ensure proper management of health and safety at workplaces.</li> </ul>
Directorate of Water Development (part of the Ministry of Water and Environment)	<ul style="list-style-type: none"> <li>• Provides support to local governments and other service providers with respect to water resource issues</li> </ul>
Directorate of Water Resources Management – DWRM (part of the Ministry of Water and Environment)	<ul style="list-style-type: none"> <li>• Develops and maintains national water laws, policies and regulations</li> <li>• Manages, monitors and regulates water resources through issuing water use, abstraction and wastewater discharge permits</li> <li>• Integrates water resources management activities</li> <li>• Coordinates Uganda’s participation in joint management of transboundary waters resources and peaceful cooperation with Nile Basin countries.</li> </ul>
Ministry of Water and Environment (MWE)	<ul style="list-style-type: none"> <li>• Responsible for setting national policies and standards, managing and regulating water resources and determining priorities for water development and management</li> </ul> <p>MWE has three directorates:</p> <ul style="list-style-type: none"> <li>• Directorate of Water Resources Management (DWRM)</li> <li>• Directorate of Water Development</li> <li>• Directorate of Environmental Affairs.</li> </ul> <p>Reporting to MWE are the:</p> <ul style="list-style-type: none"> <li>• National Environment Management Authority (NEMA),</li> <li>• National Forestry Authority (NFA)</li> <li>• National Water and Sewerage Corporation.</li> </ul>
National Environment Management Authority (NEMA)	<p>Established in May 1995 under the National Environment Act Cap 153 (now the National Environment Act, No 5, 2019) as the principal agency in Uganda charged with the responsibility of coordinating, monitoring, regulating and</p>

Institution	Roles and Responsibilities
	supervising environmental management. NEMA's functions: <ul style="list-style-type: none"> <li>• coordinates the implementation of government policies and decisions of the Policy Committee on Environment</li> <li>• ensures the integration of environmental concerns in overall national planning through coordination with the relevant ministries, departments and government agencies</li> <li>• liaises with the private sector, intergovernmental organisations, nongovernmental and government agencies of other states on issues relating to the environment</li> <li>• proposes environmental policies and strategies to the Policy Committee</li> <li>• initiates legislative proposals, standards and guidelines on the environment in accordance with the law</li> <li>• reviews and approves environmental and social impact assessment statements</li> </ul>
<b>Serere District Local Government / Serere Town Council</b>	
District Environment Committee	<ul style="list-style-type: none"> <li>• Coordinates the activities of the district council and the local environment committees relating to the management of the environment and natural resources</li> <li>• Ensures that environmental concerns are integrated in all plans and projects approved by the district council</li> <li>• Assists in developing and formulating byelaws relating to managing the environment</li> <li>• Coordinates with NEMA on all issues relating to environment management</li> </ul>
Environment Officers (Serere district and Serere Town Council and sub county officials).	<ul style="list-style-type: none"> <li>• Advises the district environment committee on all matters relating to the environment</li> <li>• Assists local environment committees in the performance of their functions</li> <li>• Gathers information on the environment and the utilisation of natural resources in the district</li> <li>• Serves as the secretary to the district environment committee</li> </ul>

Institution	Roles and Responsibilities
Community Development Officers (Serere district and Serere Town Council and sub county officials).	Plays a key role in stakeholder engagement and community projects

### Stakeholder Identification and Analysis

The environmental and social assessment team sought the views of the people neighbouring the different project component sites to inform the project affected persons about the project and capture their concerns.

**Table 0-7: List of relevant stakeholders**

Category	Stakeholder	Timing
Neighbouring local community and Local leadership	L.CI s Targeted communities	08 <sup>th</sup> September 2022
Serere district	Chief Administration Officer (CAO) District Water Officer (DWO) District Health Inspector District Health Officer District Environment Officer District Community Development Officer (DCDO)	7 <sup>th</sup> & 8 <sup>th</sup> September 2022
Serere Town officials	Sub county and town council officials (LC III, CDO, SAS), Parish Chief, Councilors, LCIs	08 <sup>th</sup> September 2022
Kasilo Town Council		8 <sup>th</sup> September 2022
Bugondo sub county		8 <sup>th</sup> September 2022
Kadungulu Sub county		8 <sup>th</sup> September 2022
Kidetok RGC		8 <sup>th</sup> September 2022
Directorate of Water Resources Management – DWRM (part of the Ministry of Water and Environment).		

Table 0-8: Summary of stakeholder views and concerns

Issue	Stakeholder concern(s)	Incorporation in ESIS / project
Employment of local community	Local labor should be prioritized both skilled and unskilled, this will help in reducing unemployment cases in the project communities but the contractor should equally avoid child labor.	Sub section 8.1.1
Involvement of stakeholders	The contractor should involve the concerned community stakeholders (local council leaders, security officers and political leaders) at all stages of the project since it's the leaders that have closer contact with the project beneficiaries.	Section 9.4
Potential increase in domestic and gender-based violence	During especially the construction period of the project, domestic violence cases may rise due to new people mixing with the communities which might lead to marriage breakups, rape, diseases and also domestic violence. Precaution measures should be put in place by the contractor to tame the projector workers.	The likely impact of the project on domestic and gender-based violence has been analysed under section 8.2.11 and appropriate recommendation measures proposed
Accidents	The contractor should devise measures on how to reduce accidents on access roads	Section 7.3.14
Misconduct of Contractor's workers	Poor behavior of the construction workers by using obscene words in the community. The contractor should sensitize the workers on acceptable behaviors to avoid obscenity	

### Project Alternative

Under the proposed Project Alternative, the development would induce job creation, in addition to stimulating social and economic development of the area. A cost benefit analysis indicates a ratio far above one implying that project benefits outstrip the environment cost of the project area and given the evaluation of the impacts below, most of the anticipated impacts are within manageable range that is low and severity is minor.

While the option of “**No Project**” Alternative implies not establishing the proposed project at all, and maintaining the status quo, this would keep the current environment and social status in and around the

project site unchanged. In addition, this would erode the potential benefits in the direct and forward and backward linkages associated with the proposed project.

### Environmental Assessment findings and recommendations

Sensitive receptors identified along the pipeline corridor include settlements, schools, a health centre and trading centres.

Water demand has been stressed, as well as the benefits of the water supply system. Stakeholder consultations and engagements have been carried out with Government Lead Agencies, Serere District Local Government, Budongo, Kasilo, Kidetok, Kadungulu, Serere Town Council officials, and with project affected persons along the pipeline corridor.

An Environmental and social management plan has been proposed to be implemented by Ministry of Water and Environment (Developer), as well as Supplemental environment and social management plans including Grievance Management Mechanism, Public Consultation and Disclosure.

The Contractor to be engaged by the developer will have this ESMP integrated into their contract specifications, contractor environment and social action plans and provide for continual supervision of contractor for compliance with ESMP provisions. The contractor will specifically be required to have a Labour Force Management Plan and Code of Conduct for workers, and to implement a Chance Finds Procedure.

Ministry of Water and Environment will monitor compliance of the Contractor with the ESMP and regulatory requirements. Ministry of Water and Environment or through a Supervising Consultant will follow up on environmental, social, health and safety aspects of the water supply system construction works, including handling of emergencies and grievances. For operations and maintenance, public safety aspects, pipeline and other water supply system components protection measures and emergency preparedness will be emphasized.

**Table 0-9: Summary of environmental and social impacts**

Issue/ impact	Mitigation measures
<b>Positive impacts</b>	
Employment opportunities	<ul style="list-style-type: none"> <li>• Employ locally available labour to create ownership and participation by the local communities on the project</li> <li>• Contractor to operate within Uganda’s labour laws</li> <li>• Involvement of local leaders especially LC Is in recruitment</li> <li>• Avail equal opportunities and equal pay for men and women for the same job done</li> <li>• Ensure compliance with occupational safety and health requirements e.g., provision of PPE</li> </ul>
Income to material / equipment suppliers	<ul style="list-style-type: none"> <li>• To the extent possible, obtain earth materials needed for construction, for example, murrum, aggregate (stones and sand) from the project affected villages.</li> <li>• Sign agreements with suppliers and comply with provisions</li> <li>• Restore material source areas after use</li> <li>• Ensure fair, adequate and timely remuneration of suppliers</li> </ul>

Clean Water supply -	<ul style="list-style-type: none"> <li>• Sensitize communities through the Water User Committees on safe ways of collection and storage of water to avoid contamination</li> </ul>
Improved access to water	<ul style="list-style-type: none"> <li>• MVE to ensure that the pump remains operational and maintain the required abstraction rate to ensure the water quantity supplied meets the needs of the people for the projected design life of the facility.</li> </ul>
Improved Sanitation and hygiene	<ul style="list-style-type: none"> <li>• Sensitize communities through the water user committee on hygienic practices such as hand washing and personal hygiene at home</li> </ul>
Improved health and Economic status of the community	<ul style="list-style-type: none"> <li>• Users will be educated on the proper use, regular cleaning and effective maintenance of the public facilities.</li> </ul>
<b>Negative</b>	
Loss of vegetation cover and crops	<ul style="list-style-type: none"> <li>• Develop and implement a vegetation restoration plan</li> <li>• Limit vegetation clearing to only sections planned for civil works</li> <li>• Restore areas of temporary land take after construction</li> <li>• Conduct awareness creation (amongst the public and contractor's workers) focusing on vegetation conservation prior to and during construction</li> <li>• Sensitize workers on vegetation conservation</li> </ul>
Soil erosion & pollution of surface water	<ul style="list-style-type: none"> <li>• Limit vegetation clearance to areas that will be required for construction of the system components to minimize land disturbance</li> <li>• Develop and implement a waste management plan</li> <li>• Store topsoil and subsoil generated during site preparation properly (away from runoff and possible contaminants) for reuse elsewhere or for backfilling and reinstatement</li> <li>• Cover heaps of excavated soil with tarpaulin to minimize exposure to agents of erosion such as wind and running water;</li> </ul>
Dust and gaseous emissions to air	<ul style="list-style-type: none"> <li>• Backfill trenches as soon as possible after laying pipes to avoid dust generation from the excavated heaped soils.</li> <li>• Provide workers with appropriate PPE especially masks</li> <li>• Cover material transporting trucks with tarpaulin</li> <li>• Regularly service construction equipment and vehicles to control emission of gases;</li> </ul>
Noise emission and vibrations	<ul style="list-style-type: none"> <li>• Switch off machinery when not in use</li> <li>• Restrict noise generating activities to day time</li> <li>• Fit noise generating machinery with silences, if possible</li> <li>• Provide workers with appropriate PPE e.g., ear muffs</li> <li>• Site major noise sources away from community</li> </ul>
Soil and water contamination due to use of chemicals and oil spills.	<ul style="list-style-type: none"> <li>• No fuel storage will be done onsite.</li> <li>• Refueling of project vehicles will be done at designated fuel stations.</li> <li>• Oil drip trays will be put in place to cater for emergency fuel leakages on site during construction.</li> <li>• In case of an oil spill, the contaminated soils will be removed for disposal at a hazardous waste handling facility.</li> </ul>



	<ul style="list-style-type: none"> <li>• Construction waste (including excavated earth) will be disposed of at designated facilities.</li> <li>• Chemicals will be stored in designated areas with spill containment barriers.</li> <li>• Material safety data sheets will be used in handling any chemicals used.</li> </ul>
Sanitary waste disposal.	<ul style="list-style-type: none"> <li>• The community will be made aware of the available sanitary facilities.</li> <li>• During the operation phase, septic tanks will be emptied periodically by licensed cesspool for treatment and disposal at Serere sewage treatment facility.</li> </ul>
Occupational safety and health of construction workers	<ul style="list-style-type: none"> <li>• Hoarding off construction sites to prevent access by unauthorized person</li> <li>• Recruit a qualified Health and Safety Officer to oversee OHS matters on a daily basis.</li> <li>• Provide adequate and appropriate personnel protective gear to the employees</li> <li>• Barricading with warning tapes all excavated sites/ open trenches and pits to prevent access by un authorized person</li> <li>• Recruit the cleaners to ensure the work place is kept in a state of cleanliness and security guards to ensure work place is properly secured</li> <li>• Provide first Aid kits fully equipped with the necessary materials at all working sites; and train a first aider to administer it</li> </ul>
Community health and safety	<ul style="list-style-type: none"> <li>• Enforce restrictions on unnecessary entry into the construction working area</li> <li>• Hoarding off the sites will be mandatory especially at sanitation facilities, treatment plant and reservoir areas where some major construction is expected</li> <li>• Conduct safety awareness campaigns in schools about the risks of students coming close to the construction site;</li> <li>• Safe vehicle speed limits will be instituted and enforced along access roads including site vehicle manoeuvres</li> </ul>
Solid and hazardous waste management	<ul style="list-style-type: none"> <li>• Develop and implement a waste management plan to ensure that measures for handling all project-generated waste are in place</li> <li>• Handle all excavated material in a manner that minimizes the release of fugitive dust (especially during hot and dry weather) and where possible, keep the movement of material to a minimum.</li> <li>• Waste will be collected, sorted and temporally stockpiled in a designated area before haulage off site</li> </ul>
Water source pollution	<ul style="list-style-type: none"> <li>• Keep all construction equipment in good operating condition to avoid oil or fuel leakages that might contaminate water resources.</li> <li>• Store all hazardous wastes in special containers in a designated area on site for regular removal and disposal by a NEMA registered contractor/waste handler.</li> <li>• All other wastes generated will be transported by the contractor or a company that has been specifically contracted to an authorized disposal area</li> </ul>

### Frequency of Monitoring and Reporting

Monitoring will be undertaken throughout the project period by various actors. Detailed monthly monitoring reports with clear illustrations of implementation of mitigation measures will be compiled by the contractor and submitted to the supervising engineer and client. These detailed reports with evidence of compliance will be prepared and appended to summary monthly reports.

## **Environmental and Social Management and Monitoring Plan (ESMMP)**

The project's ESMMP indicates both Management and monitoring measures to ensure that regulatory compliance can be checked and recorded during implementation, frequency, indicators and responsible parties. During the construction phase, ESMMP implementation shall be monitored by MWE (NEMA and Water and Sanitation Development Facility –East) together with Serere District Environment officer, community development officer and District Water officer. The contractor will also be required to customise this ESMP and form C-ESMP

The cost of monitoring during construction phase is UGX 293,250,000 and monitoring during operation phase is UGX 28,000,000

## **Conclusion**

This ESIS has developed an Environmental and Social Management and Monitoring Plan (ESMMP) to guide construction works of the piped water supply and sanitation system and sourcing materials for construction. The ESMMP was based upon environmental and social baseline and identification and assessment of potential environmental and social impacts of the proposed project with a view of minimizing negative impacts prior to, during and project implementation. With implementation of mitigation actions herein proposed, potential adverse impacts of project activities will be mitigated and positive ones enhanced.

## I INTRODUCTION

### 1.1 Project Background

The Government of Uganda is committed to a policy for increased provision of safe water supply and appropriate sanitation to the whole population. Access to safe water and hygienic sanitation facilities provides a solid foundation for prosperity for all.

In line with the commitment, the Ministry of Water and Environment intends to establish urban water supply systems geared towards ensuring that as many communities as possible get to benefit. Previous interventions targeted single towns/rural growth centers that were found to have eligible requirements for construction of a piped water supply system. However, the new approach of designing and subsequently constructing large schemes interconnecting Urban centers and rural growth centers ensures that even the small communities enrooted between towns to benefit from the services of safe water.

The MWE through Water and Sanitation Development Facility intends to develop four (04) large urban water supply systems in Serere district, Eastern Uganda - Lot 4. The water will be abstracted from Lake Kyoga. This is part of Government commitment to provide clean, safe, adequate, reliable and affordable water and sanitation systems in urban centres.

### 1.2 Project Overview

The Ministry of Water and Environment through the Water and Sanitation Development Facility intends to develop urban water supply systems in Serere district in Eastern Uganda. The water system will comprise of; an intake, raw water pumping station, conventional water treatment plant with throughput of 31,800m<sup>3</sup>/day, 5.60km of treated water pumping main, to Bugondo main tank and 65.96km of distribution network

The ministry proposes to abstract water from Lake Kyoga and will be treated at a water treatment plant which will be constructed 0.24km away from the lake. The water treatment process shall involve aeration, coagulation, flocculation, sedimentation, filtration and disinfection. From the water treatment plant, water will go through pipes to Bugondo main tank; from there, the water will be supplied to the communities.

### 1.3 Objectives of the proposed project

- f) To improve the socio economic situation and the opportunities for people living in Urban Centers and Rural Growth Centres targeted by the project through;
  - The provision of safe, adequate, reliable and accessible water supply
  - The promotion of sanitation facilities
- g) To improve general health conditions through the reduction of water borne diseases in the targeted RGCs and urban centers.
- h) Empower communities in the targeted urban centers through the nature of the management of the WSDF (decentralized, participatory, bottom up approach)
  - High degree of community organization as prerequisite for funding

- Strong capacity building component for O&M of installed facilities
- i) To contribute to environmental protection through the use of appropriate technologies in water and sanitation interventions, such as renewable solar energy and ecological sanitation.
- j) To ensure that gender issues are addressed in such a way that women are empowered and both sexes are involved as decision makers.

#### 1.4 Project cost

The estimated project cost for the proposed project is Twenty-Four Billion Eight Hundred Million Uganda shillings (UGX 24,800,000,000/=).

#### 1.5 Project location

Serere District is located in Eastern Uganda and bordered by Buyende to the south, Pallisa in the south East, Soroti in the North East, Kaberamaido in the North and Ngora in the East. Serere TC is the seat of the District headquarters which is located 30Km from Soroti Town.

The proposed intake point will be located at Lake Kyoga, around coordinates 36N 531168 179391 in Bugondo landing site, Bugondo Sub County in Serere district. The site where the water treatment plant will be set up is three (03) acres and the boundaries of the site lie around coordinates 36N 531263 179150; 36N 531266 179119; 36N 531091 179094 & 36N 531068 179191 (WGS 84). The water pipes will be laid in the road reserve.

**Table 1-1: Targeted Urban Centres**

S/N	Name of Urban Centre	Sub Counties (in Serere District)
1	Serere Town Council	Serere Town Council
2	Kasilo Town Council	Kasilo TC
3	Bugondo	Bugondo sub county
4	Kadungulu	Kadungulu
5	Kidetok RGC	Pingire

#### 1.6 Requirement for an Environmental Impact Assessment

An Environmental and Social Impact Assessment (ESIA) is a systematic process that predicts and evaluates the potential impacts a proposed project may have on aspects of the physical, biological, and human environment. Mitigation measures are then developed and incorporated into the project to eliminate or reduce adverse impacts and, where practicable, to enhance benefits.

The third schedule of the Act lists projects for which an environmental impact study is mandatory. Section (4) ((a) Abstraction or utilisation of surface water for agricultural, industrial or urban use of more than 1000 m<sup>3</sup>/day. Section 4 (k) Support facilities.

Undertaking an Environmental Assessment and preparation of the Environmental Statement for the proposed development of the urban Water Supply systems by Ministry of Water and Environment is in line with the national requirements. The EIS has been prepared considering that the project impacts are readily identified and can be avoided or mitigated. This EIS is based on project description provided by

Ministry of Water and Environment and findings of the detailed surveys and stakeholder consultations conducted by the study team.

### 1.7 Purpose of ESIA

Section 110 (Part X) of the National Environment Act, 2019 requires that all projects or policies that may, are likely to or will have significant impacts on the environment should be subjected to Environmental and Social Impact Assessment (ESIA) so that adverse impacts can be eliminated or mitigated. These projects (for which ESIA is mandatory) are listed in the fifth schedule of the Act.

The purpose of the Environmental Impact Assessment therefore, is to provide necessary information on the proposed activity to guide the Authority and the Lead Agencies in decision making and ensure that the project is implemented in an environmentally sound manner consistent with environmental regulations. This Environmental Impact Statement also proposes mitigation measures to potential impacts that have been identified which are likely to accrue from the construction and operations of the Urban Water Supply systems.

### 1.8 Objectives of the ESIA

The prime objective of this ESIA study is to assess and identify any significant positive or negative impacts arising from the activities of the proposed project. This assessment will help the developer, the Lead Agencies such as the Local council, district local government, and NEMA in undertaking informed decisions and ensure compliance of this development with the Ugandan legislation.

The specific objectives of the proposed ESIA include the following;

- a) To establish the baseline environmental and social conditions in the project area relevant to the project
- b) To obtain the views, concerns and suggestions of the relevant key stakeholders (including potentially affected persons) regarding the environmental and social impacts of the project
- c) To identify the potential environmental and social impacts, and make recommendation for their mitigation or enhancement and monitoring
- d) To prepare an environmental and social management plan for the project, indicating potential impacts, sources, management options, monitoring indicators, effects and monitoring agencies and budget.

### 1.9 Contact details of the developer

#### **Developer**

Ministry of Water and Environment  
Directorate of Water Development  
Water and Sanitation Development Facility –East

#### **Contact person:**

Eng. George Alito  
Email: [alito.g.j@gmail.com](mailto:alito.g.j@gmail.com)  
Contact: +256 774 368915

### 1.10 Structure of this Report

The ESIA has been compiled in accordance with the requirements of the National Environment (Environmental and Social Assessment) Regulations, 2020.

**Table 1-2: ESIA Report Structure**

Executive summary	Summary of the ESIA written in non-technical language.
Chapter 1	Gives the introduction to the project and the report
Chapter 2	Contains the project description;
Chapter 3	Deals with the legislation taken into consideration that has a bearing on this project;
Chapter 4	Gives the methodology
Chapter 5	Gives the baseline information of the project area;
Chapter 6	Presents project alternatives;
Chapter 7	Describes impacts and mitigation measures
Chapter 8	Presents stakeholder consultations and engagement;
Chapter 9	Contains the Environmental and Social Management and Monitoring Plan (ESMMP)
Chapter 10	Institutional Capacities and Strengthening Plan
Chapter 11	Grievance Redress Mechanism
Chapter 12	Gives the conclusion and recommendations
	References
	Appendices

## 2 PROPOSED PROJECT DESCRIPTION

Serere District is located in Eastern Uganda and bordered by Buyende to the south, Pallisa in the south East, Soroti in the North East, Kaberamaido in the North and Ngora in the East. Serere TC is the seat of the District headquarters which is located 30Km from Soroti Town.

**Table 2-1: Summary of Maximum Day Demand for Kasilo**

Supply Area	Served	2019 (Base Year)	2024 (Initial Year)	2034 (Future Year)	2044 (Ultimate Year)
Kasilo	Popn.	4304	5236	7751	11473
	Domestic	158	197	306	475
	Govt/Inst	56	61	70	82
	Ind/Com	0	0	0	0
	UFW	54	64	94	139
	ADD	268	322	470	696
	<b>MDD (m3 /d)</b>	<b>348</b>	<b>419</b>	<b>611</b>	<b>90</b>

Source: Draft Feasibility Study and Preliminary Design Report for Serere, 2019

**Table 2-2: Summary of Maximum Day Demand for Kidetok**

Supply Area	Served	2019 (Base Year)	2024 (Initial Year)	2034 (Future Year)	2044 (Ultimate Year)
Kidetok	Popn.	41520	50514	74776	110686
	Domestic	1522	1900	2950	4582
	Govt/Inst	62	73	85	99
	Ind/Com	0	0	0	0
	UFW	396	493	759	1170
	ADD	1980	2466	3794	5850
	<b>MDD (m3 /d)</b>	<b>2574</b>	<b>3206</b>	<b>4932</b>	<b>7606</b>

Source: Draft Feasibility Study and Preliminary Design Report for Serere, 2019

**Table 2-3: Summary of Maximum Day Demand**

Supply Area	Served	2019 (Base Year)	2024 (Initial Year)	2034 (Future Year)	2044 (Ultimate Year)
Serere	Popn.	9438	11484	16999	25162
	Domestic	346	430	665	1028
	Govt/Inst	78	84	98	114
	Ind/Com	0	0	0	0
	UFW	106	129	191	285
	ADD	530	643	954	1427

	<b>MDD (m3 /d)</b>	<b>690</b>	<b>836</b>	<b>1240</b>	<b>1855</b>
Source: Draft Feasibility Study and Preliminary Design Report for Serere, 2019					

**Table 2-4: Summary of Maximum Day Demand for Kadungulu**

Supply Area	Served	2019 (Base Year)	2024 (Initial Year)	2034 (Future Year)	2044 (Ultimate Year)
Kadungulu	Popn.	32894	40019	59237	87683
	Domestic	1206	1499	2317	3582
	Govt/Inst	89	68	79	91
	Ind/Com	0	0	0	0
	UFW	324	392	599	918
	ADD	1618	1958	2994	4592
	<b>MDD (m3 /d)</b>	<b>2103</b>	<b>2545</b>	<b>3892</b>	<b>5969</b>
Source: Draft Feasibility Study and Preliminary Design Report for Serere, 2019					

The system will therefore be sized on the basis of the design demand of 26,486m<sup>3</sup> /day

### Main Reservoir

The required storage capacity has been computed as 30% of the MDD. The required storage capacity is therefore 7,946m<sup>3</sup>. A 7,986m<sup>3</sup> main reservoir has been adopted representing 30.2% storage capacity of the ultimate year maximum day demand. The reservoir's storage capacity at various stages of the design period is reflected in the table below.

**Table 2-5: Reservoir Storage Capacity**

Item	2019	2024	2034	2044
MD Demand- m3 /day	9,285	10,272	17,369	26,486
Storage Capacity (m3 )	7,986	7,986	7,986	7,986
Hours of Storage	21	19	11	7
Storage Capacity (%)	86%	78%	46%	30%
Source: Project Estimates				



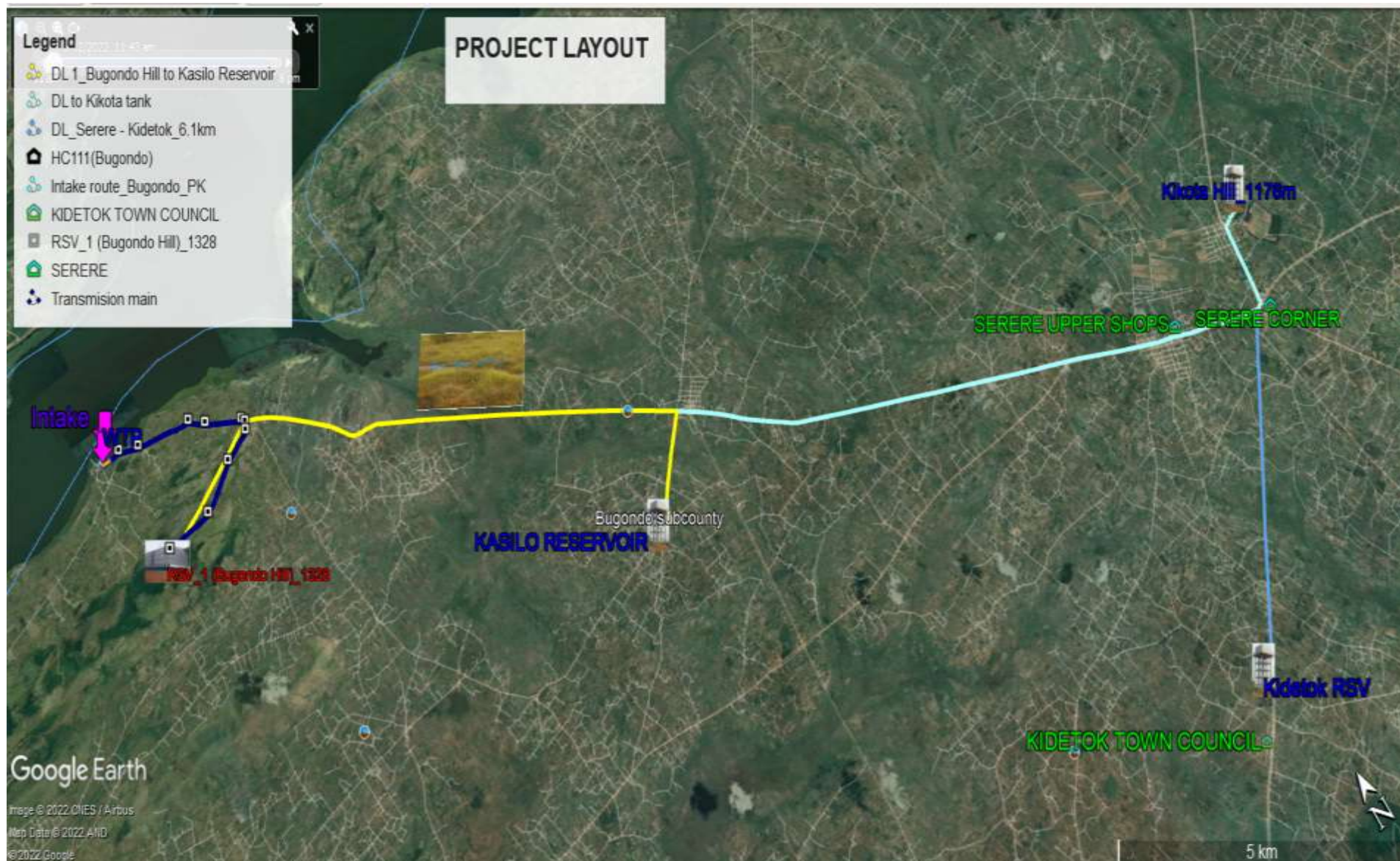


Figure 2-1: Proposed project layout

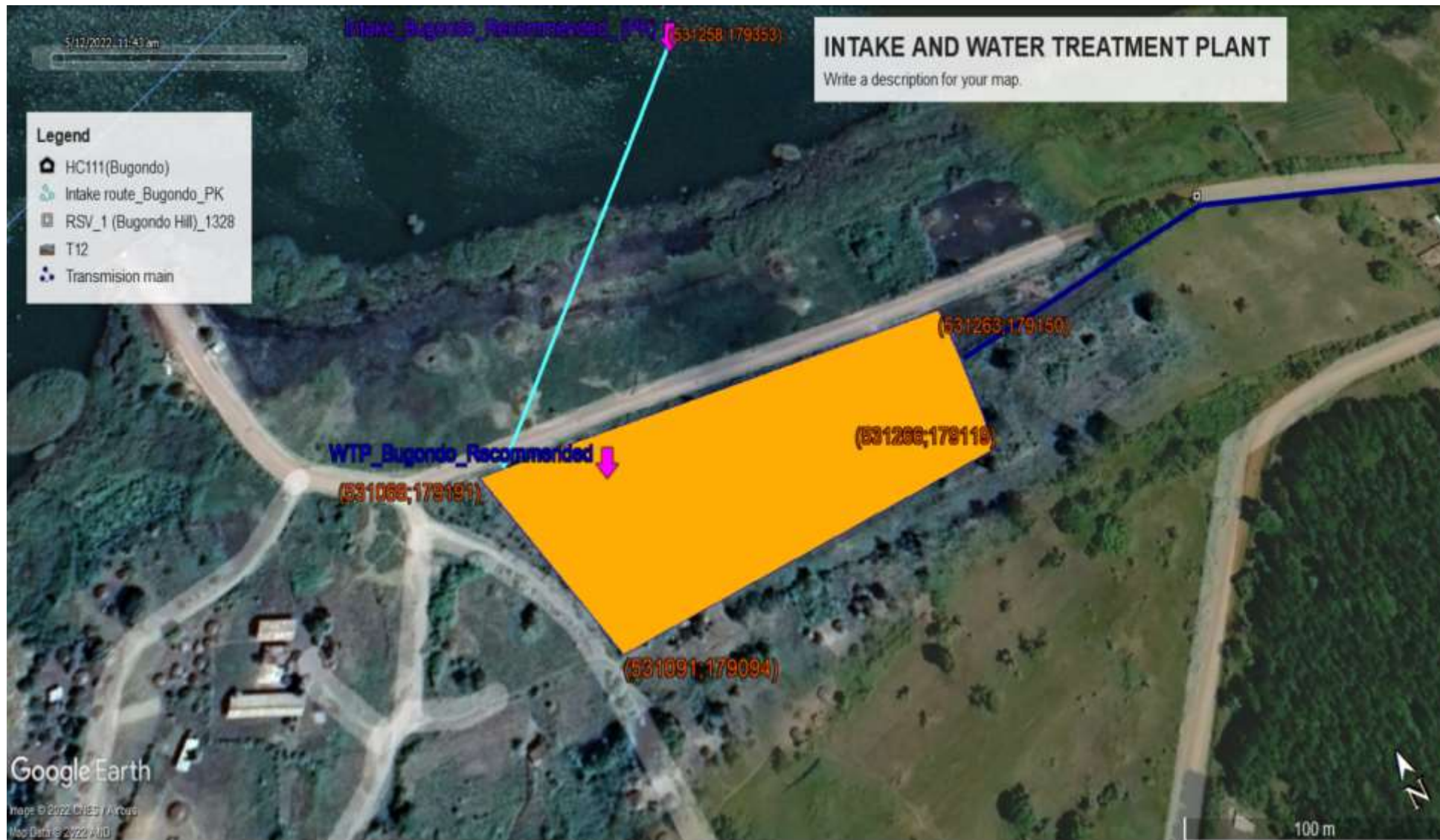


Figure 2-2: Proposed intake point and water treatment plant



**Figure 2-3: Showing the intake point of the water at Bugondo landing site.**



**Figure 2-4: The proposed intake point at coordinates 36N 53 | 168 | 17939 | in Bugondo landing site**



**Figure 2-5: People within the project area fetching water at Bugondo landing site**



**Figure 2-6: Showing crop gardens and the neighbouring community settlements near the proposed site for water treatment plant.**



**Figure 2-7: Showing the access route to the intake point and the proposed site for the water treatment point.**



**Figure 2-8: Showing the view of the Budongo hill where the tank will be installed that will supply the whole of Serere District**

The water pipeline corridor (road reserve) mainly consists of gardens of food crops such as sweet potatoes, maize, and cash crops like cotton and coffee, mature trees of different species like mango trees, jack fruit trees among others and a rocky area.



Figure 2-9: Showing access route where piped water will pass.



Figure 2-10: Homesteads near the West of the proposed site



Figure 2-11: Proposed site for Kadungulu site for storage tank (36N 0523487 0168519)



**Figure 2-12: One of the routes where the pipes will be laid in Serere Town Council**



**Figure 2-13: One of the routes where the pipes will be laid in Budongo Sub-County**



**Figure 2-14: pipeline route in Kasilo Town Council**



**Figure 2-15: Showing one of the existing water reservoir/ tank at Kidetok Girls SS which will be used as the supply point for Kidetok Town Council.**



**Figure 2-16: Showing the access route where piped water system will pass, the tank in Kidetok Town Council, Serere District.**



**Figure 2-17: Existing tank for Kasilo (36N 0539088 0171895) which will be used for Kasilo**



**Figure 2-18: Kikota Hill in Serere Town Council where the water reservoir will be installed for water supply (36N 551685.56mE 169240.59mN)**





Figure 2-19: Route to Kikota Hill



Figure 2-20: Existing tanks at Kikota Hill in Serere Town Council where the water reservoir will be installed

### 2.1.1 Lake Kyoga

Lake Kyoga is a large shallow lake and is located in central Uganda north of Lake Victoria; 914 m above sea level. The lake has fingerlike extensions with a surface of 1,720 sq. km. Its average depth reaches 3 m, its maximum depth is 5.7 m. The Victoria Nile flows through Lake Kyoga on its way from Lake Victoria to Lake Albert.

Lake Kyoga has volume of 16km<sup>3</sup> and net supply of 47m<sup>3</sup> /s (4,060,800m<sup>3</sup> /day) which is able to meet the water demand of 26,486m<sup>3</sup> /day (Ultimate year – 2044) of the project area. This translates to only 0.69% of the net supply of Lake Kyoga. Therefore, the supply from Lake Kyoga provides the highest quantity of

water potential in the project area compared to the other alternatives described earlier. Potential intake on Lake Kyoga locations in Serere can be located at Kagwara, Mugarama and Bugondo landing sites. For this project, Budongo landing site was the best choice for the intake point.

## 2.2 Clear Water Transmission Mains

The Clear water transmission main system will deliver water from the clear water tank within the water treatment system to the proposed Reservoir location of Bugondo or Ogera Hill. These high lift water transmission mains have been designed taking into consideration of the Maximum Day Demand (MDD) and 20% for the usage for the WTP. The system will have a pumping transmission rate of 31,783.67m<sup>3</sup> /day as shown the table below.

**Table 2-6: Clear Water Transmission Network**

<b>Raw water transmission system</b>	<b>Requirements</b>
Hours of Pumping (hr)	20
Total Daily Delivery (m <sup>3</sup> /day)	31,783.67
Level of the outlet of the WTP	1034.60
Level of Inlet at Reservoir	1315.00
Static Lift (m)	281
Cwh	140
Pipe Details	<b>DN 600 Ductile Iron Pipe PN25</b>
Pipe Diameter ND (mm)	600.00
Flow in Pipe (l/s)	441.44
Velocity (m/s)	1.33
<b>Length of Pipe Clear water Main (m)</b>	<b>5,480</b>
Head Loss (m)	11.76
Fittings losses - 10% (m)	1.18
<b>Residual Head in Clear water main (m)</b>	<b>292.16</b>
Flow (l/s)	441.44
Pump Efficiency (%)	80%
Power (kVA)	1,778.53
<b>Source:</b> Project estimates.	

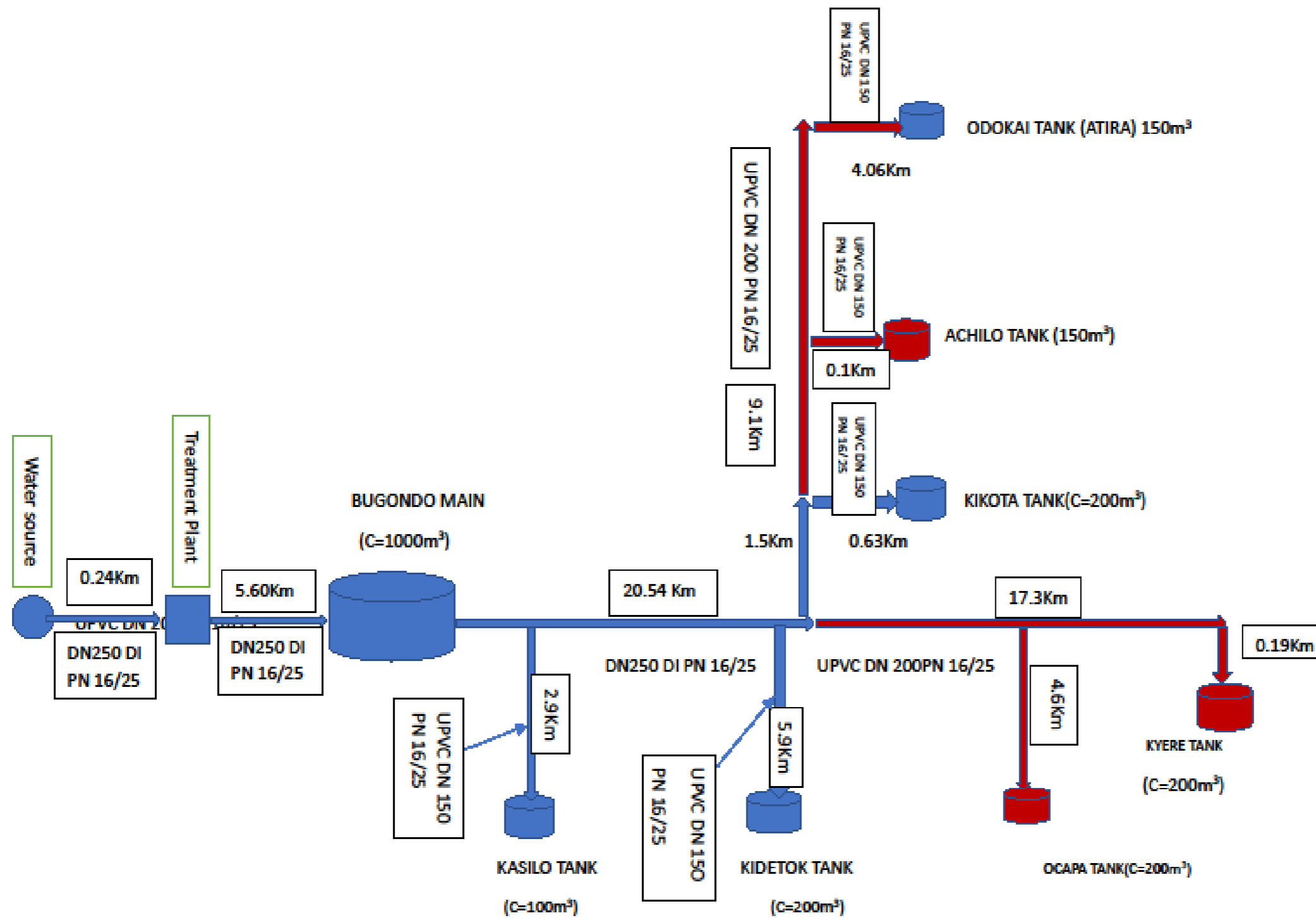


Figure 2-21: Proposed project layout

## GENERAL LAYOUT OF THE PROPOSED WATER TREATMENT PLANT

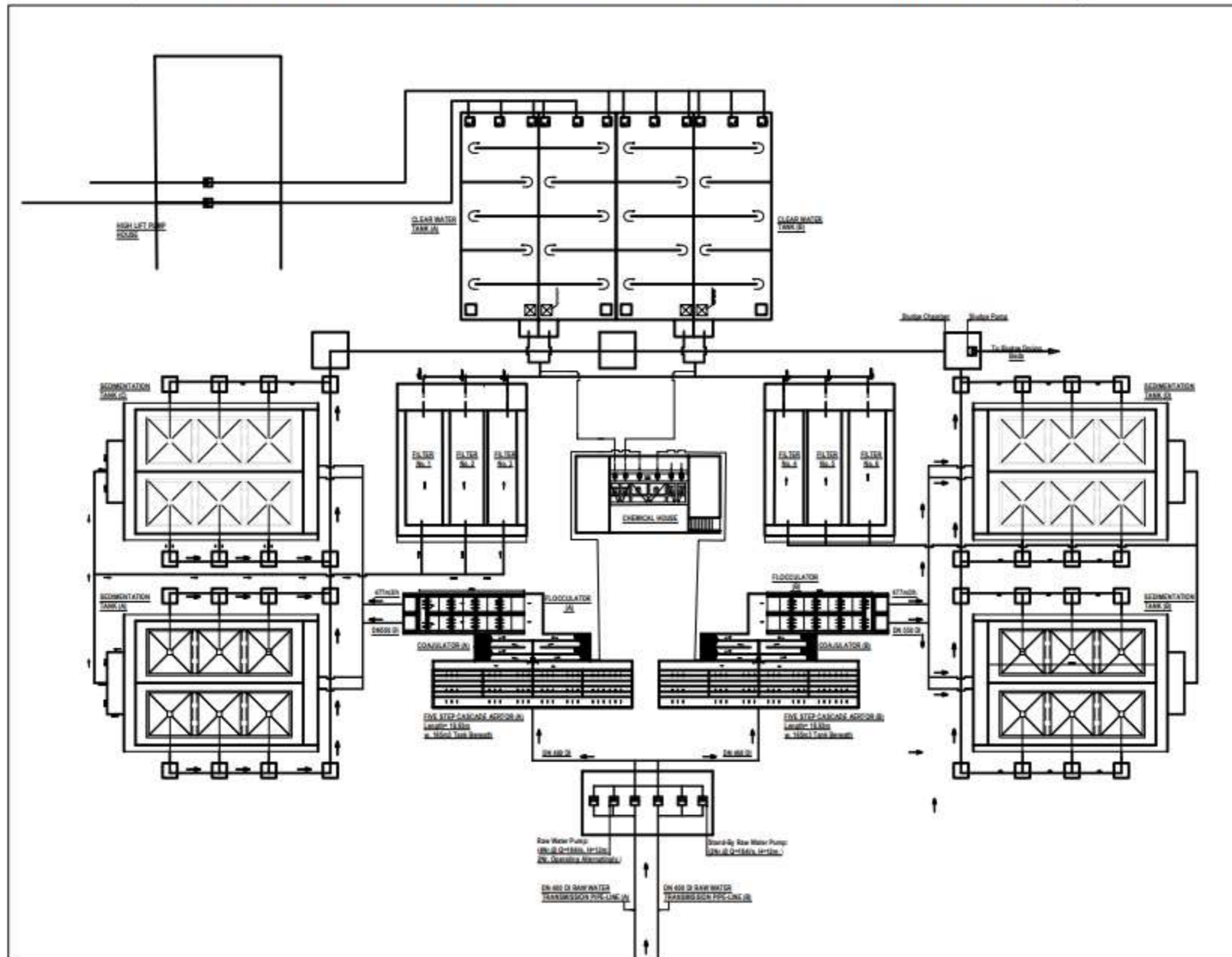


Figure 2-22: Layout plan for the proposed Water Treatment Plant

Table 2-7: Summary of parameters used in the designing of the components of the water treatment works

S/No.	Design Parameter	Cascade Aerator	Coagulator	Flocculator	Clarifiers	Rapid filters	Backwash Tank	Clear Water tank
1	Overall Safe Abstraction (m <sup>3</sup> /day)	31,784.00	31,800.00	31,800.00	31,800.00	31,800.00	31,800.00	31,800.00
2	Number of Split units (No.)	2.00	2.00	2.00	4.00	2.00	1.00	2.00
3	Split unit Safe Abstraction (m <sup>3</sup> /day)	15,892.00	15,900.00	15,900.00	7,950.00	15,900.00	-	15,900.00
4	Split Unit Through put (m <sup>3</sup> /day)	15,900.00	15,900.00	15,900.00	8,000.00	15,900.00	-	15,900.00
5	For Water works usage ( M3)	-	-	-	-	-	5,300.00	
6	For 8 storage ( M3) Elevated Pressed Steel Tank	-	-	-	-	-	1,766.67	
7	Split unit Storage For 60 mins contact time (M3)	-	-	-	-	-	-	795.00
8	Split Unit Flow (m <sup>3</sup> /hr.)	333.00	795.00	795.00	400.00	795.00	-	-
9	Slope (%)	-	2%	-	2%	-	-	-
10	Velocity of Flow (m/s)		1.23	0.58	0.01	-	-	-
11	Filtration rate ( m <sup>3</sup> /m <sup>2</sup> /hour)	-	-	-	-	10.00		
12	System Length (m) of split Unit	18.93	18.93	18.93	10.00	9.00	16.80	14.14

<b>13</b>	Width to Height Ratio	1:1	1:2	1:9	2.25:1	1:3	2:1	1:3.5
<b>14</b>	Height (m)	0.50	0.60	4.05	2.99		4.20	4.00
<b>15</b>	Width (m)	0.50	0.30	0.45	6.70	3.00	8.40	14.14
<b>16</b>	Surface Area (m2)		5.68	8.52	134.00	27.00	-	-
<b>17</b>	Resultant Effective Surface area with Lamella plates (m2)	-	-	-	1,340.00	-	-	-
<b>18</b>	Effective surface loading (m3/m2hr.)	-	-	-	0.30	-	-	-
<b>19</b>	Cross sectional Area (m2)	-	-	2.21	-	-	-	-
<b>-20</b>	<b>Overall Total Surface Area</b>	<b>75.71</b>	<b>11.36</b>	<b>17.04</b>	<b>536.00</b>	<b>162.00 -</b>	-	-
<b>21</b>	<b>Split Unit Surface Area =W*L (m2) of Unit</b>	<b>37.86</b>	<b>5.68</b>	<b>8.52</b>	<b>134.00</b>	<b>81.00</b>	-	-

## 2.3 Construction Phase

### 2.3.1 Mobilisation of Project Team and Resources to Site

This phase will majorly involve preparations by the awarded contractor such as mobilizing workforce, material and equipment to be used during construction. The developer will prepare all the required tools, personal protection equipment and put in place all facilities for worker's welfare. The construction team will be encouraged to use as much local manual labour as possible especially for unskilled labour. All contractors' employees will be provided with identification and personal protective equipment (PPE) for use while undertaking tasks on site by the contractor.

**A. Design and planning phase:** The Piped Water supply and sanitation system was based on the conducted Feasibility Studies and Preliminary Design of Four (04) Large Urban Water Supply Systems in Eastern Uganda – Lot 4: Greater Serere, 2019, Previous Studies / Projects, DWD Water Supply design Manual (2013), DWD Water Supply design Guidelines (2013) and Uganda Drinking Water Standard (US - 201: 1994), following which the following recommendations were made;

- i. The water supply and sanitation system will rely on one water source, Lake Kyoga, water treatment plant, command reservoir and independent distribution networks.

**Table 2-8: Summary of Maximum Day Demand for Kasilo**

Supply Area	Served	2019 (Base Year)	2024 (Initial Year)	2034 (Future Year)	2044 (Ultimate Year)
Kasilo	Popn.	4304	5236	7751	11473
	Domestic	158	197	306	475
	Govt/Inst	56	61	70	82
	Ind/Com	0	0	0	0
	UFW	54	64	94	139
	ADD	268	322	470	696
	<b>MDD (m3 /d)</b>	<b>348</b>	<b>419</b>	<b>611</b>	<b>90</b>

Source: Draft Feasibility Study and Preliminary Design Report for Serere, 2019

**Table 2-9: Summary of Maximum Day Demand for Kidetok**

Supply Area	Served	2019 (Base Year)	2024 (Initial Year)	2034 (Future Year)	2044 (Ultimate Year)
Kidetok	Popn.	41520	50514	74776	110686
	Domestic	1522	1900	2950	4582
	Govt/Inst	62	73	85	99
	Ind/Com	0	0	0	0
	UFW	396	493	759	1170
	ADD	1980	2466	3794	5850
	<b>MDD (m3 /d)</b>	<b>2574</b>	<b>3206</b>	<b>4932</b>	<b>7606</b>

Source: Draft Feasibility Study and Preliminary Design Report for Serere, 2019

**Table 2-10: Summary of Maximum Day Demand**

Supply Area	Served	2019 (Base Year)	2024 (Initial Year)	2034 (Future Year)	2044 (Ultimate Year)
Serere	Popn.	9438	11484	16999	25162
	Domestic	346	430	665	1028
	Govt/Inst	78	84	98	114
	Ind/Com	0	0	0	0
	UFW	106	129	191	285
	ADD	530	643	954	1427
	<b>MDD (m3 /d)</b>	<b>690</b>	<b>836</b>	<b>1240</b>	<b>1855</b>
Source: Draft Feasibility Study and Preliminary Design Report for Serere, 2019					

The system will therefore be sized on the basis of the design demand of 26,486m<sup>3</sup> /day

## 2.4 Distribution Network

### 2.4.1 Main Reservoir

The storage capacity has been computed as 30% of the MDD. The required storage capacity is therefore 7,946m<sup>3</sup>. A 7,986m<sup>3</sup> main reservoir has been adopted representing 30.2% storage capacity of the ultimate year maximum day demand. It is recommended to provide 3No. Reservoir storage tanks. The reservoir’s storage capacity at various stages of the design period is reflected in the table below.

**Table 2-11: Reservoir Storage Capacity**

Item	2019	2024	2034	2044
MD Demand- m <sup>3</sup> /day	9,285	10,272	17,369	26,486
Storage Capacity (m <sup>3</sup> )	7,986	7,986	7,986	7,986
Hours of Storage	21	19	11	7
Storage Capacity (%)	86%	78%	46%	30%
<b>Source: Project Estimates</b>				

### 2.4.2 Distribution Network

The distribution network for the project area will be gravity fed from the Main reservoir tank to the satellite reservoirs. The network was designed for the year 2044. The distribution network was designed using EPANET 2.0 software. A peak hour factor of 2.0 was used. Table below shows the summary of the distribution mains.



**Table 2-12: Greater Serere Distribution Mains**

Pipe Type	Unit	Bugondo Hill	Ogera Hill
DN 650 DI PN 25	m	2,415.27	1,395.07
DN 600 DI PN 25	m	20,542.54	22,823.72
DN 350 DI PN 16/25	m	8,749.30	22,121.27
DN 300 DI PN 16/25	m	25,461.52	9,725.38
DN 250 DI PN 16/25	m	11,600.16	11,600.16
DN 200 uPVC PN 16/25	m	4,889.81	4,889.81
DN 150 uPVC PN 16/25	m	2,202.73	12.00
<b>Total (m)</b>		<b>75,861.33</b>	<b>72,567.41</b>

### 2.4.3 Satellite Reservoirs

The individual satellite reservoirs for each of the 7No. target areas have been designed for 30% of the MDD in the Ultimate year of 2044. The table below summarises the reservoir’s storage capacity at various stages of the design period.

**Table 2-13: Satellite Reservoirs’ Storage Capacity**

Target Supply Area	Item	2019	2024	2034	2044
Kidetok	MD Demand- m3 /day	2,574	3,206	4,932	7,606
	Storage Capacity (m3 )	2,282	2,282	2,282	2,282
	Hours of Storage	21	17	11	7
	Storage Capacity (%)	89%	71%	46%	30%
Serere	MD Demand- m3 /day	690	836	1,240	1,855
	Storage Capacity (m3 )	557	557	557	557
	Hours of Storage	19	16	11	7
	Storage Capacity (%)	81%	67%	45%	30%
Kadungulu	MD Demand- m3 /day	2,103	2,545	3,892	5,969
	Storage Capacity (m3 )	1,791	1,791	1,791	1,791
	Hours of Storage	20	17	11	7
	Capacity (%)	85%	70%	46%	30%

## 2.4.4 Water supply

### 2.4.4.1 The project components and activities

#### 2.4.4.1.1 Intake Point

The purpose of a water supply intake is to extract and deliver water to the users. The intake shall comprise of an intake chamber (tower) located off the Lakeshore (Lake Kyoga) and fitted with coarse and fine screens. In addition the intake chamber shall be fitted with a manually operated slide gate. The intake chamber shall be located such that it draws water even when the minimum forecasted water level occurred.

A short foot bridge shall be provided for access to the intake chamber and support for the suction pipes.

Volume of water abstracted at the intake point will be 31,800m<sup>3</sup>/day at Bugondo.

#### 2.4.4.1.2 Pumping Station

The pumping station shall be located 35m from the extreme flood extent. Raw water shall be treated 0.24km away from the water source and treated water shall be pumped at Bugondo main station which is 5.60km from treated the treatment plant.

Treated water pumps shall be installed to operate on a duty/ stand by basis and shall draw water from the clear water well and pump it to the elevated steel tank at Bugondo main in the town and to the backwash tank at the water treatment plant.

#### 2.4.4.1.3 The water treatment plant design

The water supply system will consist of a water treatment plant. The water treatment process shall involve aeration, coagulation, flocculation, sedimentation, filtration and disinfection. Figure 2-8 shows the site layout plan and view of the water treatment units.

(a) **Cascade aerator:** Two No. 18.93m long Five-Stepped Cascade aerators with a 165m<sup>3</sup> tank was opted. The designed flow of water through each aerator is 15,900m<sup>3</sup>/day (662m<sup>3</sup>/hr). The designed capacity is 35m<sup>3</sup> per meter length therefore the total surface area will equal to 19.05m<sup>2</sup>.

(b) **Coagulator:** 2no. Coagulators with a total channel length of 19.4m have been adopted. The designed slope is 2% while the while the width and height are 0.3m and 0.6m respectively. Therefore, the cross sectional area is 0.18m<sup>2</sup> and the velocity is 1.2m/s. Thus, the calculated detention period of mixing is 32.50 seconds.

(c) **Flocculator:** Two No. Coagulators with a total channel length of 19.4m each with the following attributes have been adopted:

- i. Directional changes – 4No.
- ii. Baffles – 4No.
- iii. Weirs – 5No.
- iv. Provided dimensions- Length: 9.5m, Width: 3.35m & Depth: 2.75m
- v. Volume of Flocculator provided – 88m<sup>3</sup>.

(d) **Clarifier:** There will be 4No. Sedimentation tanks with lamella plates to increase the surface area of sedimentation (1m<sup>2</sup> = 10m<sup>2</sup>) and each will have the following dimensions below:

- i. Provided dimensions- Length - 14.1m, Width: .9.4m & Depth: 2.75m.
- ii. Adopted Tank Surface Area -133m<sup>2</sup>. - each
- iii. Effective Tank surface area – 1330m<sup>2</sup>. – each

(e) **Rapid Filters:** There will be 2No. Rapid filter tanks, each comprising 3No. beds of 9m\* 3m =27m<sup>2</sup>

(f) **Backwash Tank:** 20% of the MDD is required for adequate usage of backwashing activities and other utilities at the treatment plant. A 1800m<sup>3</sup> pressed steel tank will be installed on an elevated galvanised steel structure for balancing storage of water for the treatment plant.

(g) **Chemical House:** This building is designed house six chemical solution tanks, Chemical mixing troughs and baskets, Chemical dosing pumps and Chemical storage.

(h) **Clear Water Contact Tank:** Two tanks designed for contact time of sixty minutes have a capacity of 800m<sup>3</sup> each.

#### 2.4.4.1.4 Plant Attendants' House

The house shall be constructed and shall be used for storing tools for operation of the water system and also serve as an office, shelter for the plant attendants and a laboratory. It shall be provided with wash rooms and on site collection and disposal of sewage by means of a septic tank and soak pit as shown on the site layout plan.

#### 2.4.4.1.5 Site Drainage

A network of drainage manholes shall be provided as illustrated on the site layout plan. All wastewater shall flow through the sludge drying beds and discharge finally into the river over land.

The pipes leading to the sludge drying beds shall be uPVC OD 225mm while the rest of the drainage pipes shall be uPVC OD 160mm.

#### 2.4.4.1.6 Distribution System

The distribution system shall start at the elevated reservoir and shall comprise 65.96km of distribution network of pipelines

### 2.4.5 Sanitation

The proposed interventions in sanitation are centred on the construction of a total of 5No. Water borne public toilets in Serere, Kasilo Town Council, Bugondo, Kadungulu & Kidetok RGC. The proposed public water borne public toilets are envisaged to be seven (7) stance with a urinal has been proposed for each of the project target towns/ RGCs.

### 2.4.6 Construction inputs and equipment

Part of the investment will be used to supply new O & M tools and equipment. Equipment will be supplied for the running of the Water Treatment Plant and well as equipping the current water office. These will include;

- ❖ Water Treatment Plant Office Equipment
- ❖ Town Water Offices Equipment,
- ❖ Plumbing Tools and Equipment,
- ❖ Workshop Equipment,
- ❖ Laboratory Equipment,

- ❖ Mechanical Tools and Equipment,
- ❖ Electrical Tools and Equipment,
- ❖ Miscellaneous Tools,
- ❖ Chemical Equipment and Chemicals.

#### 2.4.7 Site Clearing and Excavations

The first stage of the construction phase will be site clearing of section that require concrete foundations construction and section for dumping material where tarpaulin will be put to reduce material erosion.

This will be followed by setting out of the site for structure construction alignment and levelling by use of various equipment's like survey equipment, poles, construction squares, plump bob and others.

Excavations at the site will involve use of manual excavation and tools like spades.

#### 2.4.8 Standards

The construction phase will consider standard procedures for construction of structures and these shall include but not be limited to; hoarding off the site to minimize noise and dust emission to the neighbouring community and enhance security at the site, ground grading and leveling to obtain levels suitable for construction. Other activities include excavation works for foundations, erection of foundations, buildings and other support structures like roofs, civil and mechanic works including cabling works for electricity supply, piping works/plumbing for water, surface finishes, painting, removal and disposal of construction waste.

During construction, the contractor will be encouraged to recruit workers with relevant skills and experience from within the project area. All workers will commute daily from their places of residence as no worker camp will be constructed on site save for the security personnel house. Employment will be in accordance with the provisions of National Labour Laws and industry best practice, including those pertaining to working hours, overtime, and form and frequency of pay.

#### 2.4.9 Transport

Transport will be a significant component during the construction phase as materials will be transported to, whereas construction and installation waste will be transported away from the site for disposal.

#### 2.4.10 Occupation Health and Safety

During construction phase, the health and safety concerns of employees will have to be taken into account. Some level of safety will be a requirement for all personnel involved in the construction phase; workers will be inducted and personal protective equipment provided to all workers to ensure that work is carried out safely. During the construction phase; excavations, civil works, fabrications will be carried out in an approved manner to comply with the requirements of the Occupational Health and Safety Act, 2006 as well as the required specifications in building and civil engineering standards, while all electrical installations will be done by an accredited electrician who is registered according to Electricity (Installation Permits) Regulations 2003. Mobile toilets will be provided on site for management of human waste and disposal will be done by a licensed cesspool provider.

### 2.4.11 Materials

Majority of construction materials such as sand, Ballast, PVC pipes, Stones and hard-core chips, Cement, Steel bars, Timber, Iron sheets, concrete bricks, cement, water, paint, wood partitions, glass, and wood glue and wood vanish will be locally sourced from within Serere District. The materials, particularly sand, murram and aggregate, will be sourced from licensed dealers.

## 2.5 Operation and Maintenance

The operations phase of this project basically refers to the time after construction activities have ended and water is being supplied to the communities. This phase will consist of storage and supply of water and other associated activities including but not limited to power generation, supply and use of water, tariff collection and generation of waste including solid waste such worn out parts

Routine activities include at least the following;

- a. Maintenance of pipelines and treatment works. Attending to blockages and breakages along the pipelines,
- b. Cleaning of screens and clearing of vegetation at treatment works.
- c. Treatment performance monitoring through laboratory analysis

### 2.5.1 Material Inputs during Operation Phase

Chemicals for water treatment will be part of the most important inputs during operation phase. Operation of water distribution system will require minimal input, apart from occasional repair materials and water itself. In cases of burst along the pipe line pieces of plastic pipes, adhesives, metal clips etc. will be needed. The water will flow by gravity and therefore electrical power will not be an input requirement. Power for lighting of the premises as well as running office equipment will be supplied throughout operation phase. Spare parts for mechanical equipment, filter sand, water quality testing equipment and chemicals will also be required to run the water supply scheme. Other inputs will include tools for unblocking pipelines, and occasional vehicles for administrative inspections and maintenance.

### 2.5.2 Health, Safety and Emergency systems

Upon completion of construction, the treatment facility will be registered with the Occupational Safety and Health Department under the Ministry of Gender, Labour and Social Development as per section 40 and 41 of the OSH Act 2006.

A 9kg CO<sub>2</sub> fire extinguisher will be placed at the water treatment premises. The fire extinguisher will be periodically serviced by qualified personnel at least every six months to maintain its functionality. A functional first Aid kit will be kept at the premises to cater for any emergency case.

The workforce will be provided with protective gear including safety shoes and uniform to ensure safety at work. It is recommended that all employees are trained in fire safety measures and that a fire-plan is developed for all workers to follow. This plan shall include a designated emergency meeting area, procedures to follow in case of a fire, and alerting procedures.

### 2.5.3 Energy and water usage

The treatment plant will be connected to solar as a source of energy since Bugondo Sub County has not yet been connected to the national grid and a standby generator will be put in place since solar energy is unreliable especially in a rainy season.

### 2.5.4 Solid waste management

Waste Solid waste is a term used to describe things we throw away. In Serere, survey data revealed that waste was generated from and categorized as residential [HHs], commercial [markets, restaurants and shops] and institutional [health centers and schools]. The solid waste composition is food waste, yard wastes, paper, metals, plastics, stones & debris, textiles and glasses that is typical of the urban areas. Solid wastes are not sorted and are indiscriminately dumped in open spaces or burnt.

In Serere, the approach to solid waste management should be final disposal at open dumpsites. The best waste scheme and collection methods at HHs shall be by rubbish pits or bins because solid waste is disposed daily. Meanwhile for commercial and institutional waste, community disposal points with metallic or plastic waste bins, bunkers or road verges for temporary storage are available solutions. A cost saving design of a type of bin that is suspended on metal arms with movable joints on the sides is proposed. The suspended skips are mass-produced and positioned near waste generation centers at commercial areas and institutions.

The numbers of bin points are proportionately increased basing on the population generating waste in that area.

Waste collection shall be door to door at HHs and by open truck collection for commercial and institutional waste. Urban councils shall own and manage the final dumping sites. In addition, resources should be allocated for waste pickers, waste collection and waste disposal management. An alternative option worth exploring is Private companies offering door-to-door collection of wastes especially from high-income HHs.

Note that the waste produced could lead to deterioration of the urban environment and impact on human health negatively if it is not properly disposed.

In conclusion, to prevent deterioration of urban environment and adverse impacts on human health, the project will provide the initial (100No.) portable trash bins to kick start waste gathering and door-to-door collection. In addition, the urban councils shall install the garbage skips at waste generating centers around the towns. They will maintain the responsibility of the collecting and disposing of waste to the dumping sites.

**Legal implication:** The Project intends to comply to the National Environment (Waste Management) Regulations S.I. No. 49 of 2020

**Table 2-14: Proposed project waste Management**

Waste Category	Measures proposed to be implemented
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Non-hazardous	<ul style="list-style-type: none"> <li>▪ Recycling non-hazardous wastes (such as uncontaminated wood, metal, plastic, paper) where suitable facilities can be identified.</li> <li>▪ Reuse of topsoil and subsoil from site clearance or trenching works. Soil could be used for restoration</li> <li>▪ Instituting procurement measures that recognize opportunities to return usable materials such as cut pipes and which prevents the over ordering of materials;</li> <li>▪ Instituting good housekeeping and operating practices</li> <li>▪ Procurement procedures with strict guidelines to ensure packaging is minimized and recyclable wherever possible</li> <li>▪ Utilize services of Serere District Natural Resource Department in disposal approval for general waste such as food waste.</li> </ul>
Hazardous	<ul style="list-style-type: none"> <li>▪ Minimizing hazardous waste generation by implementing stringent waste segregation to prevent the commingling of non-hazardous and hazardous waste to be managed</li> <li>▪ Substituting raw materials or inputs with less hazardous or toxic materials or with those where processing generates lower waste volume</li> <li>▪ Clearly identifying and demarcating waste storage areas</li> <li>▪ Applying for a waste management license</li> <li>▪ Having an MoU with a NEMA licensed waste handler</li> </ul>

### 2.5.5 Sewage waste handling and hygiene

#### Operation and Maintenance of the Proposed Toilets

For the toilets to function well, they need to be maintained properly. The public toilet can only be properly maintained when the users are paying a fee set by the local authorities. This can be in the form of;

- ❖ A monthly fee being charged to the residents within the locality of the public toilet who would wish to use it, while the non-residents paying and fee for every time they use the toilet or,
- ❖ A standard user fee is charged for using the toilet at any one time. Housekeeping and maintenance

### 2.6 Contractor’s facilities during the construction phase

During the construction phase of the system, the contractor will require land on which to set up auxiliary facilities such as;

- A camp to accommodate the project employees and provide offices for the management and administrative staff
- Areas for the storage and management of equipment (heavy machinery, trucks, vehicles, engines, etc.) as well as materials, lubricants, fuel, chemicals, etc.)

Information on the number, design and exact locations of these areas is not yet available because the contractor has not yet been selected and there are no clearly definable locations. Once awarded, the contractor will identify suitable sites in consultation with the local authority and conduct a separate Environmental and social assessment for submission and subsequent approval by NEMA.

The contractor will negotiate on the required lease amounts and sign lease agreements with the respective landowners. It is important that these agreements contain clauses on restoration of these sites once construction of the system is completed.

### 3 POLICY, LEGAL, REGULATORY AND INSTITUTIONAL FRAMEWORK

This section provides an overview of the policies and legal framework in Uganda and the specific national legislations applicable to the project. The section includes;

- Policies, legislations, regulatory and administrative framework;
- Permitting requirements
- Compliance measures for the respective environmental laws and regulations.

**Table 3-1: Summary of applicable Policies**

Policy	Extract of the policy	Relevance
The National Environmental Management Policy, 1994	The National Environment Management Policy for Uganda (1994) is the cornerstone of the country's commitment to social and economic development that is environmentally sustainable	In line with this policy, this ESIA study was conducted to take into consideration any social-economic and environmental impacts anticipated from the proposed water supply and sanitation system construction



Policy	Extract of the policy	Relevance
	<p>and brings the benefits of a better life to all. The National Environment Management Policy gives the overall policy framework, which calls for sustainable development that maintains and enhances environmental quality and resources productivity to meet human needs of the present generation without compromising ability of future generations to meet their own needs.</p> <p>The framework points out cross-sectoral guiding principles and strategies to achieve sustainable socio-economic development. The policy sets a guiding principle that Environmental Impact Assessment should be required for any activities which may cause significant impact on the environment.</p>	<p>and operation. The management and monitoring plans developed as a result of the findings of this study will serve for sustainability for the proposed project.</p>
<p>The National Water Policy, 1999</p>	<p>The National Water Policy, 1999 promotes an integrated approach to manage the water resources in ways that are sustainable and most beneficial to the people of Uganda. It stipulates that the quality of drainage water shall be such as not to pollute the receiving water or ground water and that all measures must be taken by the users to prevent increase in salinity levels in receiving waters, to prevent the accumulation of dangerous or toxic compounds in the subsoil,</p>	<p>Lake Kyoga is the proposed source for the system. Precautions will be taken to ensure no contamination occurs at the water source being utilized and along the transmission line until the water reaches the consumer. In lieu to this, a conventional water treatment plant included in the system design.</p>

Policy	Extract of the policy	Relevance
	capable of contaminating underground waters.	
National HIV/AIDS Policy, 2011	<p>The policy aims to create a protective and supporting environment in which the national response to HIV and AIDS is systematic, effective and coherent. The policy also aims to prevent new infection and to eliminate the socio economic impacts of HIV and AIDS nationwide. The policy objectives are:</p> <ul style="list-style-type: none"> <li>• coordinated management of the national response to the epidemic</li> <li>• Prevention of HIV transmission</li> <li>• Mitigation of adverse health impacts on the infected</li> <li>• minimisation of socio economic impacts on the population</li> <li>• reduction of vulnerability to HIV via enhanced access to services</li> <li>• identification and reduction of gender based vulnerability to the disease</li> <li>• promotion of HIV and AIDS related research.</li> </ul>	<p>The implementation of this project will require labour for the construction, operation and maintenance of the piped water and sanitation system. Contractor and communities are required to undergo an HIV/AIDS sensitization along with other mainstreaming topics. The contractor needs to develop HIV/AIDS management plans to guide sensitisation meetings and other activities aimed at addressing the issue of spread of HIV/AIDS, in line with this Policy.</p>
The Second National Health Policy 2010-2019	<p>Under the 2nd National Health Policy (NHP) there is the Uganda National Minimum Health Care Package (UNMHCP) which consists of the most cost-effective priority healthcare interventions and services addressing the high disease burden that are acceptable and affordable within the total resource</p>	<p>The Environmental Health policy will guide implementation of public health and hygiene intervention measures on the project. This project's provision of water and improved sanitation system will contribute to a healthy living in the project area and the surrounding areas, thereby</p>

Policy	Extract of the policy	Relevance
	<p>envelope of the sector. The package consists of the following clusters:</p> <p>(a) Health promotion, environmental health, disease prevention and community health initiatives, including epidemic and disaster preparedness and response</p> <p>(b) Maternal and Child Health;</p> <p>(c) Prevention, management and control of communicable diseases</p> <p>(d) Prevention, management and control of non-communicable diseases. The composition of the package shall be re-visited periodically depending on changes in disease burden, availability of new interventions to address these conditions.</p>	<p>improving people’s standards of living.</p>
<p>Uganda National Land Policy, 2013</p>	<p>The policy seeks to harmonise and streamline the complex tenure regimes in Uganda for equitable access to land, and to clarify the complex constitutional and legal framework for sustainable management and stewardship. It also aims to ensure sustainable utilisation, protection and management of environmental, natural and cultural resources on land for socio-economic development.</p>	<p>The land for the proposed water treatment facility was acquired by MoWE. An ESMP has been developed in section 8 to ensure sustainable implementation of the project</p>
<p>National Policy for the Conservation and Management of Wetland Resources, 1995</p>	<p>The policy:</p> <ul style="list-style-type: none"> <li>• provides the guiding principles and strategies for sustainable wetland use</li> <li>• emphasises the need for users of wetlands to consider the</li> </ul>	<p>The proposed project components will not be constructed within a wetland. The proposed treatment plant will be located on a dry land.</p>

Policy	Extract of the policy	Relevance
	<p>knock-on effects of their activities, and identifies non-destructive wetland uses that may be allowed (s.7.2)</p> <ul style="list-style-type: none"> <li>• emphasises the need for users of wetlands to consider the requirements of other wetland users in the community (s.7.3)</li> <li>• identifies the need for environmental impact assessment for development activities that are likely to impact wetlands (s.7.8)</li> </ul>	
Occupational Health and Safety (OHS) Policy	<p>This policy seeks to:</p> <ul style="list-style-type: none"> <li>▪ Provide and maintain a healthy working environment;</li> <li>▪ Institutionalize OHS in the power-sector policies, programs and plans; and</li> <li>▪ Contribute towards safeguarding the physical environment. The OHS Policy Statement is guided by the Constitution of the Republic of Uganda and other global, national and sectoral regulations and policies. The OHS Policy also takes into recognition of the Health Sector Strategic Plan, all of which aim to improve the quality of life for all Ugandans in their living and working environment</li> </ul>	<p>This policy will be especially relevant for OHS of construction crews and subsequently, operation and maintenance personnel. The policy will also have relevance in mitigation measures that protect the public from health and safety impacts because of project construction and subsequent operation and maintenance activities. All workers, including Sub Contractors and casual laborers, will undergo an environmental, health and safety induction before commencing work on site. This will include a full briefing on site safety and rules and PPE usage and shall be supplemented by regular toolbox talks.</p>
National Child Labour Policy, 2007	<p>The overall objective of the policy is to guide and promote sustainable actions aimed at the progressive elimination of child labour. The vision of the policy is a society free of exploitative child labour in which all</p>	<p>The project shall actively participate in efforts to eliminate child labour during pre-construction, construction and post construction. The construction contractor shall conduct labour screening at</p>

Policy	Extract of the policy	Relevance
	working children enjoy their right to childhood, education, dignity and the full development of their potential.	recruitment to ensure underage children are not employed in project works.
Ministry of Water and Environment; Environment and Social Safeguards Policy 2018	The ESS is aimed to ensure that in implementing development programs, positive outcomes are maximized and negative outcomes are minimized. This framework ensures integration of environmental and social concerns in all stages of project development and all levels including national, district and local levels, with full participation of the people as means of minimizing environmental and social impacts. It further ensures identification of key environmental and social issues/aspects that will affect or will be affected by the projects/programmes and ensuring that risks are screened against the 15 principles as well as specification of appropriate roles and responsibilities, and outlining the necessary reporting procedures, for managing and monitoring environmental and social concerns including compliance; grievance mechanism, and establishment of institutional capacity building requirements to successfully implement the ESS.	Among the 15 principles, those relevant to this project include; Compliance with the Law; Human Rights; Gender Equality and Women’s Empowerment; Core Labour Rights; Protection of Natural Habitats; Conservation of Biological Diversity; Pollution Prevention and Resource Efficiency; Public Health; Physical and Cultural Heritage. Implementation of this project will be in such a manner as to incorporate and ensure compliance to these principles at all levels of project implementation; the first step to compliance with the law being undertaking of Environmental and Social impact studies to identify key issues that are likely to accrue from project implementation and proposing appropriate mitigation measures to manage them.

### 3.1 Applicable Acts, Regulations, and guidelines

There are a number of Acts, Regulations, and guidelines that relate to the protection of the environment in Uganda. The competent authority responsible for the environment is the National Environment Management Authority. The acts, regulations, and guidelines applicable to this project are presented in Table 3-2 below.

**Table 3-2: Summary of Acts and Regulations**

Act, Regulation guidelines	Extract of the Act or Regulation	Compliance measure
<b>Applicable Acts</b>		
The Constitution of the Republic of Uganda, 1995	Objective XXVII (i) requires the State to promote sustainable development and public awareness of the need to manage land, air and water resources in a balanced and sustainable manner for the present and future generations. This objective petition for public awareness about the proposed project construction and operational scope and activities including an environmental management and monitoring plan hence was the basis for consultation of the community in the project area as a step for sustainable development. Paragraph (ii) of that objective goes ahead to state that the State will take all possible measures to prevent or minimize damage and destruction to land, air and water resources resulting from pollution or other causes. Ugandan	The implementation of this Project will be conducted in a manner that will incorporate the appropriate safeguards for environmental and social issues

Act, Regulation guidelines	Extract of the Act or Regulation	Compliance measure
	<p>government enforces this through the lead agencies like NEMA which in turn mandates for an ESIS for the proposed projects to mitigate damage to the environment. Article 39 preserves the right of every Ugandan to a clean and healthy environment. The proposed project construction status will be radical to clean, healthy and safe environment practices.</p>	
<p>National Environment Act, No 5, 2019</p>	<p>The National Environment Act enacted in 2019 spells out principles of environmental management and the rights to a decent environment; institutional arrangements; environmental planning, environmental regulations, environmental standard; environmental restoration orders and environmental easements; records, inspection and analysis, financial provisions, offences, judicial proceedings and international obligations.</p> <p>The Act was put in place: to repeal, replace and reform the law relating to environmental management in Uganda; to provide for the management of the environment for sustainable development; to allow the National Environment Management Authority continue as a coordinating, monitoring, regulatory and supervisory body for all activities relating to environment; to provide for emerging environmental issues including climate change, the management of hazardous chemicals and biodiversity offsets;</p>	<p>An environmental and social impact assessment for the proposed project has been conducted to identify impacts of the proposed project on the local community and the environment, and an environment and social management plan (refer to section 8 of this report) has been developed for implementation by MoWE and the Contractor.</p>

Act, Regulation guidelines	Extract of the Act or Regulation	Compliance measure
	<p>to provide for strategic environmental assessment; to address environmental concerns arising out of petroleum activities and midstream operations, to provide for the management of plastics and plastic products; to establish the Environmental Protection Force; to provide for enhanced penalties for offences under the Act; to provide for procedural and administrative matters; and for related matters.</p> <p>Part I section 5 on principles – section 5 subsection I gives NEMA the Authority to ensure that the principles of environment management set out in section 5 subsection (2) are observed, taking into account the finite nature of non-renewable resources and the productivity of the available renewable resources. Principles stated in section 5 sub-section 2 (h and i) state that there should be prior environmental and social impact assessments of proposed projects which may significantly affect the environment or use of natural resources;</p> <p>The Act (Part II, section 8) authorizes NEMA to continue existing as a body responsible for management, monitoring and supervision of all environmental conservation activities. Section 9 mandates NEMA to among others;</p> <p>(g) to regulate, monitor and coordinate private sector, intergovernmental organizations, nongovernmental organizations,</p>	



Act, Regulation guidelines	Extract of the Act or Regulation	Compliance measure
	<p>cultural institutions, indigenous people and local communities and religious institutions on issues relating to the environment; (h) to regulate environmental practitioners in the environmental and social impact assessment and environmental audit processes; (i) to review and make decisions on environmental and social impact assessments, environmental audits and other studies or reports submitted in accordance with this Act or any other applicable law; (j) to issue permits and licenses in accordance with this Act and any other applicable law; (k) to undertake and coordinate environmental monitoring, inspections and compliance audits;</p> <p>This Act prescribes projects for which ESIA is mandatory in the Fifth Schedule</p>	
<p>The Investment Code Act, Cap 92, 1991.</p>	<p>Investments by developer are subject to the provisions of the Uganda Investment Policy/code thus it is a mandatory requirement under Section 19s (2)(d), of the Uganda Investment Policy/Code that every investment licensee should take necessary steps to ensure that the operations of his/her business unit do not cause injury to the ecology or environment.</p>	<p>An environmental and social impact assessment has been conducted and impacts of the proposed project have been identified and an ESMP (see section 8) has been developed to address the potential project impacts on ecology or environment and social aspects of the project area</p>
<p>The Water Act, Cap 152, 1995</p>	<p>The Water Act, Cap 152 of 1995 provides for the management of water in Uganda under the mandate of the Directorate of Water Resources Management in the</p>	<p>MoWE will obtain water abstraction and waste discharge permits from DWRM.</p>

Act, Regulation guidelines	Extract of the Act or Regulation	Compliance measure
	<p>Ministry of Water and Environment. Section 31, subsection (1) of the Water Act deals with prohibition of pollution to water and stipulates that a person commits an offence that, unless authorised under this Act, causes or allows:</p> <ul style="list-style-type: none"> <li>• Waste to come into contact with any water;</li> <li>• Waste to be discharged directly or indirectly into water; and</li> <li>• Water to be polluted.</li> </ul> <p>Under section 107, the Water (Waste Discharge) Regulations (1998); the Water Resources Regulations (1999) and the Sewerage Regulations (1999) have been put in place in order to implement this Act and are aimed at minimizing pollution of public waters by developers and other users.</p> <p>According to Regulation 4 (1) of the Water (Waste Discharge) Regulations (1998): No person shall discharge effluent or waste on land or into an aquatic environment contrary to the standards established under section 27 of the National Environment (Standards for Discharge of Effluent into Water or on Land) Regulations (1999); unless he or she has a permit in the format specified in the First Schedule issued by Directorate of Water Resources Management. In Part II of the Water Resources Regulations (1998), procedures for</p>	

Act, Regulation guidelines	Extract of the Act or Regulation	Compliance measure
	applying for a water abstraction permit are detailed.	
Land Act, Cap 227, 1998 (as amended in 2010)	<p>The Act:</p> <ul style="list-style-type: none"> <li>requires that a person who owns or occupies land will manage and use the land in accordance with the Forest Management Act, the Mining Act, the National Environment Act, the Water Act, the Uganda Wildlife Act and any other law. The 2010 amendment aims to enhance the security of occupancy of lawful and bona fide occupants on registered land in accordance with Article 237 of the Constitution (Section 43).</li> <li>The Act requires a developer of a project to seek a mutual agreement with the occupier or owner of the affected land, and implements the valuation principles for compensation.</li> </ul>	<p>The land on which the proposed site for treatment facility was acquired by MoWE.</p> <p>MoWE will seek consent/approval from UNRA and Serere district local government authorities for the installation of water transmission mains along road reserves</p>
Survey Act, Cap 232, 1939	<p>The Act provides for, and guides, the surveying of land in Uganda, including aspects such as access to lands to be surveyed, and compensation for injury caused during survey activities. The Act:</p> <ul style="list-style-type: none"> <li>requires the proponent to undertake land acquisition activities in accordance with the requirements of the Act, including provision of prior notice and compensation for trees, fences or crops cleared or damaged as part of a survey stipulates provisions for licensing of surveyors and confers upon government surveyors the power to enter onto any land during execution of their duties.</li> </ul>	<p>The road reserves to be used for installation of the water transmission mains have been surveyed in accordance with the requirements of this act. Where private property is damaged or affected – compensation will be done amicably</p>
The Local Government Act, 1997 (as amended in 2010)	The Act:	The proposed project lies within the jurisdiction of

Act, Regulation guidelines	Extract of the Act or Regulation	Compliance measure
	<p>• establishes a decentralised form of government based on the district as the main unit of administration. Districts are given legislative and planning powers, including land administration and planning for the conservation of the environment within their boundaries.</p> <p>• requires District Environment Committees, established under Section 15 of the National Environment Act, to guide the district authorities in matters relating to conservation of the environment specifies functions and services of the Government and local governments (Second Schedule). These include:</p> <ul style="list-style-type: none"> <li>o Government responsibility for the national monuments, antiquities, archives and public records as Parliament may determine</li> <li>o district council responsibility for aiding and supporting the establishment and maintenance of social amenities such as art galleries, museums and tourist centres.</li> </ul>	<p>Serere district local government administration and technical officials were consulted during the process of conducting the Environmental and Social Impact Assessment.</p> <p>MoWE will submit structural and architectural plans for the respective project components to Serere town council planning committee for review and approval before construction works commence.</p>
<p>The Occupational Safety and Health Act, 2006</p>	<p>The Occupational Safety and Health Act of 2006 consolidates, harmonizes and updates the law relating to occupational safety and health and repeals the Factories Act of 1964. It makes provisions for the health, safety, welfare and appropriate training of persons employed in work places.</p> <p>Part 3 of this act outlines duties, obligations and responsibilities of employers. These include but are not limited to employers providing</p>	<p>MoWE will ensure that safety precautions are undertaken by its workers and the contractor through provision of appropriate and adequate personal protective equipment to workers during construction and operation phases.</p> <p>Workers shall be inducted in occupational safety and health and tool box</p>

Act, Regulation guidelines	Extract of the Act or Regulation	Compliance measure
	<p>protective clothing where a worker is to be exposed to pollutant or chemical that could be hazardous to health. Also, section 13 states that it is the responsibility of an employer to take as far as is reasonably practicable, all measures for the protection of his or her workers and the general public from the dangerous aspects of the employer's undertaking at his or her own cost. Employers are also held responsible to ensure that the working environment is kept free from any hazard due to pollution by employing technical measures, applied to new plant or processes in design or installation or added to existing plant or processes; or employing supplementary organizational measures. The employer is also to provide protective gear and supervise health of workers.</p> <p>Under section 14, any employer having more than 20 workers at a workplace, is obliged to prepare and as often as appropriate revise a written statement of policy with respect to the safety and health of employees while at work, and make arrangements for implementation of the policy and also to bring the statement of policy or revision of it to the notice of all employees.</p>	<p>meetings undertaken on a daily basis during construction works.</p> <p>Risk assessments of project tasks are to be done and appropriate mitigation measures put in place</p>
<p>Equal Opportunities Commission Act No.2, 2007.</p>	<p>The Act:</p> <ul style="list-style-type: none"> <li>• establishes the Equal Opportunities Commission;</li> <li>• mandates the Commission to investigate practices of that undermine equal opportunities</li> </ul>	<p>The Act provides details on requirements expected of MoWE and the contractor about hiring and use of labour in its operations without any</p>

Act, Regulation guidelines	Extract of the Act or Regulation	Compliance measure
	defines as an offence the refusal of employing a person based on the ground of sex, age, race, colour, ethnic origin, tribe, birth, creed or religion, health status, social or economic standing, political opinion or disability.	form of discrimination as long as people have the requisite skills for a given task.
Workers' Compensation Act, 2000.	Section 28 of The Workers' Compensation Act (2000) states that: ▪ Where a medical practitioner grants a certificate that a worker is suffering from a scheduled disease causing disablement or that the death of a workman was caused by any scheduled disease; and ▪ The disease was due to the nature of the worker's employment and was contracted within the twenty-four months immediately previous to the date of such disablement or death, the worker or, if he or she is deceased, his or her dependants shall be entitled to claim and to receive compensation under this Act as if such disablement or death had been caused by an accident arising out of and in the course of his or her employment.	MoWE and the contractor shall ensure compliance with the provisions of this act in case of injuries to workers that require compensation.
The Public Health Act, Cap281, 1964	Section 7 of the Public Health Act, Cap 281 provides local authorities with administrative powers to take all lawful, necessary and reasonable practicable measures for preventing the occurrence of, or for dealing with any outbreak of, any infectious communicable or preventable disease in order to safeguard and promote public health.  Section 105 of the Public Health Act (1964) imposes a duty on the local	MoWE shall undertake all measures necessary to prevent or minimise the occurrence of negative effects on community health, safety and security.  Dust suppression measures like spraying of water on dusty areas will be undertaken where necessary.

Act, Regulation guidelines	Extract of the Act or Regulation	Compliance measure
	<p>authority to take measures to prevent any pollution that is dangerous to the health to enter any water supply that the public has a right to use for drinking or domestic purposes. The Act further details the location of waste disposal facilities such as solid waste skips and septic tanks in relation to settlements and food points.</p> <p>In general the Public Health Act seeks to protect the health of all citizens including the health of the environment through stipulations about drainage and safety of buildings and activities.</p>	<p>The project is intended to ensure good public health through treatment of water to acceptable standards.</p> <p>COVID-19 standard operating procedures (SOPs) are to be adhered to during implementation of the project</p>
<p>The Employment Act, 2006 and other related Acts.</p>	<p>The Employment Act 2006 shall be the governing legal statutory instrument for the recruitment, contracting, deployment, remuneration, management and compensation of workers. The Employment Act 2006 is based on the provisions of Article 40 of The Constitution of Uganda. The Act mandates Labour officers to regularly inspect the working conditions of workers to ascertain that the rights of workers and basic provisions are provided and workers' welfare is attended to. The Act also provides for the freedom of association of workers permitting workers to join labour organizations. This provision is also supported by the Labour Unions Act 7, 2006, which provides elaborate guideline and regulation for membership.</p>	<p>MoWE and the contractor shall comply with the provisions of this act and other related acts in the recruitment and employment of all the workers to the project.</p>

Act, Regulation guidelines	Extract of the Act or Regulation	Compliance measure
	<p>Other related laws requiring the developer to ensure workers' safety, social security and protection include The Labour disputes (Arbitration and settlement) Act, 2006, Workers' Compensation Act, Cap 225, 2000 the Interpretation Act, Cap 3; Occupational Safety and Health Act , 2006; The National Social Security Act Cap 222, and the Labour Unions' Act, 2005.</p>	
<p>The Physical Planning Act, 2010 (as amended in 2019)</p>	<p>The physical planning Act 2010 was passed to consolidate the law on physical planning in order to make the whole country a planning area. Amongst the principles of this Act is to repeal the Town and Country Planning Act, Cap 246 which is now outdated. Hence the Physical Planning Act establishes a National Planning board which shall be responsible for physical planning. Clause 32 of this Act provides for a landowner to use services of a qualified planner to prepare a local physical plan which shall be submitted to the local physical planning committee for adoption with or without modifications. Part 8 is concerned with control of development and clause 38 of this part specifies that an applicant for development permission in a planning area must obtain an Environmental Impact Assessment certificate in accordance with the National Environment Act.</p>	<p>The structural and architectural plans for the respective project components shall be submitted to Serere Town Council committee for review and approval.</p>
<p>National Forestry and Tree Planting Act, 2003</p>	<p>The Act provides for:</p> <ul style="list-style-type: none"> <li>• the conservation, sustainable management and development of</li> </ul>	<p>The developer and contractor shall endeavour to avoid felling of NFA</p>



Act, Regulation guidelines	Extract of the Act or Regulation	Compliance measure
	trees and forests for the benefit of the people of Uganda	restricted trees as practically feasible and seek approval from NFA to cut restricted trees
Plant Protection and Health Act, 2015	The Act: • provides for prevention and control of pests, weeds and diseases. This includes the duty of land occupiers to take measures necessary for eradication, reduction or prevention of the spread of harmful organisms • regulates the export and import of plants. Permit and a phytosanitary certificate are required for import of plants.	MoWE and contractor will ensure that invasive species are not spread along the different project components through avoidance of replanting of invasive species
The Traffic and Road Safety Act, 1998, Cap 361 (as amended in 2020)	<p>The Act provides for: • the overarching requirements for the use of road vehicles in Uganda, including registration of vehicles, issuance of driver permits, licensing of public service, omnibuses and goods vehicles. • the enabling framework for related traffic and road safety regulations.</p> <p>The 2020 amendment abolishes the Transport Licensing Board and the National Road Safety Council, provides for licensing of driving schools and instructors, and provides for a graduated drivers licencing system and to provide for the licensing and regulation of a special category of transport network companies using online digital platforms for provision of passenger and goods services among others.</p>	The project will entail transportation of heavy construction equipment and vehicles and as such – the developer and contractor will be obliged to comply with requirements in this act.
<b>Applicable Regulations</b>		
The National Environment (Environmental and Social Assessment) Regulations, 2020	The ESIA Regulations, 2020 specify the general requirements for good ESIA practice in Uganda.	An environmental and social impact assessment (ESIA) has been conducted

Act, Regulation guidelines	Extract of the Act or Regulation	Compliance measure
	<p>These regulations apply to all projects included in the Fourth and Fifth Schedules to the NEA, and to any major repairs, extensions or routine maintenance of any existing projects.</p> <p>These regulations stipulate about project briefs, environmental and social impact assessment studies, environmental statements, the review process of environmental and social impact statements, decisions after ESIA review, access to information and ESIA reports and post-assessment audits.</p> <p>Regulation 6 sub regulation (2) requires a developer to submit a project brief to NEMA for projects set out in Part I of Schedule 4 of the NEA. The contents of the project brief shall include requirements of Regulation 6 sub-regulation (5) of these regulations.</p> <p>Regulation 12 sub regulation (1) requires a developer to undertake scoping and an environmental and social impact study for projects set out in Schedule 5 of the NEA.</p> <p>Regulation 5 states that the developer is responsible for the content of a project brief, environmental and social impact statement or an environmental risk assessment prepared under the NEA and these ESIA regulations</p>	<p>in compliance with these regulations and impacts of the proposed project have been identified and an ESMP (see section 8) has been developed to address the anticipated impacts.</p> <p>MoWE shall ensure implementation of the ESMP contained in this environmental and social impact statement and undertake corrective actions for impacts not contemplated during the environmental and social assessment in liaison with NEMA</p>
The National Environment (Audit) Regulations, 2020	These Regulations apply to an environmental audit for a project or activity for which environmental and social assessment has been undertaken and any other project	MoWE shall undertake an environmental compliance audit to assess the status of compliance with mitigation measures presented in this Environment and Social

Act, Regulation guidelines	Extract of the Act or Regulation	Compliance measure
	<p>or activity as may be prescribed by the Authority.</p> <p>An environmental audit shall be undertaken to ensure compliance by the developer with the Act, regulations and standards made under the Act, conditions in permits and licences and any other applicable law, environment management systems and the environmental management and monitoring plan of the developer.</p> <p>Regulation 12 (1): The developer of a project or activity listed in Schedule 3 to these Regulations shall carry out an environmental compliance audit.</p> <p>Regulation 12 (3): The environmental compliance audit referred to in sub-regulation (1) shall be undertaken annually, unless otherwise required by the Authority.</p>	<p>Impact Statement (ESIS), environmental laws, regulations and standards and requirements from other lead agencies as well as NEMA conditions of ESIA approval for the project.</p>
<p>The National Environment (Standards for Discharge of Effluent into Water or on Land) Regulations, 2020.</p>	<p>These regulations are important for treatment and disposal of effluent. Section 6(2) of the regulations, states that ‘ a person who intends to discharge effluent into water or land shall ensure that the effluent meets the standards for general chemicals and micro-biological discharge set out in Schedule 2 to these regulations’ Schedule 3 – details standards for inorganic substances effluent discharge, and Schedule 4 presents standards for organic substances effluent discharge.</p>	<p>Backwash water will be discharged to a nearby land within the water treatment plant, MoWE will obtain a wastewater discharge permit from DWRM. Sanitary wastewater (black water) will be channelled to a septic tank which will be periodically emptied by a licensed cesspool provider to a designated sewage treatment facility.</p>
<p>The National Environment (Waste Management) Regulations, 2020</p>	<p>These regulations apply;</p> <p>a) to all waste classified, characterised and categorised</p>	<p>Well labelled waste bins with lids to cater for solid waste will be strategically</p>

Act, Regulation guidelines	Extract of the Act or Regulation	Compliance measure
	<p>under Schedule 2, Schedule 3 and Schedule 4 to these Regulations; b) to the generation, collection, transportation, storage, treatment and disposal of waste; c) to transboundary movement of waste; and d) to all waste management facilities. Regulation 4 states that "a person who generates waste, a waste handler or a product steward shall, in compliance with the environmental principles set out in section 5 of the Act;</p> <p>a) apply measures in the management of waste to prevent harm to human health and ensure safety of human beings; b) apply measures in the management of waste to prevent pollution, harm to biological diversity and contamination of the wider environment by waste; c) use best available technologies and best environmental practices to manage waste; and d) ensure resource efficiency through the application of the waste management hierarchy, control and minimization of the generation of waste to the greatest extent possible.</p> <p>Regulation 5 (1): A person who generates waste, a waste handler or product steward has a duty of care and shall take measures to ensure that:-</p> <p>a) waste is managed appropriately and securely in accordance with the Act, these Regulations, any other applicable law, environmental standards and conditions of the licence;</p>	<p>located within the project site for use in waste collection and waste minimization will be emphasized and implemented throughout all stages of construction. Excavated soil will be disposed of at an approved spoil disposal site or used for landscaping of where project components are to be constructed.</p>

Act, Regulation guidelines	Extract of the Act or Regulation	Compliance measure
	<p>b) waste is managed in a manner that does not cause harm to human health or the environment; c) any leakage or spillage of waste is quickly detected and managed; and d) spillages which may cause pollution are managed in accordance with regulation 95.</p>	
<p>The National Environment (Noise Standards and Control) Regulations, 2003</p>	<p>Section 7(1) states that “No person shall emit or engage in any activity that emits or is likely to emit noise above a maximum permissible level specified in Section 6 and Schedule I of these Regulations, unless permitted to do so by these Regulations.</p> <p>Section 8(1) provides for the duty to control noise. It shall be the duty of the owner or occupier of a facility or premise or machinery to use the best practicable means of ensuring that the emission of noise from those premises does not exceed the standards and limitations set in these regulations. Section 8 (2) provides for the owner of machinery, or the owner or occupier of an industry or establishment shall install, at the premises sound level meters for the measurement and monitoring of sound from the industry or establishment to ensure that the noise emitted does not exceed the permissible noise level.</p>	<p>MoWE and the contractor will ensure that construction activities are limited to daytime only and that noise emissions from the construction sites do not exceed the maximum permissible limit for construction sites through installation of silencers on major noise emitting equipment and also positioning such equipment away from sensitive noise receptors like human settlements.</p>
<p>The National Environment (Wetlands, River banks and Lakeshores Management) Regulations, 2000</p>	<p>Section 12 (1) of the regulations provides that ‘subject to the provisions of these regulations, a person shall not carry out any activity in a wetland without a</p>	<p>The proposed sites for the different project components are not located within wetland areas.</p>

Act, Regulation guidelines	Extract of the Act or Regulation	Compliance measure
	<p>permit issued by the Executive Director. The regulations in section 34 also provides that ‘a developer desiring to conduct a project which may have a significant impact on a wetland, river bank or lake shore, shall be required to carry out an environmental impact assessment in accordance with sections 20, 21 and 22 of the National Environment Act’.</p>	
<p>National Forestry and Tree Planting Regulations, 2016 (SI No. 57 of 2016)</p>	<p>The regulations include all aspects of sustainable management of forests. The regulations: • outline the rules for establishment and management of community and private forest reserves • provide for registration of protected trees and reserved species • regulate introduction of alien and exotic species • require the consent of the owner before any tree can be disturbed, uprooted or cut (Regulation 80) • list the activities for which a person may apply for a licence to operate in a forest (Regulation 89).</p>	<p>The developer and contractor shall endeavour to avoid felling of NFA restricted trees as practically feasible and seek approval from NFA to cut restricted trees.</p> <p>However, the proposed sites for the different project components are not located within forest reserves.</p>
<p>Environmental Impact Assessment guidelines for water resources related projects in Uganda, 2011</p>	<p>The purpose of the EIA Guidelines is to assist stakeholders participating in or conducting EIA for water resources related projects to streamline and standardise the EIA process for water works and water resources related projects in Uganda. The objectives of the Guidelines are: • to ensure that for all new water resources related projects, EIAs are carried out quickly and in an orderly way; • to provide stakeholders in the water and sanitation sector with</p>	<p>An environmental and social impact assessment has been conducted in compliance with these guidelines and impacts of the proposed project have been identified and an ESMP (see section 8) has been developed to address the potential impacts.</p>

Act, Regulation guidelines	Extract of the Act or Regulation	Compliance measure
	<p>a reference tool for assessing impacts of water resources related projects on the environment, and.</p> <ul style="list-style-type: none"> <li>• to assist planners, developers, EIA practitioners on how to play their specific roles in safeguarding water resources through the EIA processes, and</li> <li>• to ensure integrated approach to sustainable management and development of water resources related projects.</li> </ul>	
<p>Guidelines for Environmental Impact Assessment in Uganda (NEMA 1997)</p>	<p>General guidelines on the ESIA process in Uganda. Includes recommendations to project developers, EIA practitioners, lead agencies and NEMA</p>	<p>An ESIA was undertaken in compliance with these guidelines</p>

### 3.2 International legal and lenders requirements

Uganda is a party to a number of international and regional agreements which requires her to comply with provisions of the agreements when setting up projects like Serere Water Supply and Sanitation Project.

International financial institutions like the African Development Bank (AfDB) have environmental and social safeguard policies that are designed to avoid, mitigate, or minimize adverse environmental and social impacts of projects supported by them. These are complimented by the Performance Standards (PS) which have been set by the International Finance Corporation (IFC). These safeguard policies and performance standards (Table 2-4) can be used and adhered to during the project cycle to ensure that the project meets the international standards.

**Table 3-3: The Safeguard policies and Performance Standards relevant to the Project**

Operational Safeguard/ Performance Standard	Key Issues	Relevance/Applicability
<b>OS 1:</b> Environmental and social assessment	Mainstream environmental and social considerations, including those related to climate change vulnerability and thereby contribute to sustainable development in the region. It governs the process of determining a project's environmental and social category and the resulting environmental and social assessment requirements	An environmental and Social Impact Assessment (ESIA) has been conducted for this project (this Report) where potential impacts have been identified and mitigation measures proposed. This will ensure that the project is implemented in a sustainable way.
<b>OS 2:</b> Involuntary resettlement, land acquisition, displacement and compensation	Mainstream resettlement considerations in AfDB operations. It consolidates the policy commitments and requirements set out in the Bank's policy on involuntary resettlement, and incorporates a number of refinements designed to improve the operational effectiveness of those requirements	The proposed land where pipe lines will pass in a road reserve hence no compensation will be required.  MWE acquired land through the Serere District Local Government (See Appendix 7 for MOUs and Land agreements) and therefore, there are no issues of compensation anticipated.
<b>OS 3:</b> Biodiversity and ecosystem services	Identify and implement opportunities to	Mitigation measures have been proposed in this Report to



	conserve and sustainably use biodiversity and natural habitats as well as observe, implement, and respond to requirements for the conservation and sustainable management of priority ecosystem services.	minimize probable impacts of this project on biodiversity, including water resources so that their ability to provide ecosystem services to people are not compromised.
<b>OS 4:</b> Pollution prevention and control, hazardous materials and resource efficiency	Manage and reduce pollution in AfDB funded projects. It covers a range of key impacts including pollution, waste, and hazardous materials for which there are agreed international conventions, as well as comprehensive industry specific and regional standards, to be followed to safeguard the environment and humans from being polluted as a result of the development activities	The project proponent and contractor will set up a waste management plan to handle liquid and solid wastes, including those of hazardous nature.
<b>OS 5:</b> Labour conditions, health and safety	Protection of workers' rights and provision of their basic needs. It establishes the Bank's requirements for its borrowers or clients concerning workers' conditions, rights and protection from abuse or exploitation of the labourers	The project will abide by the labour laws to protect the interests of workers. This will include for example: providing contracts to all hired workers, providing workers with personal protective equipment, setting up a grievance handling mechanism (See <b>Appendix 8</b> ) to enable workers express their complaints, among others.
<b>Performance Standards</b>		
<b>PSI:</b> Social & environmental assessment and management systems	It establishes the importance of: (i) integrated assessment to identify the environmental and social impacts, risks, and opportunities of projects; (ii) effective community	An ESIA has been carried out. Potential impacts of the project have been identified and their mitigation measures proposed. Stakeholder involvement was a major component of the ESIA.

	engagement through disclosure of project-related information and consultation with local communities on matters that directly affect them; and (iii) the client's management of environmental and social performance throughout the life of the project.	
<b>PS 2:</b> Labour and working conditions	This performance standard is concerned with management of labour risks such as lack of contracts, insufficient wages, exploitation of minors, discriminatory hiring, unsafe and un hygienic living conditions, internal grievance handling, excessive over-time and handling of casual laborer.	A grievance handling mechanism will be put in place where workers can lodge their complaints.  The project will employ up to 50 workers following the relevant labour laws of Uganda.
<b>PS3:</b> Resource efficiency and pollution prevention	Requires project to efficiently use resources and to minimize or avoid pollution to the environment	The Developer shall ensure that pollution control measures are in place and only the required resources are utilized.
<b>PS4:</b> Community health, safety and security	This performance standard looks at aspects that can expose the public to accidents, excessive noise, traffic congestion, diseases, insecurity, among others	An ESMMP has been put in place detailing the management of impacts related to community health, safety and security.
<b>PS5:</b> Land acquisition and involuntary resettlement	Establishes requirements for efficient and timely compensation and/resettlement of project affected persons	All the required for project activities will be obtained following the laws of Uganda, and all people whose land is affected will be compensated prior to the start of project activities
<b>PS6:</b> Biodiversity conservation and sustainable management of living natural resources.	Requires that projects put up necessary measures to conserve biodiversity and natural habitats	An ESMMP has been put in place with measures to ensure biodiversity is not adversely impacted by the implementation of the project.

<b>PS7:</b> Indigenous peoples	Promotes the protection of indigenous people	No indigenous peoples as defined under this standard are considered to be resident in the project area.
<b>PS8:</b> Cultural heritage	Requires that all resources of cultural importance are identified and protected	No cultural resources were identified during this assessment. However, any cultural resource that may be identified at any stage of project operation will be protected and relocated according to the established laws of Uganda.

### 3.3 Institutional framework

Table 3-4 below highlights some of the key institutions or agencies that are closely linked to water resources and environment management in Uganda. This is necessary for coordination of the different activities related to the proposed project.

**Table 3-4: Key institutions / agencies relevant for the project.**

Institution	Roles and Responsibilities
<b>National level</b>	
Department of Occupational Safety and Health, Ministry of Gender, Labour and Social Development	<ul style="list-style-type: none"> <li>Responsible for implementing the Occupational Safety and Health Act (2006) and carrying out statutory inspections to ensure proper management of health and safety at workplaces.</li> </ul>
Directorate of Water Development (part of the Ministry of Water and Environment)	<ul style="list-style-type: none"> <li>Provides support to local governments and other service providers with respect to water resource issues</li> </ul>

Institution	Roles and Responsibilities
<p>Directorate of Water Resources Management – DWRM (part of the Ministry of Water and Environment)</p>	<ul style="list-style-type: none"> <li>• Develops and maintains national water laws, policies and regulations</li> <li>• Manages, monitors and regulates water resources through issuing water use, abstraction and wastewater discharge permits</li> <li>• Integrates water resources management activities</li> <li>• Coordinates Uganda’s participation in joint management of transboundary waters resources and peaceful cooperation with Nile Basin countries.</li> </ul>
<p>Ministry of Water and Environment (MWE)</p>	<ul style="list-style-type: none"> <li>• Responsible for setting national policies and standards, managing and regulating water resources and determining priorities for water development and management</li> <li>• MWE has three directorates:                             <ul style="list-style-type: none"> <li>o Directorate of Water Resources Management (DWRM)</li> <li>o Directorate of Water Development</li> <li>o Directorate of Environmental Affairs.</li> </ul> </li> <li>• Reporting to MWE are the:                             <ul style="list-style-type: none"> <li>o National Environment Management Authority (NEMA),</li> <li>o National Forestry Authority (NFA)</li> <li>o National Water and Sewerage Corporation.</li> </ul> </li> </ul>

Institution	Roles and Responsibilities
National Environment Management Authority (NEMA)	<p>Established in May 1995 under the National Environment Act Cap 153 (now the National Environment Act, No 5, 2019) as the principal agency in Uganda charged with the responsibility of coordinating, monitoring, regulating and supervising environmental management. NEMA's functions:</p> <ul style="list-style-type: none"> <li>• coordinates the implementation of government policies and decisions of the Policy Committee on Environment</li> <li>• ensures the integration of environmental concerns in overall national planning through coordination with the relevant ministries, departments and government agencies</li> <li>• liaises with the private sector, intergovernmental organisations, nongovernmental and government agencies of other states on issues relating to the environment</li> <li>• proposes environmental policies and strategies to the Policy Committee</li> <li>• initiates legislative proposals, standards and guidelines on the environment in accordance with the law</li> <li>• reviews and approves environmental and social impact assessment statements</li> </ul>
<b>Serere District Local Government / Serere Town Council</b>	

Institution	Roles and Responsibilities
District Environment Committee	<ul style="list-style-type: none"> <li>• Coordinates the activities of the district council and the local environment committees relating to the management of the environment and natural resources</li> <li>• Ensures that environmental concerns are integrated in all plans and projects approved by the district council</li> <li>• Assists in developing and formulating byelaws relating to managing the environment</li> <li>• Coordinates with NEMA on all issues relating to environment management</li> </ul>
Environment Officers (Serere district and Serere Town Council and sub county officials).	<ul style="list-style-type: none"> <li>• Advises the district environment committee on all matters relating to the environment</li> <li>• Assists local environment committees in the performance of their functions</li> <li>• Gathers information on the environment and the utilisation of natural resources in the district</li> <li>• Serves as the secretary to the district environment committee</li> </ul>
Community Development Officers (Serere district and Serere Town Council and sub county officials).	Plays a key role in stakeholder engagement and community projects

### 3.4 Applicable permits and licences

**Table 3-5: Permits, certificates, and licences potentially required by the project**

	Permit Required	Issuing Authority	Legal Framework
1.	Water Abstraction Permit	DWRM	Water Act, cap 152 and the Water Resources Regulations, 1998.
2.	Effluent Discharge permit	DWRM	Water Act, cap 152 and the Water Resources Regulations, 1998

	Permit Required	Issuing Authority	Legal Framework
3.	Waste Disposal Permit	NEMA	National Environment Act, 2019; National Environment (Waste Management) Regulation, 2020.
4.	Storage of Hazardous/ Non Hazardous Waste	NEMA	National Environment Act, 2020; National Environment (Waste Management) Regulation, 2020
5.	License to emit noise in excess of permissible noise levels	NEMA	
6.	Permit for Storage of Petroleum Products	PSD/MEMD	Petroleum Act, Cap 2003
7.	Work Place Registration	MGLSD, occupational safety and health department.	OHS Act, 2006
8.	Certification of Equipment	MGLSD, occupational safety and health department.	OHS Act.
9.	Building plans approval and Occupation permits.	Serere District and Town Council administration	Physical Planning Act, 2010 (as amended in 2020).
10.	Waste Transportation and disposal Permit	NEMA	National Environment Act, 2019; National Environment (Waste Management) Regulations, 2020
11.	Cutting of NFA Trees	NFA	National Forestry and Tree Planting Act, 2003; National Forestry and Tree Planting Regulations, 2016 (SI No. 57 of 2016)
12.	Permit to use road reserve	UNRA and Serere District Local Government	The Uganda National Roads Authority (General) Regulations, 2017.  Physical Planning Act, 2010 (as amended in 2020).

## 4 METHODOLOGY

### 4.1 Introduction

This section outlines the methodology that was used to assess the environmental baseline and to identify, predict and assess the environmental impacts of the project on each relevant environmental component. It also covers the methodology for the identification of mitigation and monitoring measures that were recommended to address these impacts and identification of relevant stakeholders. The methodology consists of a review of Uganda's institutional arrangements, regulations and policies. Environmental impacts of the proposed project were predicted in relation to environmental receptors and natural resources while comparing prevailing pre-project conditions and post-project situations.

The requirement for environmental impact assessment in Uganda is set out by the National Environment Act No. 5 of 2019 and the National Environment (Environmental and Social Impact Assessment) Regulations of 2020. This process was guided by the Environmental Impact Assessment (EIA) Guidelines (NEMA, 1997) and the process is schematically presented in Figure 4-1. In addition, safeguards implementation has to comply with the requirements of investment project financing and the World Bank Group Environmental, Health, and Safety (EHS) Guidelines for general Construction and Decommissioning as well as the EHS guideline for access roads.



## 4.2 Impact Assessment Approach

The significance of environmental and social impacts was established based on the comparison with the baseline situations in the project area. Generally, the environmental and social impact study involved various methods including:

- Review of relevant literature and secondary baseline data on legislation, policies and guidelines, bio-physical environment, including among others, area land use, sensitive receptor systems and ecology likely to be affected.
- Field studies included receptor systems baseline data including baseline noise and air quality measurements. Water quality analysis was done at pre-determined locations to set an environmental baseline and establish status;
- An inventory of activities in the neighbourhood likely to be affected by proposed project;
- Safety and health impacts on workers during construction and operation, protection from injury and adequacy of sanitation provisions for the workers;
- Consultations with stakeholders, including the regulatory agencies, and the local community;
- Study and analysis of engineering designs and drawings for civil solutions to be implemented by the developer, including safety measures;
- Prediction and analysis of environmental and social impacts resulting from the project activities and proposing appropriate mitigation measures, and preparation of an Environment and Social Management Plan (ESMP) for implementation by relevant stakeholders;
- Preparation of scoping report/Terms of Reference Report and ESIA Report and presentation to NEMA by the developer for review and approval.

The figure below shows the ESIA process that has been followed.

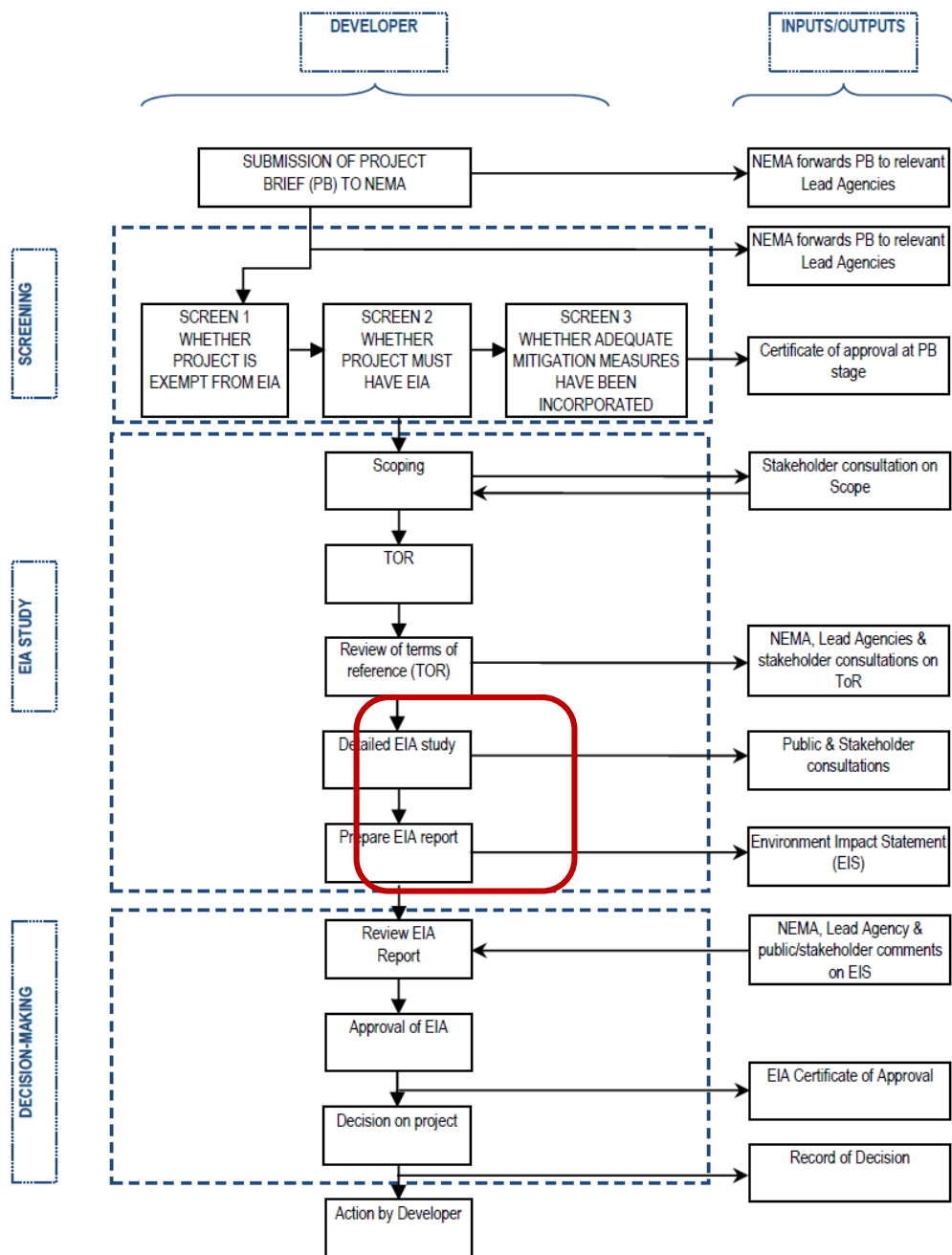


Figure 4-1: ESIA process that was adopted as provided for under the Laws of Uganda

### 4.3 Physical Environment

Baseline noise levels and air quality were measured, not only to inform construction contractors about pre-construction conditions existing at proposed sites, but also the first annual environmental audit. These were determined through the following actions:

#### 4.3.1 Land Surface and Visual Impact Assessments

Under the land surface investigations, the character and resources of the landscape, including effects on the aesthetic values of the landscape, caused by changes in the elements, characteristics, character and qualities of the landscape was investigated. The visual amenity, including effects upon potential viewers and viewing groups caused by change in the appearance of the landscape as a result of the development, was also considered.

The landscape and visual impact assessment methodology is applicable, both to the assessment of short-term impacts during the construction of the Project, and to the long term impacts once completed. The landscape character and resources are considered to be of importance in their own right, and valued for their intrinsic qualities regardless of whether they are seen by people or not. Impacts on landscape are therefore considered as distinct from impacts on visual amenity as perceived by people. For purposes of clarity, Landscape Impacts relate to the effects of the Project on the physical and other characteristics like fabric, character and quality of the existing landscape, whereas Visual Impacts relate to the effects on views from visual receptors (e.g. residents, workers, visitors to the area, etc.) at specific viewpoint locations. The key steps of the methodology for the assessment were as follows:

- The project study area was determined using maps and aerial photos data and field observation.
- Local landscape character areas within the study area were identified.
- The sensitivity of each landscape and potential visual impact was assessed.

The magnitude of change in the character of each landscape character area and the magnitude of change in the view at each viewpoint location was predicted.

#### 4.3.2 Air Quality measurements

Baseline air quality was measured using a pair of digital MX6 iBrid™ portable gas meters (Industrial Scientific-Oldham) and a Microdust 880nm digital aerosol monitor (Casella®). Measurement points or locations were selected basing on presence of potential receptors (such as proposed road routes, existing roads etc.) and an averaging period of 8 hours was used. For gaseous emissions.

- The equipment was powered on and left in measuring mode for the first two minutes to allow zeroing and self-calibration. This was followed by ten minutes of measurement to allow digital readings to stabilize before they could be recorded.
- Measurements were conducted at each of the selected points to determine whether there would be any gaseous emissions detected.
- Values for Carbon monoxide (CO), Oxygen (O<sub>2</sub>), Hydrogen sulphide, H<sub>2</sub>S, volatile organic compounds (VOCs) will be noted.

For particulate matter.

- The equipment was allowed for two minutes for zeroing down and thereafter, it captured the samples for five minutes with interval of 10 seconds.

For every sampled point, a GPS coordinate was noted.

#### 4.3.3 Ambient Noise Measurements

Baseline noise measurements were undertaken at locations along project area with potential receptors. Measurement of ambient noise levels were carried out using a precision integrating sound level meter,

with an active range of 0-130 decibels (dB) and complying with IEC 651 and ANSI S4 standards. A Casella CEL-621C digital noise logger will set to record for a sample period of 10 minutes at each of the selected locations. The assessment procedure involved recording the  $LA_{MAX}$  and  $LA_{MIN}$  decibel levels. Measurement points were recorded using a GPS receiver and the noise sources together with the ambient environment at each location noted. The obtained results have been compared against the National Environment (Noise Standards and Control) Regulations, 2003. The regulations require that persons to be exposed to occupational noise exceeding 85 dBA for eight hours in a day should be provided with requisite hearing protection.

#### 4.4 Biological Environment

##### 4.4.1 Flora

Transect walks were taken along the proposed project area, with emphasis around the specific areas of proposed access roads development, with the aim of observing and recording vegetation types or any plant species listed on the IUCN list (2015).

#### 4.5 Socio-Economic Environment

A detailed social impact assessment and evaluation of the positive and negative, direct and indirect, immediate and long term, and permanent and temporary impacts due to the construction and operation of the proposed development and associated works was carried out. An assessment of the impacts identified in either qualitative or quantitative terms, according to their inherent nature and the availability of adequate data to enable predictive analysis was undertaken. Specific activities undertaken included:

- a) Land use in site zone of influence: Types of land use were established from observation and consultation with Local/district Planning Authorities on existing land use.
- b) Existing infrastructure (roads, power, and telephone): Their presence was established by observation and consultation with relevant utility companies. Potential impact of line during construction on any such existing facilities has been predicted.
- c) Settlement patterns including induced unplanned development: Population numbers, characteristics and dynamics were analyzed to predict potential induced developments.
- d) Circulation patterns (people and livestock): These were established by observation with the aim of identifying any potential severance of access when existing paths get blocked by construction works.
- e) Social cohesion was established from community consultations and literature review to predict any disruption of social ties during or after project construction.
- f) Population demographics: Population numbers, education levels, age, gender disparities, access to factors of production, disease burden, income sources and expenditure were established from a social survey and consultations.
- g) Community structure: were established from observation, surveys and community consultation.
- h) Employment characteristics: were established from social surveys, consultations and review of existing local and national census or labour reports/surveys undertaken by Uganda Bureau of Statistics (UBOS)

- i) Local economy and income distribution: were determined through a socio-economic survey by a socio-economist, observation and interviews.
- j) Social services: Presence or lack and efficacy of existing services were determined through a socio-economic survey, observations and community consultations.
- k) Sociologist established any unique ethnic or tribal customs, traditions/ethos and values which might be affected by the construction works in the project area, we looked out for known sites of significant historic, cultural merit (locally, regional or internationally). A “chance finds procedure” has been prepared.
- l) Public health: Potential public health and occupational Health & Safety (OHS) impacts during construction were outlined. Measures to manage dust plumes from excavations, construction; noise levels from construction equipment during construction were developed. Other impacts established included risk of exposure to hazardous substances without adequate protection (skin contact); disease vectors, machine-related accidents and inadequate sanitation, HIV/AIDS.
- m) Gender analysis: was carried out to identify potential gender impacts. The SWOT tool was applied during community consultations to reveal expected opportunities that can be evaluated.

#### 4.6 Impact Assessment and Evaluation Method

The purpose of this section is to predict and make an assessment of the impacts on the environment that may potentially arise as a result of the implementation of the proposed project. An assessment of these impacts was made on the basis of information gathered during the environmental baseline study of the project area, which included several field visits to the project sites/area and its surroundings, as well as a desk study of relevant existing documents and information pertaining to the project and information describing the nature and design of the proposed project. From this, mitigation measures have been drawn up to be recommended for incorporation into the design and implementation of the project so as to minimize, compensate for or avoid the occurrence of anticipated potential impacts.

The potential positive and negative impacts were discussed below in terms of the various environmental components. The potential impacts that could occur during the construction and operation phases are categorized and assessed as follows:

- i. Type of impact – whether direct or indirect;
- ii. Status/Direction Positive or negative;
- iii. Duration - Temporary (1 year), short term (1-3 years), medium term (3 -5 years) long term (> 5 years - L) or permanent;
- iv. Intensity/Magnitude - Low, medium or Major;
- v. Extent: within limited area (1km radius from site), local (up to 5 km) or wide (> 5km radius, district wide, regional or global)
- vi. Probability of occurrence: Low (25%), Medium (25-75%) or High (>75%); and
- vii. Overall Assessment- Negligible, Minor, Medium or Severe/Significant

Based on the project details and the baseline environmental status, potential impacts as a result of the construction, operation and decommissioning of the proposed project were identified. We therefore propose an impacts analysis criteria that takes into account the magnitude or intensity of impacts based

on project activities and sensitivities to receptors in the project areas that were identified in the environmental and social baseline.

**Table 4-I: Impact Assessment and Evaluation**

Criteria	Description
Type of Impact	<ul style="list-style-type: none"> <li>▪ Direct - An impact that appears immediately as a result of an activity of the project. For example, the loss of vegetation is a direct impact of site clearing. The direct impacts would be experienced mainly during the construction process, and include effects on the physical environment, health and safety of the construction workers.</li> <li>▪ Indirect - An impact that is related to the project but that arises from an activity of the project at a secondary level. For example, the demand for supplies and services may cause indirect impacts on the local economy by increasing indirect employment opportunities.</li> </ul>
Status	<ul style="list-style-type: none"> <li>▪ Positive</li> <li>▪ Negative</li> </ul>
Duration	<p>The lifetime of the impact; this is measured in the context of the life-time of the proposed development. Whether the Impact will be:</p> <ul style="list-style-type: none"> <li>▪ Intermittent – not occurring at all times.</li> <li>▪ Temporary-only for a short period.</li> <li>▪ Short term - the impact will either disappear with mitigation or will be mitigated through natural process in a span shorter than the construction phase.</li> <li>▪ Medium term - the impact will last for the period of the construction phase, thereafter it will be entirely negated.</li> <li>▪ Long term - the impact will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter</li> <li>▪ Permanent</li> </ul>
Intensity	<p>Whether or not the intensity (magnitude) of the impact would be high, medium, low or negligible (no impact). An attempt to quantify the impacts on components of the affected environment to be described whether destructive to alter its functioning or harmless:</p> <ul style="list-style-type: none"> <li>▪ Negligible</li> <li>▪ Low - where impact alters the affected environment in such a way that natural processes of functions are not affected in any significant way.</li> <li>▪ Moderate - where the affected environment is altered, however, function and process continue, albeit in a modified manner.</li> <li>▪ High - where function or process of the environment is seriously altered and disturbed to the extent where it temporarily or permanently ceases.</li> </ul>
Spatial Extent	<p>The physical and spatial size of the impact; a description of whether the impact would occur on a scale described as follows:</p> <ul style="list-style-type: none"> <li>▪ Site - whether the impact will be within limited locale of the project site / study area affecting the whole or measurable portion of the area.</li> <li>▪ Local - whether the impact will affect the environment or communities along the border of the study area or in the extended area adjacent to the site or perhaps outside the immediate environment.</li> </ul>

	<ul style="list-style-type: none"> <li>Regional - whether the impact extends beyond the study area affecting areas on a regional scale.</li> </ul>
Likelihood	<p>The probability or likelihood of the impacts actually occurring. The impact may occur for any length of time during the life cycle of the activity, and not at any given time. The probability that a certain impact will in fact realize:</p> <ul style="list-style-type: none"> <li>Uncertain - insufficient information to determine its probability. Because the precautionary principle is followed, this increases the significance of the impact.</li> <li>Improbable - the impact is unlikely to occur.</li> <li>Probable - the impact could possibly happen, and mitigation planning should be undertaken.</li> <li>Highly probable - it is most likely that the impact will occur at some or other stage of the development.</li> <li>Certain - the impact will take place regardless of any prevention plans, and only mitigatory actions can be relied on to contain the effect.</li> </ul>
Sensitivity	<ul style="list-style-type: none"> <li>Degree of change effected on natural processes or people’s livelihoods; the sensitivity of the receptor of the impact to change</li> <li>Very low</li> <li>Low</li> <li>Moderate</li> <li>High</li> </ul>

Table below presents a quantitative format for ranking impacts based on parameters above, summarised as magnitude and sensitivity.

**Table 4-2: Quantitative rating of impacts**

Significance			Sensitivity			
			Very low	Low	Medium	High
			1	2	3	4
Magnitude	Very low	1	1 Negligible	2 Minor	3 Minor	4 Minor
	Low	2	2 Minor	4 Minor	6 Moderate	8 Moderate
	Medium	3	3 Minor	6 Moderate	9 Moderate	12 Moderate
	High	4	4 Minor	8 Moderate	12 Moderate	16 Severe

Table below presents the overall impact rating criteria, with illustrations of such impacts.

**Table 4-3: Overall Impact Rating and Description**

Overall Impact Rating	Description of Impact	Significance
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Severe	<ul style="list-style-type: none"> <li>▪ Non-compliance with national policy, environmental laws and regulations; WB Safeguards Policies and International Treaties on Environment</li> <li>▪ Highly noticeable, irreparable effect upon the environment and the people</li> <li>▪ Significant, widespread and permanent loss of resources and livelihoods</li> <li>▪ Major contribution to a known global environmental problem with demonstrable effects</li> <li>▪ Causing mortality to individuals of a species classified as globally or regionally endangered</li> <li>▪ Major exceedance of water/air quality and noise standard quantities representing threat to human health in long and short term</li> <li>▪ Causing widespread nuisance both on and off site</li> <li>▪ Extensive property damage or loss,</li> <li>▪ Widespread effects on livelihoods.</li> </ul>	>12
Moderate	<ul style="list-style-type: none"> <li>▪ Frequent breaches of national regulations, WB Safeguards Policies and International Agreements and Treaties including water/air quality and noise guidelines, wetlands and river banks regulations causing localised nuisance both on and off site</li> <li>▪ Noticeable effects on the environment and the population, reversible over the long term</li> <li>▪ Localised degradation of resources restricting potential for further usage</li> <li>▪ Sub-lethal effects upon a globally or regionally endangered species with no effect on reproductive fitness and/or resulting in disruption/disturbance to normal behaviour but returning to normal in the medium term</li> <li>▪ Elevated contribution to global air pollution problem partly due to preventable releases</li> <li>▪ Unplanned immigration flows</li> <li>▪ Increased traffic in sensitive environments</li> <li>▪ Increased serious crime rates</li> <li>▪ Widespread physical resettlement, affecting livelihoods</li> </ul>	6 – 12
Minor	<ul style="list-style-type: none"> <li>▪ Noticeable effects on the environment and the population, but returning naturally to original state in the medium term</li> <li>▪ Slight local degradation of resources but not jeopardising usage</li> <li>▪ Disruption to normal behaviour of a globally or regionally endangered species returning to normal in the short term</li> <li>▪ Small contribution to global air problem through unavoidable releases</li> <li>▪ Elevation in ambient water/air pollutant levels greater than 50% of guidelines</li> <li>▪ Infrequent localised nuisance</li> <li>▪ Population increase not expected to stress existing infrastructure</li> </ul>	2 – 4



Negligible	<ul style="list-style-type: none"> <li>▪ No noticeable or limited local effect upon the environment and the population, rapidly returning to original state by natural action</li> <li>▪ Unlikely to affect resources to noticeable degree</li> <li>▪ No noticeable effects on globally or regionally endangered species</li> <li>▪ No significant contribution to global air pollution problem</li> <li>▪ Minor elevation in ambient air pollutant levels below guidelines</li> <li>▪ No reported nuisance effects.</li> <li>▪ Temporary or intermittent changes to livelihoods or life quality aspects</li> </ul>	< 2
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#### 4.7 Identifying Mitigation Measures and ESMP Preparation

The ESIA team identified and described in detail possible mitigation measures considering all the project implementation phases. Measures and actions to address negative impacts favor avoidance and prevention over minimization, mitigation or compensation. Measures proposed are in compliance with the Ugandan legislation and other development partners.

We would ensure that our outcomes are well defined and are measurable events with performance indicators, targets and acceptable criteria that can be tracked over defined periods, with estimates of the resources (including human resource and training requirements) and responsibilities for implementation.

The ESMP format is flexible to ensure the integration of project specific mitigating, enhancing and monitoring requirements. The ESMP’s scope and level of details are proportional to the number and complexity of the measures required to ensure the project’s environmental and social sustainability. The following components constitute the minimal contents of an ESMP:

- a) *Objectives of the ESMP* - This section specifies that the ESMP aims to bring the project into compliance with applicable national environmental and social legal requirements and the Bank’s safeguards policies and procedures. The other objective of the ESMP is to outline the mitigating/ enhancing, monitoring, consultative and institutional measures required to prevent, minimize, mitigate or compensate for adverse environmental and social impacts, or to enhance the project beneficial impacts. It shall also address capacity building requirements.
- b) *Context the ESMP* - briefly describes project activities and major environmental and social components that are likely to be affected positively or negatively by the project. It describes and analyze the physical, biological and human conditions prevailing in the project area, highlighting relevant environmental and social issues among others.
- c) *Beneficial and Adverse Impacts* - This section focuses on beneficial impacts that can be enhanced to improve the project environmental and social performance as well as on adverse impacts that require mitigation measures to be minimized or compensated.
- d) *Enhancement/Mitigation Measures and Complementary Initiatives* - This section proposes feasible and cost effective measures to address the impacts previously defined, in order to accrue project benefits through enhancement measures or to reduce potentially adverse environmental and social impacts to acceptable levels (mitigation measures).

- e) *Environmental and Social Monitoring Program* - A monitoring program aims to ensure that mitigation and enhancement measures are implemented, that they generate intended results and that they are modified, ceased or replaced when inappropriate.
- f) *Consultations* - The implementation and monitoring of some mitigation or enhancement measures may require that consultative mechanisms be used. In such cases, the ESMP first identifies for which measures consultations would be undertaken as well as the goals and expected outcomes of these consultations. Then the ESMP specifies the target groups, appropriate consultative processes, consultation frequency, reporting methods and result disclosure procedures.
- g) *Responsibilities and Institutional Arrangements* - The implementation of enhancement and mitigation measures and the completion of the monitoring program require to clearly establish responsibilities among the various organizations involved in project implementation and operation. The ESMP proposes support to the organizations that may have insufficient capacities to fulfill their obligations. This support could be provided through various means including technical assistance, training and/or procurement.
- h) *Estimated Cost* - This section estimates the capital and recurrent cost associated with the various proposed measures (enhancement and mitigation), the monitoring program, consultations, complementary initiatives and institutional arrangements. The cost of each mitigation and enhancement measure shall be estimated, including the cost for environmental and social capacity building.
- i) *Implementation Results Schedule and Reporting* - The ESMP includes a results matrix, an implementation schedule taking into account all activities related to the proposed measures (enhancement and mitigation), the monitoring program, consultations, complementary initiatives and institutional arrangements.
- j) *Conclusion* - The conclusion summarizes the main expected environmental and social impacts and mitigation and enhancement measures that would ensure that the project meets the Bank's safeguards requirements. It also specifies the environmental and/or social loan conditions or covenants that are part of the project loan agreements.
- k) *References and Contacts* - The documents consulted to prepare the ESMP are listed. In addition, the persons to contact for comments or further information shall be mentioned in the ESMP.

#### 4.8 Identifying Monitoring Measures & Monitoring Plan

Monitoring planning includes baseline monitoring, impact monitoring and compliance monitoring. Monitoring points, measures, frequency, cost, reporting format, responsible agency and implementation agency would be identified. Monitoring measures proposed are in compliance with the Government of Uganda legislation and Safeguard Policies of the AfDB. The table below provides a summary template for Monitoring Requirements.

**Table 4-4: Summary Template for Monitoring Requirements**

Phasing	Mitigation Measure	Parameters to be Monitored	Location	Measurements	Frequency	Responsibilities	Cost
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Pre-Construction Phase							
Construction Phase							
Operation and Maintenance Phase							

A monitoring program aims at ensuring that mitigation and enhancement measures are implemented, that they generate intended results and that they are modified, ceased or replaced when inappropriate. Further, it allows assessing compliance with national environmental and social policies and standards. A monitoring program shall include two parts:

- a) *Surveillance activities* - The surveillance aims to ensure that the proposed mitigation and enhancement measures are effectively implemented during the construction phase.
- b) *Monitoring activities* - These activities consist in measuring and evaluating the project impacts on some environmental and social components of concern and to implement remedial measures, if necessary.

The program defines as clearly as possible the indicators to be used to monitor the mitigation and enhancement measures that need to be assessed during project implementation and/or operation. The monitoring program would also provide technical details on monitoring activities such as methods to be used, sampling locations, frequency of measurements, detection limits, and definition of thresholds that will signal the need for corrective actions. The process for establishing a monitoring programme would consist of the following actions:

- Specific management and monitoring objectives;
- Identification of the scope of monitoring;
- Recommend appropriate monitoring environmental and social aspects and technology;
- Specify how the information collected should be used in decision-making;
- Define the spatial boundaries and select map scales and sites for observation, measurement or sampling;
- Select key indicators for direct measurement, observation or sampling;
- Define how the data will be analysed and interpreted and how it should be presented in monitoring reports;
- Define the precision and accuracy required in the data;
- Consider compatibility of data to be collected with historical data and with related contemporary data;
- Set minimum requirements for monitoring.

## 5 ENVIRONMENTAL AND SOCIAL BASELINE CONDITIONS OF THE PROJECT AREA

This section describes the Physical, Ecological and Socio-Economic baseline of the project area, in Serere District. Physical and Ecological data was captured by specialist studies while socio-economic information was obtained from review of literature including the UBOS socio-economic reports, District and Sub County Development Plan, District and community consultation and engagement.

Under environmental baseline, particular emphasis was placed on flora and fauna, aquatic and terrestrial environment and water quality. The specific objectives of the study were to:

- (i) describe and characterise the vegetation and land use,
- (ii) describe the floral species composition,
- (iii) Description of the fauna composition, using avi-fauna as the indicator species,
- (iv) Characterisation of the aquatic environment in the project area.

### 5.1 District information

Serere is one of the districts in the eastern region of Uganda. It borders Pallisa in the South East, Soroti in the North, Kaberamaido in the West and Ngora in the East. It lies between latitudes 10 33' South and 20 23' North and longitudes 330 00' East and 330 45' East with an average altitude of 2500 above sea level. Serere District headquarters are situated at Serere T/C and the district has a total area of 1965.935 sq. km of which land area is 1494.8 km<sup>2</sup>

### 5.2 Project location

The proposed intake point will be located at Lake Kyoga, around coordinates 36N 531168 179391 in Bugondo landing site, Bugondo Sub County in Serere district. The site where the water treatment plant will be set up is three (03) acres and the boundaries of the site lie around coordinates 36N 531263 179150; 36N 531266 179119; 36N 531091 179094 & 36N 531068 179191 (UTM, WGS 84). The water pipes will be laid along the road reserve.

ESIA for the proposed for the four (04) large urban Water Supply Systems in Serere district

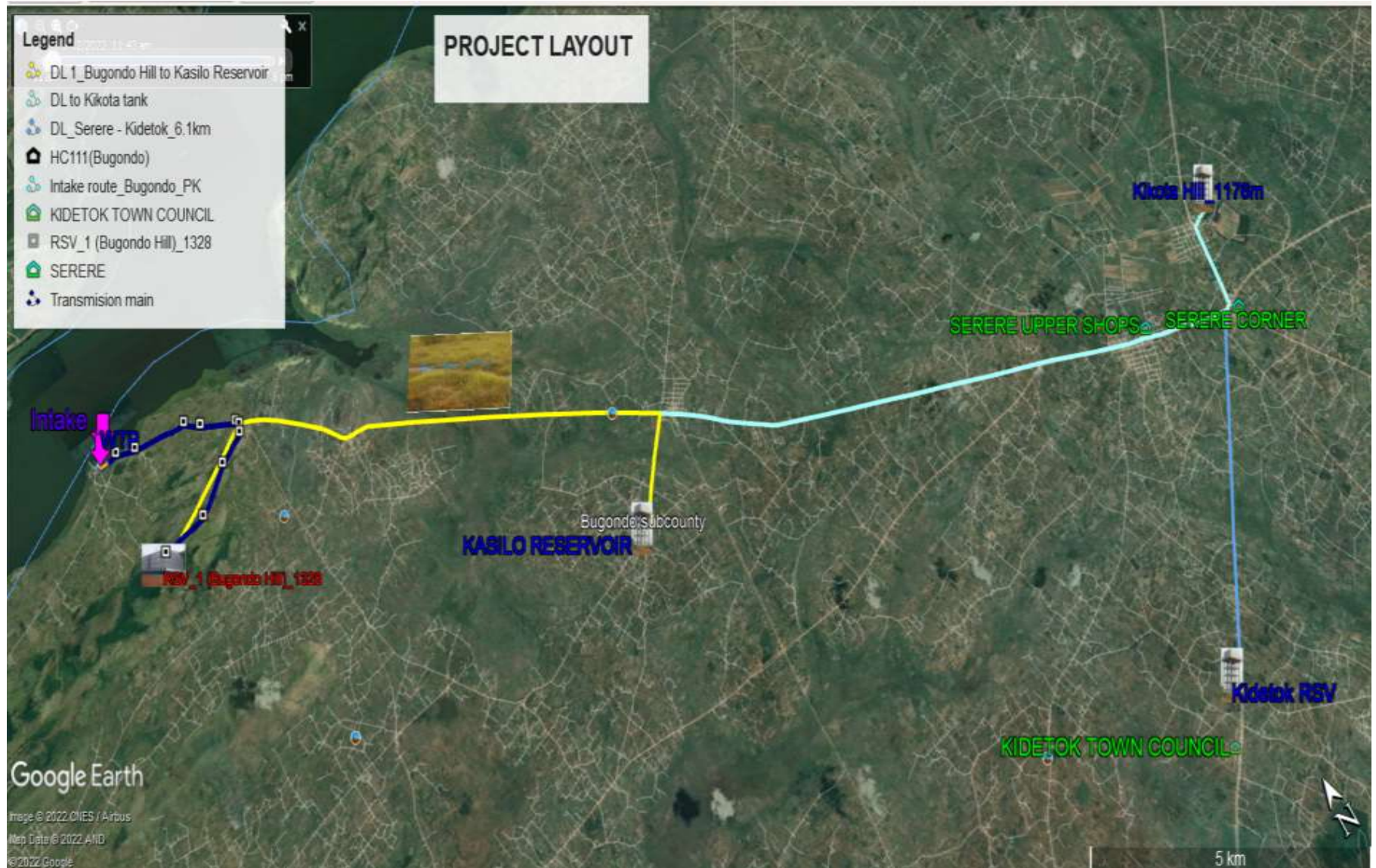


Figure 5-1: Shows project layout

## 5.3 Bio-physical Environment

### 5.3.1 Lake Kyoga (intake point)

Lake Kyoga is a large shallow lake and is located in central Uganda north of Lake Victoria; 914 m above sea level. The lake has fingerlike extensions with a surface of 1,720 sq. km. Its average depth reaches 3 m, its maximum depth is 5.7 m. The Victoria Nile flows through Lake Kyoga on its way from Lake Victoria to Lake Albert.

Extensions of Lake Kyoga include Lake Kwanja, Lake Bisina and Lake Opetta. These "finger lakes" are surrounded by swampland during rainy seasons. All lakes in the Lake Kyoga basin are shallow, usually reaching a depth of only eight or nine meters, and Lake Opetta forms a separate lake during dry seasons. Lake Kyoga has three different environmental zones: the open water deeper than 3 m; the water less than 3 m, which is covered completely with water lilies and water hyacinth; and the swamps mainly papyrus, which fringe the shoreline.

### 5.3.2 Climate

The rainfall pattern in Serere district is bi-modal with peaks in April-May and July- August, December and January are the driest months. The mean annual rainfall ranges between 800-1000mm while the mean annual temperature is 24°C. The district climate is the modified equatorial type. In the recent past, however rainfalls patterns have become erratic and unpredictable, which has resulted to frequent flood and severe prolonged droughts and these, have contributed to food insecurity in Serere district. The climate of the District is modified by the large swamp area surrounding it. Of recent rainfall, has been unreliable and unpredictable hence affecting the activities of people e.g. agriculture, livestock rearing etc.

Lake Kyoga has enough water, because of two rainy seasons, the first from the months October to December and the second between March and May. In the dry period from December to February, the temperatures in the North of Uganda are higher than in the South. All in all, Lake Kyoga and Uganda have a tropical climate, tempered by the altitude.

### 5.3.3 Soil

Some areas in Serere District are underlain by rocks of the basement complex Precambrian age that include granites, migmatites, gneiss, schists and quartzites.

The soils fall mainly under four major units; Serere catena; Metu complex series. These are mainly of the ferralitic type (sandy sediments and sandy loams). They are well drained and friable. Bottomlands contain widespread deposits of alluvium.

### 5.3.4 Topography

Some areas in Serere District are underlain by rocks of the basement complex Precambrian age that include granites, migmatites, gneiss, schists and quartzites.

The soils fall mainly under four major units; Serere catena; Metu complex series. These are mainly of the ferralitic type (sandy sediments and sandy loams). They are well drained and friable. Bottomlands contain widespread deposits of alluvium.

### 5.3.5 Vegetation and fauna

Serere has vegetation, which can best be described as wooded savannah, grass savannah, forests and riparian vegetation. The wooded savanna mainly comprises moist Acacia savanna associated with hyparrhenia spp and combretum savanna associated with hyparrhenia spp. These are mainly found in southwestern part of the District i.e. Kasilo County.

The riparian category comprises certain scattered tree grasslands associated with *Setaria incrassate* *Hyparrheria rufa*, *Accacia sayel* *Accacia fistula*, *Balanities aegyptica* and *Terminalia spp.*

Serere also has expansive wetlands, which cover vast areas including Apujan from Kyere Sub County in Serere district to Ngora County in Kumi District. Further to the Northeast is a vegetation characteristic of semi-arid type with thorny shrubs

Lake Kyoga has a rich biodiversity. These include flora and fauna such as *Cyperus Papyrus*, *Hyppo Grass (Vossia Cuspidate)*, *Cattail (Typha spp.)*, *Water Lily (Nymphaea spp.)*, and *Water Lettuce (Pistia stratiodes)*. Large crocodile populations are also found in the lake.

46 different fish species live in Lake Kyoga, some of them are endemic. The Nile Perch (*Lates niloticus*) was introduced into Lake Kyoga in the late 1950s to increase the fish production. The Nile Perch proliferation led to the almost complete elimination of many domestic fish species, such as *Synodontis victoriae*, *Engraulicypris argentus*, *Barbus kiogae*, *Tilapia esculenta*, *Tilapia variabilis*, *Mormyrus kanumme*, *Clarias mossambicus*, *Schilbe mystus* and *Haplochromis macrodon*.

### 5.3.6 Access to safe and clean water

The Serere district Safe Water coverage has increased from the previous 72.15 % to 74.23 % as compared to the national average of 68% from boreholes, shallow wells springs, and piped water. The district has a potential of expanding its major sources of water for the provision of piped water system. This service coverage has met the challenge of high population growth rate whose impact in terms of the average number of persons per improved water source automatically increases the rate of breakdown of the facility. This situation is even made worse by sharing the existing water sources with animals meant to be watered by broken and silted valley dams.

**Table 5-I: Access to safe water by Sub County**

S/N	Name	Population	No of functional Water sources	Population Served	Access to safe Water (%)
1	Atiira	20,432	71	18,300	89.57
<b>2</b>	<b>Bugondo</b>	<b>35,380</b>	<b>113</b>	<b>25,890</b>	<b>73.18</b>
<b>3</b>	<b>Kadungulu</b>	<b>32,769</b>	<b>82</b>	<b>21,180</b>	<b>64.63</b>
4	Kateta	54,168	170	32,290	59.61
<b>5</b>	<b>Kyere</b>	<b>47,591</b>	<b>111</b>	<b>27,534</b>	<b>57.86</b>
6	Labori	19,499	61	14,520	74.47
7	Olio	28,702	119	31,950	111.32
8	Pingire	34,581	123	27,810	80.42
<b>9</b>	<b>Kasilo T/Council</b>	<b>3,576</b>	<b>77</b>	<b>4,580</b>	<b>128.08</b>
<b>10</b>	<b>Serere T Council</b>	<b>6,936</b>	<b>204</b>	<b>6,480</b>	<b>93.43</b>
	<b>Totals</b>	<b>283,634</b>	<b>1,131</b>	<b>210,534</b>	<b>74.23</b>

Source: Works and Technical Services department (Serere District Local Government District Development Plan 2015/16 – 2019/20)

### 5.3.7 Water quality

Lake Kyoga is one of the African Great Lakes situated in Uganda, East Africa. An estimated 9.3 million people live in Lake Kyoga Basin with 85% of the population mainly engaged in agriculture comprised of livestock farming and crop growing as their major industrial activity. Consequently, most of the watershed areas have been rapidly converted into agricultural land and rangelands. For instance, 48.5% of wetlands in the Lake Kyoga region were lost between 1994 and 2008 alone due to conversion to agriculture. In addition, about 200,000 people are directly engaged in fishing and the lake plays an important role for inland water transport. Furthermore, most of the inhabitants get water for drinking and other domestic uses directly from the lake. The above activities have resulted into the disappearance of vegetation as well as gully erosion in Lake Kyoga catchment causing pollution of the lake. As the number of people and animals increased around Lake Kyoga, more waste from human activities and livestock has been discharged into the lake leading to nutrient (mainly phosphorus and nitrogen) enrichment.

Water samples from Lake Kyoga were tested in accordance with the MWE/DWD design manual and guidelines (2013-second edition) with close reference to Uganda Drinking Water Quality standards and World Health Organisation standards. The water quality of the selected water source was analyzed for the following pollution parameters:

- Bacteriological (microbiological) parameters;
- Chemical parameters directly related to health;
- Chemical parameters indirectly related to health;
- Physical and chemical parameters related to aesthetic and technical effects; and



- Physical and chemical parameters affecting building and pipe materials.

**Table 5-2: Results for water quality at the intake point (See Appendix 3 for water quality results) against drinking water standards.**

Parameters (Units)	Ground water from Budongo Borehole I	Surface water from Lake Kyoga at 5m	Surface water from Lake Kyoga at 5m	Abstraction point at Lake Kyoga	Drinking water standards (DEAS12:2018 Maximum permissible for Natural Portable Water)
pH	6.6	8.5	8.5	8.4	5.5 – 9.5
Colour: apparent (PtCo)	<0.243	3	3	3	25
Turbidity (NTU)	7.2	3.6	3.5	3.4	25
Electrical Conductivity (µS/cm )	836	264	269	511	2500
Total Dissolved Solids: TDS (Mg/L)	<b>585</b>	<b>185</b>	<b>188</b>	<b>358</b>	1500
Total Hardness as CaCO <sub>3</sub> (Mg/L)	120	80	83	86	600
Calcium hardness as CaCO <sub>3</sub> (Mg/L)	81	33	42	40	600
Magnesium as CaCO <sub>3</sub> (Mg/L)	39	47	41	46	600
Calcium: Ca <sup>2+</sup> (Mg/L)	32	13	17	16	150
Magnesium	9	11	10	11	100
Total Alkalinity (Mg/L)	170	135	130	130	
Bicarbonates	207	165	159	159	
Sodium	67.5	32.6	32.6	33.7	200
Potassium	1	1	1	1	50
Fluoride: F (Mg/L)	0.3	0.5	0.5	0.4	1.5
Chlorides	62	14.7	15.2	15	250
Sulphates (Mg/L)	131	<0.02	<0.02	<0.02	400

Nitrates as N	1	<0.02	<0.02	<0.02	10
Nitrites as N	<b>&lt;0.001</b>	<0.001	<0.001	<0.001	0.003
Phosphates as P	<b>&lt;0.002</b>	<0.002	<0.002	<0.002	0.7
Total Iron	0.18	0.03	0.03	0.02	<0.5

### 5.3.8 Air Quality

The WHO air quality guidelines were designed to offer guidance in reducing the health impacts of air pollution. The WHO air quality guidelines (AQGs) are intended for worldwide use but were developed to support actions to achieve air quality that protects public health in different contexts.

Air quality standards, are set by each country to protect the public health of their citizens and as such are an important component of national risk management and environmental policies. National standards vary according to the approach adopted for balancing health risks, technological feasibility, economic considerations and various other political and social factors, which in turn depend on, among other things, the level of development and national capability in air quality management. The guideline values recommended by WHO acknowledge this heterogeneity and, in particular, recognize that when formulating policy targets, governments should consider their own local circumstances carefully before adopting the guidelines directly as legally based standards.

In the absence of established standards for Uganda, World Health Organization (WHO) guidelines for emissions to ambient air were used to determine the level of compliance at the measured points within the proposed site.

**Table 5-3: WHO Air quality guidelines and interim targets for particulate matter: 24hr concentrations**

	PM <sub>10</sub> (µg/m <sup>3</sup> )	PM <sub>2.5</sub> (µg/m <sup>3</sup> )	Basis for the selected level
Interim target-1 (IT-1)	150	75	Based on published risk coefficients from multi-Centre studies and meta analyses (about 5% increase of short-term mortality over the AQG value).
Interim target-2 (IT-2)	100	50	Based on published risk coefficients from multi-Centre studies and meta analyses (about 2.5% increase of short-term mortality over the AQG value).
Interim target-3 (IT-3)	75	37.5	Based on published risk coefficients from multi-Centre studies and meta analyses (about 1.2% increase of short-term mortality over the AQG value).
Air Quality Guideline (AQG)	50	25	Based on the relationship between 24- hour and annual PM levels.

During the environmental impact assessment, ambient particulate matter, relative humidity and temperature measurements were undertaken using the particle counter CEM DT-9881M device. Measurements were undertaken within the proposed site and its neighborhood as shown in the Table below.

**Table 5-4: Air quality measurements taken at the proposed site**

Location Coordinates	Particulate matter			
	PM <sub>2.5</sub> (µg/m <sup>3</sup> )	PM <sub>10</sub> (µg/m <sup>3</sup> )	Temperature(°C)	Relative humidity (%)
Within the proposed site (WTP) 36N 531090 179164	5	10	28.1	51.0
Within the proposed site (WTP) 36N 531196 179126	5	12	27.7	49.4
Within the proposed site (Kasilo tank) 36N 539434 171908	3	12	27.5	44.2
Along pipeline route 36N 539221 174233	5	18	27.1	42.4
Along pipeline route 36N 535488 176605	8	20	30.4	48.7
Along pipeline route 36N 533765 178060	8	18	30.3	51.9
Serere town 36N 550865 167787	10	25	30.1	48.4
To Kidetok- along pipeline route 36N 551618 166598	8	15	27.6	45.7
<b>Neighbourhood to the proposed site (WTP)</b>				
Access road 36N 530972 179351	8	15	31.7	49.4
Access to the WTP 36N 531164 179183	5	13	32.5	44.2
House hold   neighbouring WTP 36N 530972 179178	3	16	32.1	42.4
Opucet Church 36N 530961 179136	3	13	31.4	48.7

36N 530986 179312 Homestead along access road	7	22	30.1	48.4
36N 531146 179034 Homestead near WTP	3	14	33.6	45.7

### Findings about air quality

In all of the points where air quality measurements were taken, the concentration of particles of 10µm diameter in ambient air were below the recommended Ugandan Air Quality Standards which is 100 µg/m<sup>3</sup> and WHO air quality standards which 50 µg/m<sup>3</sup>.

The concentration of particles of 2.5 µm diameter in ambient air was below the recommended WHO air quality standards which 25 µg/m<sup>3</sup> and Ugandan Air Quality Standards which is 100 µg/m<sup>3</sup>

### 5.3.9 Noise emission

There are no cases of noise pollution at the proposed project location sites. Thus, the project sites indicate a generally pristine environment with respect to ambient noise. However, as would be expected due to the increased human activities and construction activities noise levels are likely to increase. The levels are based on land use Category D (Residential plus Industry or small-scale production and commerce) for which daytime and night limits are 60 and 50 dBA, respectively according to The National Environment (Noise Standards and Control) Regulations 2003.

**Note:** Measurements were carried out during the day because construction activities shall not be carried out at night.

**Table 5-5: Shows baseline noise measurements within the proposed project area**

No	Location	Noise level/dB(A)			source of the noise and background noise
		Maximum	Minimum	Average (Leq)	
<b>Within the proposed site for development</b>					
1.	Within the proposed site (WTP) 36N 531090 179164	69.7	26.3	52.8	Twittering birds, and human conversations
2.	Within the proposed site (WTP) 36N 531196 179126	67.3	25.2	51.6	Human conversations, motor cycles movements

3.	Within the proposed site (Kasilo tank) 36N 539434 171908	59.9	32.6	48.3	Human conversations, motor cycles movements
4.	Along pipeline route 36N 539221 174233	82.1	32.6	69.4	Human conversations, motor cycles movements
5.	Along pipeline route 36N 535488 176605	65.5	22.6	44.6	Human conversations, motor vehicle movements
6.	Along pipeline route 36N 533765 178060	71.1	29.0	54.0	Human conversations, motor cycles and vehicles movements
7.	Serere town 36N 550865 167787	75.0	29.8	54.5	Birds, human conversations, motor cycles movements
8.	To Kidetok-along pipeline route 36N 551618 166598	79.9	59.9	66.3	Birds, human conversations, motor cycles movements
<b>Neighbourhood to the proposed site</b>					
9.	Access road 36N 530972 179351	62.4	27.6	45.7	human conversations, motor cycles movements
10.	Access to the WTP 36N 531164 179183	63.1	29.4	51.5	human conversations, motor cycles movements

Measurements indicate that noise levels at the proposed site were within the Maximum Permissible Noise Levels

11.	House hold I neighbouring WTP 36N 530972 179178	83.1	31.5	66.3	human conversations
12.	Opucet Church 36N 530961 179136	76.6	54.6	69.4	motor vehicle movements
13.	36N 530986 179312 Homestead along access road	79.3	29.6	59.3	human conversations and motor vehicle movement
14.	36N 531146 179034 Homestead near WTP	92.8	42.7	66.1	Birds, human conversation

## 5.4 Socio-Economic Aspects

### 5.4.1 Demographic Characteristics

The size, quality, distribution and growth of its population are very vital in formulation of present and future development programmes. Population censuses are the main sources of demographic data in general and information on population size, distribution and growth rate in particular. Other sources may include various surveys, Birth and Death Registration and Administrative Records.

**Table 5-6: Total Population and Growth rates as Compared to the Eastern Region by year**

Year	Population	
	2002	2014
Population	176,479	283,630
Growth rates	5.74	3.95
Regional Population Total	6,204,915	9,094,960
Growth rates for the Eastern Region	3.76	3.35
National Population Growth rate	3.20	3.03

Source: UBOS, based on provisional results NPHC, 2014.

As illustrated in the table 3-2 above, the district population increased from 176,479 to 283,630 in the year 2014 at a growth rate estimated to be at 3.95%. The regional population increased from 6,204,915

in 2002 to 9,094,960 in 2014 at a growth rate of 3.35%. The national population grew at a rate of 3.03% in the year 2014 from 2002.

The table below shows the population by county and sub-county disaggregated by gender, number of HHs and HH size.

Generally, the average HH size in the district is 6 persons per HH which is higher than the national average of 4.7 persons per HHI.

**Table 5-7: Demographics of Target urban areas in Serere district**

Name of the Sub-County	Gender			No. of HHs	Average HH size
	Male	Female	Total		
Serere Town Council	30,727	32,275	63,002	2,208	10
Kasilo Town Council	19,196	19,819	39,015	899	5.6
Bugondo	17,322	18,058	35,380	5,847	6
Kidetok	16,692	17,824	34,516	6,773	10.1

Source: 2014 UNDP (Serere District Hazard, risk& Vulnerability Report) and Uganda Bureau of Statistics - 2014 Census & HH survey data, August 2019

#### 5.4.1.1 Sex and Age composition of the population

The sex ratio in Serere district stands at 98 (98 males per 100 females) which is lower than the national level of 95. According to UBOS, 2014, the population of Serere was 283,630, of these 137,657 were male and 145,973 were female.

According to UBOS, 2014, the population of Serere Town Council was 285,903 of these were 139 female, 493 male. The distribution by age group i.e. 0-5 years is 30,954, 6-17 years is 60,509, 18-30 is 32,764, and 31-59 is 25,592 and 60 years and above is 8,213. This means that the highest population is composed of the age group 6-17 years which poses a high dependency burden on the able population.

#### 5.4.2 Sanitation systems

##### 5.4.2.1 Availability of toilets for disposal of excreta at households

According to the survey data presented in table below, 93.4% of HHs had toilets compared to 6.6% that did not have any toilets at home

**Table 5-8: Availability of toilets at household**

Availability of excreta disposal facility / toilet		
Status	Frequency	Percent
Yes	3,708	93.4%
No	260	6.6%
<b>Total</b>	<b>3,968</b>	<b>100%</b>

#### 5.4.2.2 Types of toilet facility

The leading type of toilet was the traditional pit latrine. 65% of HHs at Serere use Traditional pit latrines, 73% of HHs at Kasilo and 83% of HHs in Kadungulu. In addition, 27% of HHs at Serere uses VIP latrines, 10% of HHs at Kasilo and 8% at Kadungulu use VIP latrines. However, 6.6% of the HHs do not have a toilet, which means they are sharing neighbors' toilets use public toilets in the vicinity or still use the bush for a toilet, which is highly unhealthy.

**Table 5-9: Types of toilet facility**

Urban Centre	Serere		Kasilo		Kidetok	
	Freq.	%tage	Freq.	%tage	Freq.	%tage
Type of toilet						
VIP latrine	60	27%	9	10%	45	6.7%
Flash toilet	9	4%	3	3%	7	1.0%
Traditional Pit latrine	145	65%	66	73%	567	85.0%
Ecosan toilet	2	1%	0	0%	0	0.0%
Others	0	0%	0	0%	0	0.0%
Have no toilets	6	3%	12	13%	48	7.2%
<b>Total</b>	<b>222</b>	<b>100%</b>	<b>90</b>	<b>100%</b>	<b>667</b>	<b>100.0%</b>

#### 5.4.3 Administration

The District is divided into 2 counties and with 8 rural Sub-counties, 2 Town Councils. The District constitutes of 50 parishes and 250 village councils, distributed as in Table 4-6 below. Kasilo County covers most of the district area as it comprises of 4 sub-counties and 1 Town council, followed by Serere County, which comprises of 4 sub-counties and 1 Town Council.

The District Council is the highest political authority, with 22 members under the headship of the District Chairperson. It has a technical team headed by the Chief Administrative Officer, distributed in 11 departments. Each of the department has a head and under each department, there are a number of sections.

**Table 5-10: Number of Administrative Units by County**

County	No. of Sub counties	No. of parishes	No. of villages
Kasilo	5	21	129
Serere	5	29	121
Total	10	50	250

Source: District Planning Unit, 2014



**Table 5-11: Targeted Urban Centres**

S/N	Name of Urban Centre	Sub Counties (in Serere District)	County
1	Serere Town Council	Serere Town Council	Serere
2	Kasilo Town Council	Kasilo TC	Kasilo
4	Bugondo landing site	Bugondo Sub county	Bugondo
5	Kidetok RGC	Pingire	Kasilo
6	Kadungulu	Kadungulu	Kadungulu

Source: Serere DDP 2015-2019.

#### 5.4.4 Hygiene improvement at Households

Other hygiene improvement requirements include use of kitchens for indoor cooking practiced in 89% of HHs with a sun-drying racks for utensils used only in 72.3% of HHs. There were no soak pits for draining dirty in 75.5% of the HHs and no line for drying clothes in 11% of HHs. The types of bathing shelters found inside or outside the dwelling and not makeshifts were available in 84.8% of HHs according to the survey data. Bathing shelters in 15.2% of HHs were makeshift types.

**Table 5-12: Hygiene improvement practices Status**

Hygiene requirement	Status			
	Yes	%	No	%
Rubbish disposal pits used at homes	2,790	70.3	1,178	29.7
Soap near the toilet with water	1,233	31.1	2,735	68.9
Sun drying rack for plates	2,869	72.3	1,099	27.7
Drying line for clothes	3,252	82	716	18
Soak pit for draining dirty water	973	24.5	2,995	75.5
Bathing shelter or bathroom with privacy	3,364	84.8	604	15.2
Kitchen for indoor cooking	3,531	89	437	11

#### 5.4.5 Energy

In Serere district, the main source of energy used for cooking is wood fuel i.e. 91% of the households use firewood as the main source of fuel for cooking and this is followed by charcoal at 13% and electricity and solar energy at 3%. 43% of the households in Serere district use 'tadooba' for lighting and the category of 22% mostly specified torch as commonly used form of lighting. The energy consumption as described is a clear indication of possible depletion of tree vegetation earlier than anticipated unless regulation is undertaken

#### 5.4.6 Socio-Economic Profile of the targeted towns

In Serere District, the major economic activity is farming although other people depend on trade. Serere is among the districts with least biomass cover in Uganda this results from indiscriminate tree felling for charcoal, timber, firewood and brick baking for income to meet HH needs. The indiscriminate tree felling

has had a direct effect on the weather conditions of Serere district and food security in Serere district. However, agriculture remains the main economic activity 76.1 %, trade 4.4 %, manufacturing 0.1 %, Services 2.4 % in the district.

For the towns visited, the activity is farming with 63% of the town's population, 13% business and 24% in general agriculture activities.

**Table 5-13: Most dominant income source**

Most dominant income source		
Income source	Frequency	Percent
Agriculture	2	24
Business	1	13
Farming	5	63
<b>Total</b>	<b>8</b>	<b>100</b>

#### 5.4.6.1 Commercial and Industrial Base at the towns

The main commercial activities include service industry i.e. lodges, restaurants and bars; medium and small scale enterprises like grinding mills (including dry processing mills involved in the agro-processing of grain), Cotton Ginnery and Bakeries. (See Table 4-9 below). Other small trading enterprises trading in produce and merchandise (wholesale and retail shops) and small scale industries extraction oil from cereals or seeds.

**Table 5-14: Commercial and Industrial Base at the towns**

Grinding Mills			Cotton Ginnery		
Number	Frequency	Percent	Number	Frequency	Percent
1	2	25	0	7	87
2	1	13	1	1	13
4	1	13	<b>Total</b>	<b>8</b>	<b>100</b>
5	2	25			
6	1	13			
11	1	13			
<b>Total</b>	<b>8</b>	<b>100</b>			

**Table 5-15: Commercial and Industrial Base at the towns – Bakeries and Oil extracting Plants**

Bakeries			Oil extracting plants		
Number	Frequency	Percent	Number	Frequency	Percent
0	6	75.0	0	7	87
1	1	12.5	2	1	13
2	1	12.5	Total	8	100
<b>Total</b>	<b>8</b>	<b>100</b>			

Commercial sector handles trade and industry that are picking up in the seven urban Centres. In this entire Centres business, activities are taking place. Trade in farm products takes lead in the business followed by with retailing, hawking and limited wholesaling of manufactured goods. There are five livestock/ food and other commodities markets and designated market days in the district operating in the urban centers as shown in the table 4-11 below.

**Table 5-16: Market Days**

<b>Market Days</b>							
<b>Town / Trading Centre / Sub County</b>	<b>Monday</b>	<b>Tuesday</b>	<b>Wednesday</b>	<b>Thursday</b>	<b>Friday</b>	<b>Saturday</b>	<b>Sunday</b>
Atiira RGC	X			X		X	
Kasilo Town Council							
Kateta Sub-County			X				
Kidetok Town Council						X	
Kyere Sub-County	X						
Olio Sub-County							
Serere Town Council	X						

#### 5.4.6.2 Delivery of Health Services

The delivery of health services in Serere district and its urban centers is by both public and private sector. The public health delivery system is through Government health Facilities IVs, IIIs, and IIs that are spread within the districts and towns providing preventive and curative health services as shown in Table 4-12. The private health sector in the district includes the PNFPs, private clinics and drug Shops. The selected urban centers had at least one health facility providing health services for the people.

**Table 5-17: Number of Health Facilities – Serere**

<b>Number of Health Facilities - Serere</b>
---

no.	level	Gov.	PNFP	Total
1	Hospital	0	0	0
2	HCV	2	0	2
3	HCIII	6	3	9
4	HCII	8	2	10
	Totals	16	5	21

**Table 5-18: Number of Health Centers at urban centers**

Number of Health Centers at urban centers		
Number	Frequency	Percent
1	7	87
3	1	13
<b>Total</b>	<b>8</b>	<b>100</b>

Education institutions provide education services within the urban centres for nursery, primary and secondary, vocational / tertiary levels shown in table 4-14 below.

**Table 5-19: Education Institutions**

Nursery Schools			Primary			Secondary			Institutions / Voc.		
No.	Freq	%	No.	Freq.	%	No.	Freq.	%	No.	Freq.	%
0	3	36	0	3	37.5	0	2		25.0	5	62.5
1	1	13	3	2	25.0	1	1	12.5	1	2	25.0
3	1	13	4	1	12.5	2	4	50.0	11	1	12.5
4	2	25	8	1	12.5	4	1	12.5	<b>Total</b>	<b>8</b>	<b>100</b>
6	1	13	9	1	12.5	<b>Total</b>	<b>8</b>	<b>100</b>			
<b>Total</b>	<b>8</b>	<b>100</b>	<b>Total</b>	<b>8</b>	<b>100</b>						

#### 5.4.6.3 Communication Infrastructure

The urban centres are connected to the national hydro-electricity power grid managed by the utility manager UMEME (see table 4-15 below). Urban Centres are linked by wireless telephone services provided by MTN and AIRTEL. One radio station operates in Serere TC and a number of regional local FM radios are received on the radios.

**Table 5-20: Communication Infrastructure**

Electricity		
Connection to Grid	Frequency	Percentage
Yes	7	88%

### ESIA for the proposed for Water Supply Systems in Serere district -2023

No	1	13%
Total	8	100%

Lake Kyoga has a catchment area of about 75,000 sq. km. The main human activities in the Lake Kyoga basin are fishing, cultivation and livestock keeping. There are no industrial enterprises in the area, due to lack of grid or any other power connectivity.

## 6 PROJECT ALTERNATIVES

### 6.1 Project need

SDG target 6.1 aims to increase universal and equitable access to safe and affordable water supply for all by 2030. Uganda’s Vision 2040 aims at transforming Uganda’s economy to a middle-income status and have portable water supply to every parish in the country. In a bid to achieve sustainable and equitable economic development for all, Ministry of Water and Environment intends to establish urban water supply systems in Serere District.

The Government of Uganda is committed to a policy for increased provision of safe water supply and appropriate sanitation to the whole population. Access to safe water and hygienic sanitation facilities provides a solid foundation for prosperity for all.

In line with the commitment, the Ministry of Water and Environment intends to establish urban water supply systems geared towards ensuring that as many communities as possible get to benefit. Previous interventions targeted single towns/rural growth centers that were found to have eligible requirements for construction of a piped water supply system. However, the new approach of designing and subsequently constructing large schemes interconnecting Urban centers and rural growth centers ensures that even the small communities enrooted between towns to benefit from the services of safe water.

The MWE through Water and Sanitation Development Facility intends to develop four (04) large urban water supply systems in Eastern Uganda - Lot 4: in Serere district. The water is to be abstracted from Lake Kyoga. This is part of Government commitment to provide clean, safe, adequate, reliable and affordable water and sanitation systems in urban centres. . This is in line with the Government of Uganda Vision 2040.

The proposed intake point will be located at Lake Kyoga, around coordinates 36N 531168 179391 in Bugondo landing site, Bugondo Sub County in Serere district. The site where the water treatment plant will be set up is three (03) acres and the boundaries of the site lie around coordinates 36N 531263 179150; 36N 531266 179119; 36N 531091 179094 & 36N 531068 179191 (UTM, WGS 84). The water pipes will be laid in the road reserve.

**Table 6-1: Targeted Urban Centres**

S/N	Name of Urban Centre	Sub Counties (in Serere District)
1	Serere Town Council	Serere Town Council
2	Kasilo Town Council	Kasilo TC
3	Bugondo landing site	Bugondo sub county
4	Kadungulu	Kadungulu
5	Kidetok RGC	Pingire

## 6.2 The No project Alternative

The no project option means that the proposed project does not take effect. Thus the proposed sites remain in their current state and the anticipated positive and negative effects of the project are foregone. Meaning that there would be no effects to the environment and the surrounding local community. This option is not considered due to the need to extent water supply to these urban centers.

### 6.2.1 Alternative project location

No alternative project locations were availed by the developer during the environmental assessment exercise; however, the proposed sites are adequate and appropriate to accommodate the proposed water treatment unit, water transmission lines, and the main tank. Consultations with the sub county officials, town council officials and the neighbouring local communities to the project areas revealed no complaints regarding the land where the water treatment plant is located and the associated project component locations.

### 6.2.2 Alternative water sources

The alternatives regarding water abstraction points include;

#### 6.2.2.1 Surface Water Sources Options

Four surface water sources within the project area were assessed. These sources included the following:

- River Abuket;
- River Agu (Ngora NWSC) Water system;
- River Awoja (Soroti NWSC) Water system;
- Lake Kyoga.

**River Abuket:** River Abuket is about 7kms from Kyere. Based on the National Water Resource Assessment report of 2013, the maximum amount of water that can be abstracted from this water body is equivalent of 17,280m<sup>3</sup>/day.

This therefore implies that the abstraction from River Abuket water source can only be sufficient to supply Greater Serere Water supply system within the initial year, 2024 and the future year, 2034, and is therefore inadequate to meet the demand of the project target areas in the Ultimate year of 2044.

**NWSC Ngora WSS (River Agu):** NWSC Ngora Water Supply System has a production capacity of 4,320m<sup>3</sup>/day and is currently operating at 1,200m<sup>3</sup>/day (28% operation Capacity). This therefore presents it as a potential source for the Greater Serere water supply system. However, the closest potential reservoir location is at Kateeta Hill, in Serere and this is located about 24kms from the Ngora Intake at River Agu. Furthermore, the MDD for Greater Serere is 28,174.5 m<sup>3</sup>/day (Ultimate year – 2044) which is higher than the Maximum operational capacity of the NWSC Ngora WSS.

Based on the above, the current production capacity of the NWSC Ngora WSS shall need to be up-graded all the way from intake works, Transmission lines, among others, if the system is preferred for Greater Serere Water Supply System.

**Soroti NWSC System (River Awoja):** NWSC Soroti Water Supply System has a production capacity of 4,872m<sup>3</sup>/day and is a potential source for the Greater Serere water supply system. The reservoir location of the system is at Opiyai Hill, in Soroti town and this is located about 14kms from the Soroti Intake at River Awoja. The MDD for Greater Serere is 28,174.5 m<sup>3</sup>/day (Ultimate year – 2044).

From the above, the current production capacity of the Soroti NWSC system shall need to be upgraded all the way from intake works, Transmission lines, among others: if the system is preferred for Greater Serere Water Supply System.

**Lake Kyoga:** Lake Kyoga has volume of 16km<sup>3</sup> and net supply of 47m<sup>3</sup>/s (4,060,800m<sup>3</sup>/day) which is able to meet the water demand of 26,486m<sup>3</sup>/day (Ultimate year – 2044) of the project area. This translates to only 0.69% of the net supply of Lake Kyoga.

Therefore, the supply from Lake Kyoga provides the highest quantity of water potential in the project area compared to the other alternatives described earlier. Potential intake on Lake Kyoga locations in Serere can be located at Kagwara, Mugarama and Bugondo landing sites.

### 6.2.3 Project design

#### 6.2.3.1 Pipe layout location alternatives (Road reserves vs. middle of the road)

For main roads, the proposal is to lay the new transmission lines in the shoulders along the road reserves. This will help to minimise compensation costs as the land belongs to the government and meant for utilities. For dirt (community) roads, the proposal is to lay the pipe along the middle of the road as much as is technically possible (in particular in relatively narrow sections), keeping the line straight and minimising bends. Although this option has the disadvantage of causing traffic interruptions, it is cheaper as and has the least impact on private properties, due to minimum compensation costs and less need to insert bend joints.

#### 6.2.4 Feecal Sludge Treatment Plant Technological

**Options Option A:** Conventional Stabilisation Ponds The most common type of sewerage treatment in Uganda and East Africa as a whole is that of sewage lagoons. In this type, a series of ponds i.e. anaerobic ponds, (2no.) Facultative Ponds and Maturation Ponds are set up and sewage effluent flows through them delivering safe water to the environment at the end. The remaining sludge at the anaerobic ponds is periodically removed and delivered to sludge drying beds where after drying can be reused. The sewage water flows to the anaerobic ponds through a grit chamber. This system works well with piped sewage water.

However, Feecal sludge most especially from VIP latrines, cesspits and in many cases septic tanks is thick and raw with very little or almost no digestion having taken place in the tanks/Pits where it was previously stored. This necessitates the introduction of a thickening tank with a pre-treatment screening facility at the treatment plant. In here, non-Feecal materials and other non-biodegradable solids are removed and the sludge is further processed to separate sewage water from the sludge. The sewage



water then flows to the anaerobic ponds, while the sludge settles in the thickening tank. The sludge is then extracted manually or by machine to sludge drying beds.

Because the Feacal sludge is received at the treatment plant before much or any digestion has taken place, it produces unpleasant odors, which are not friendly to neighboring communities. Therefore, the location of the treatment plant should be away from settled areas.

According to the Physical development Plan 2012-2022 of Serere Town Council, the area earmarked for sewerage lagoons is located in a high-density population area in Osuguro Ward.

Therefore, the type of plant described above will not be the most suitable.

### Option B: Bio-digester FSTP

In view of the above, we have looked at the bio-digester treatment plant as originally designed by 'Dewats Borda' as the most appropriate alternative. Here Sludge in vacuum trucks is emptied into receiving basins and is pumped through a bio-digester to sealed baffled stabilization reactors. Sludge from the stabilization reactors is then separated from the effluent to drying beds. The sewage water is again subjected to secondary treatment before safely releasing it to the environment.

The key features of this type of bio-digester treatment plant include among others:

- ❖ Since the system is completely sealed as illustrated in the sectional diagram and layout 16-2 below, it will not generate unpleasant odors making the plant friendly to the neighborhood;
- ❖ Lower investment and operational costs;
- ❖ Possible to produce gas for lighting and cooking;
- ❖ The biological treatment ensures that the wastewater discharged at the end of the process meets environmental standards and advance the living standards of densely populated areas.

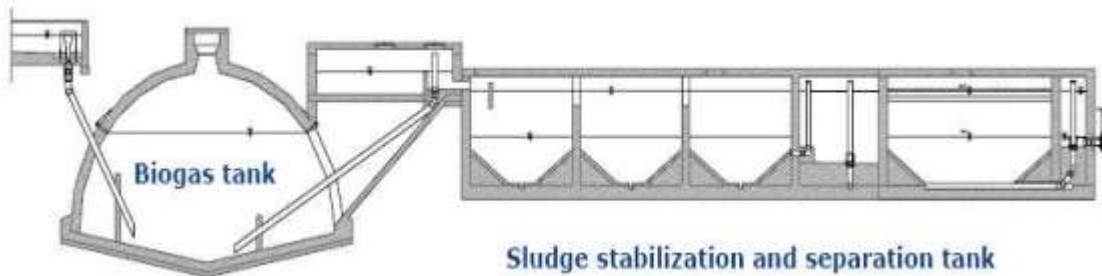


Figure 6-1: Sectional view of the Sludge stabilization and separation tank

### 6.3 The action alternative

The proposed project will most likely not have adverse environmental impacts based on the assessment in section 6 of this report, the action alternative was considered. The positive effects of the project include employment, increased water treatment production and supply capacity, improved water quality, and increased piped water distribution coverage, and generation of revenue for Serere district during the approval process of the proposed project components. The potential negative effects include; soil erosion, sedimentation of watercourses, occupational safety and community health effects, and loss of vegetation at the site where the additional water treatment facility, and noise emission from the standby generators among others. The potential negatives effects of the project can be eliminated or reduced to

insignificant levels through implementation of the proposed mitigation measures in section and the environmental and social management plan (ESMP) in section 9 of this ESIA report.

All the potential negative and positive effects of the project will be experienced and this action alternative is the basis for undertaking the environmental and social impact assessment study and preparation of this environmental and social impact statement. Any impacts not anticipated during the environmental and social impact assessment exercise and accrue during project implementation, will be addressed by Ministry of Water and Environment (developer) in liaison with NEMA and Serere District officials.

## 7 ANTICIPATED ENVIRONMENTAL AND SOCIAL IMPACTS

Following desk studies, site investigations and views obtained through public consultations, the potential significant environmental and social impacts of the proposed project activities were identified. Under this section the potential significant environmental and social impacts of the proposed project activities are presented and their level of significance evaluated. The measures proposed to mitigate/enhance each of the identified impacts are also presented.

This section provides the methodology used to assess potential project-related environmental and social economic impacts and further presents results of the assessment in terms of impact severity with respect to the sensitivity of the receptors and resources likely to be affected and the mitigation measures developed as a result of the assessment process.

### 7.1 Impact Assessment Methodology

To evaluate the impacts associated with the proposed project, the following impact characteristics listed below and an impact matrix were defined systematically.

#### Impact Characteristics

- Extent: On site, within limited area (<200m from site), local (up to 1km) or wide (regional or global).
- Duration: temporary (1 year), short term (1-3 years), medium term (3-5 years) long term (>5 years) or permanent
- Magnitude of impact - very low, low, medium or high.
- Receptor Sensitivity- The sensitivity of a resource or receptor is rated as very low, low, medium or high. The sensitivity of the receiving environment is determined by specialists based on the baseline data collected during the environmental assessment.
- Impact significance before mitigation: negligible, minor, moderate, major.

Overall impact significance after mitigation: negligible, minor, moderate, major.

By considering the combination of the **magnitude** of impact and the **sensitivity** of the receiving environment/receptor sensitivity, the **significance** of the potential impact is derived.

To provide a relative illustration of impact significance, it is useful to assign numerical descriptors to the impact magnitude and receptor sensitivity for each potential impact. Each is assigned a numerical descriptor of 1, 2, 3, or 4, equivalent to very low, low, medium or high. The significance of impact is then indicated by the product of the two numerical descriptors, with significance being described as negligible, minor, moderate or major, as in the significance table 7-1 below.

**Table 7-1: Determination of Impact Significance**

Significance of impact			Sensitivity of receptor			
			Very low	Low	Medium	High
			1	2	3	4
Intensity/magnitude of impact	Very low	1	Negligible 1	Minor 2	Minor 3	Minor 4
	Low	2	Minor 2	Minor 4	Moderate 6	Moderate 8
	Medium	3	Minor 3	Moderate 6	Moderate 9	Major 12
	High	4	Minor 4	Moderate 8	Major 12	Major 16

To systematically evaluate the impacts associated with this development activity, an impact matrix in Table 7-2 has been constructed as per the categories identified. A discussion of the impacts follows, including their description in terms of extent, duration, likelihood and proposed mitigation measures.

**Table 7-2: Impact Assessment Matrix**

Issue/impact	Extent	Duration	Magnitude	Receptor sensitivity	Impact significance before mitigation	Impact significance after mitigation
<b>Preparation and Construction phase</b>						
Clearance of vegetation and crops	Local	Temporary/ Long term	Medium	Medium	Moderate 6	Minor 3
Soil erosion & pollution of surface water	Local	Temporary	Medium	High	Major 12	Moderate 6
Air Quality	Local	Temporary	Medium	Medium	Moderate 6	Minor 3
Noise emission and vibrations	Local	Temporary	Medium	Medium	Moderate 9	Minor 3
Water contamination due to use of	Local	Temporary	Medium	Medium	Moderate 9	Minor 3

ESIA for the proposed for Water Supply Systems in Serere district -2023

Issue/impact	Extent	Duration	Magnitude	Receptor sensitivity	Impact significance before mitigation	Impact significance after mitigation
chemicals and oil spills						
Sanitary waste disposal	Local	Temporary	Medium	Medium	Moderate 9	Minor 3
Aesthetics and landscape	Local	Temporary	Low	Low	Minor 3	Negligible 1
Occupational health and safety of workers	Local	Temporary	Medium	Medium	Moderate 9	Minor 3
Community health and safety	Local	Temporary	Medium	Medium	Moderate 9	Minor 3
Poor solid waste management and sanitation	Local	Temporary	Medium	Medium	Moderate 9	Minor 3
Damage to other utility services	Local	Temporary	Medium	Medium	Moderate 6	Minor 3
Temporary loss of access to homes and businesses	Local	Temporary	Medium	Medium	Moderate 6	Minor 3
Risk of increased spread of COVID-19	Local	Temporary	Medium	High	Major 12	Moderate 6
Misconduct of workers	Limited area	Temporary	Medium	Medium	Moderate 9	Minor 3

Issue/impact	Extent	Duration	Magnitude	Receptor sensitivity	Impact significance before mitigation	Impact significance after mitigation
Traffic disruption	Limited area	Temporary	Medium	Medium	Moderate 9	Minor 3
<b>Operational phase</b>						
Water Quality and Quantity	Local	Long term	Low	Medium	Moderate 6	Minor 2
Occupational health and safety of workers	Limited area	Long term	Low	Medium	Moderate 6	Minor 2
Poor solid waste management and disposal	Limited area	Long term	Medium	Medium	Moderate 9	Minor 3
Natural hazards, including floods that may damage the intake and water pipes	Local	Temporary	Medium	Medium	Moderate 9	Minor 3
<b>Decommissioning phase</b>						
Demolition waste	Within limited area	Temporary	Medium	Medium	Moderate	Minor
Noise and vibration	Within limited area	Temporary	Medium	Medium	Moderate	Minor
Deterioration in ambient air quality due to dust emission	Within Limited area	Temporary	Medium	Medium	Moderate	Minor
Occupational safety concerns	Onsite	Temporary	Medium	High	Major	Minor
Loss of employment	On site	Permanent	Low	Medium	Moderate	Minor

## 7.2 Positive impacts

The proposed project will be associated with positive impacts during the construction and operation phases of the project. These include the following:

### 7.2.1 Creation of employment opportunities

Construction of the water supply and sanitation system will require work workforce in form of skilled and unskilled labour. This will provide job opportunities for both the local and foreign community. Some of the expected jobs include masons, carpenters, plumbers, and engineers, environmental and social experts among others. This impact will be short-term lasting only the construction period but will greatly benefit those will have gotten the opportunity.

During the operation phase, long-term technical and non-technical job opportunities for professionals, casual labourers, etc. will be available to operate and maintain the water scheme.

#### **Impact Enhancement**

- i. During recruitment of workers, the local community should be given priority especially for casual work. This will not only financially benefit the project communities but also foster project ownership which is important for project success
- ii. All workers should sign contracts with clearly spelled out terms of employment and payments should be fair and prompt.
- iii. Opportunities should be given out without discriminating against women and persons with disabilities.
- iv. Employment of children should be strictly prohibited on the project. To achieve this, all applicants should present their National IDs to verify their age.
- v. All workers should be provided with adequate personal protective equipment to protect them from occupational hazards.

### 7.2.2 Generation of revenue

Revenue will be generated for Serere Town Council, Kasilo Town Council, Bugondo Sub County, Kidetok Sub County and Serere District Local Government during the process of plan approval for construction of the proposed facility, and also during operation phase in form of operational licenses which will be issued by the Town Councils.

#### **Enhancement measures**

- Operational licenses should be obtained by developer from the town councils once the proposed water supply system is ready for commissioning.

### 7.2.3 Income to material / equipment suppliers

Both construction and operation of the project will require supply of various materials and/ or equipment. For example, construction will require cement, aggregates, sand, etc some of which can be sourced locally. Some equipment and materials, for example, pipes, pumps, steel materials required for

the project will be sourced nationally and internationally to ensure that the desired quality is achieved. Local suppliers of materials and equipment who get involved in the project will benefit financially. The project affected communities would benefit mostly during the construction phase.

### **Impact Enhancement**

- i. Whenever possible, construction material such as aggregate (stones and sand) should be obtained from the project affected villages to ensure that project communities directly benefit from the construction phase of the project.
- ii. The contractor should sign agreements with suppliers and ensure prompt payment
- iii. The contractor should ensure fair, adequate and timely payment of suppliers.

#### **7.2.4 Creation of business opportunities**

During construction of the water supply and sanitation system, local communities will gain through the sale of items like food stuffs, drinks and other consumable products to construction workers. The increase in demand of products will lead to increased supply and creation of market for local products thereby improving the incomes and general welfare of the local communities and their families. Although short term, this will positively impact persons (and their households) who would be involved in such businesses. **Impact enhancement**

- i. The contractor shall ensure adequate, fair, and prompt payments to local suppliers
- ii. During the project progress meetings with local community, the local residents will be informed about the project and how their businesses can benefit from the project.

#### **7.2.5 Improved access to water**

The proposed water supply system is to serve the population of 25,162 in Serere TC, 11473 in Kasilo TC, and 21,905 in Kidetok RGC by the ultimate year 2045. This system will bring water closer to the people thus increasing accessibility. In the long run, the project will enable MWE through its Water and Sanitation Development Facility – East to achieve its objectives which include improvement of the socio-economic situation for people living in Small Towns and Rural Growth Centres in the districts of central Uganda through provision of safe, adequate, reliable and accessible water supply, and promotion of sanitation facilities

### **Impact Enhancement**

- i. Water and Sanitation Development Facility – East and Serere district will ensure that the system is well operated and maintained

#### **7.2.6 Clean water supply**

To ensure the water that reaches the consumer is potable, a water treatment plant has been designed among the project components. This shall improve community health by reducing the challenges that have been faced over time due to consumption of unsafe water; some of which include reducing the risks of water-borne infectious diseases especially enteric fevers like typhoid, diarrhoea and dysentery among others.



### **Impact Enhancement**

- i. Additional improvements to drinking water quality at home, such as boiling especially for drinking water, are examples of simple and cheap measures that will be encouraged in the community.
- ii. Communities shall be sensitized on safe ways of collection and storage of water to avoid contamination

#### **7.2.7 Improved sanitation and hygiene**

Clean and safe water supply will play a major role in improving the sanitation and hygiene of the community. Hygiene practices for example hand washing will be increased because of water availability and this will help reduce the spread of food-borne illnesses like diarrhoea.

### **Impact Enhancement**

- i. Communities shall be sensitized on hygienic practices such as hand washing and personal hygiene at home

#### **7.2.8 Infrastructure improvement**

Safe water supply and sanitation facilities will induce development, stimulate investment and employment and helps improve marginal investment opportunities. Improved access to water will trigger development of other sectors especially the hospitality business like restaurants and hotels.

Water reliability is an important parameter for economic activities (industries, commercial agriculture and other services) which use water in their processes or as a non-substitutable input. This project will ensure reliable supply of water which will attract better investment options in the project area and neighboring areas.

### **Impact Enhancement**

- i. With availability of water, Serere District departments of production shall sensitize the communities on investment options that can benefit from water usage as a way of diversification of their livelihood sources, for example restaurants, saloon and public sanitary facilities among others.

#### **7.2.9 Impact on Education**

The hypothesis that children stay home to help in house work especially water collection and also lack of clean water at school for the older girls will be unravelled. The piped water scheme will lead to improved access to clean water in schools and households. This will encourage and save time for children to go to school as they won't be involved in fetching water from long distances. Additionally, by providing a secure sustainable water source, pupils will be able to focus on their education without stomach pains and water-borne disease.

### **Impact Enhancement**

- To the extent possible, the district will ensure that the standpipes are extended as close as possible to the communities' households.
- The district will ensure that sensitization of project communities on gender equality, children rights and the advantages of sending the children especially the girl child to school is conducted

#### 7.2.10 Climate Change and Green Growth

The project was screened using the Climate Safeguards System (CSS) of the African Development Bank and was classified as a **Category 2 Project**. In terms of climate change and green growth, the project will contribute to climate change resilience through increased availability of water and improved catchment management activities.

### 7.3 Anticipated impacts during site preparation and construction phase

#### 7.3.1 Clearance of vegetation and crops

Vegetation will be cleared from the proposed site prior to construction especially at the sites for the water tanks, WTF and pipeline corridor. This activity shall be conducted using user-operated equipment and mechanical means as well as manual labour. Vegetation to be lost from the site includes; *Artocarpus heterophyllus*, *Bougainvillea spectabilis*, *Citrus sinensis*, *Duranta erecta*, *Grewia sp variegata*, *Mangifera indica*, *Markhamia lutea*, *Paspalum sp*, *Persea americana*, *Persea americana*, *Senna siamea*, and *Terminalia mantel*. None of this vegetation is threatened, vulnerable or endangered as per IUCN red list of threatened species 2013.

The extent of the impact is limited to the site and the magnitude of the impact is expected to be very low. Along water pipeline corridor, only grass and crops will be lost and this will be restored once the water mains are laid. The receptor sensitivity of the sites is low since the sites have no endangered flora located within the site footprints to be cleared.

**Impact significance before mitigation: Moderate**

#### Mitigation measures

- Vegetation clearance will be limited to areas where it is absolutely necessary.
- Immediately after the project works, during reinstatement, all areas cleared of vegetation and not paved shall be planted with grass and trees indigenous to the area. The grass and trees shall be planted on top of a black cotton (loam) soil layer.
- Existing roads will be used wherever possible as access roads in order to minimize clearance of vegetation.
- Stockpiles of excavated soils will not be placed where there is vegetation, particularly young plants which have been planted deliberately.
- Vegetation that might have been excavated accidentally near the proposed sites will be restored to near their natural state.

**Impact significance after mitigation: Minor**

### 7.3.2 Soil erosion & pollution of surface water

The removal of vegetation due to excavation works at the proposed sites can expose the area to agents of soil erosion. Some sections of the proposed sites like reservoir sites are on hilly slopes and thus susceptible to soil erosion. The site where the Water Treatment Plant is 240m away from Lake Kyoga and thus, if excavated soils are not well managed, can easily be washed into the nearby wetland and cause pollution to its waters through increased turbidity.

The sensitivity of wetland to sedimentation due to soil erosion is high, though the construction works are temporary in nature (Lasting less than one year). The magnitude of this potential impact is predicted as medium while the extent will be of local scale since some components of the project are linear in nature. Turbidity of surface water can render the water unusable for domestic purposes for communities who depend on Lake Kyoga as a source of water especially those who cannot afford treated piped water from NWSC. Turbidity also affects aquatic species within the surface water as it leads to low dissolved oxygen.

**Impact significance before mitigation: Major**

#### Mitigation measures

- Vegetation clearance will be limited to only areas where it is absolutely necessary to minimize the areas exposed to agents of soil erosion.
- Immediately after the project works, during reinstatement, all areas cleared of vegetation and not paved shall be planted with grass and trees indigenous to the area to minimize surface runoff.
- Existing roads will be used wherever possible as access roads in order to minimize clearance of vegetation.
- The site will be hoarded off during construction works to prevent soil erosion to the neighbouring areas.
- Adequate drainage channels to direct storm water within the proposed site will be constructed for better storm water management
- Soil erosion checks will be put in place wherever necessary along drains. These checks will include scour checks and silt traps/fences. In addition, drains will be regularly de-silted.
- Stock piles of loose materials like sand will be covered to prevent them from being washed away by surface runoff into nearby wetland and lake.

**Impact significance after mitigation: Medium**

### 7.3.3 Air pollution

Earthworks, construction material haulage, and vehicle movements on unpaved roads will generate dust and depreciate the air quality. Dust emissions may hamper visibility, cause inconvenience to the local community along transportation routes, cause respiratory illnesses (e.g. silicosis and asthmatic attacks) and eye infections (particularly for workers). Air pollution is also likely to result from ill-serviced fuel-powered machinery emissions and emissions from vehicles involved in site preparation and construction works. Machinery and vehicular emissions can include internal combustion engine emissions including

carbon monoxide (CO), Sulphur oxides, Nitrogen Oxides, Hydrocarbons, Ozone (O<sub>3</sub>), Specific Particulate Matter (SPM) and Manganese. Machinery and vehicular emissions can cause respiratory and eye infections.

The air quality within the project area was considerably good. PM<sub>2.5</sub> ranged from 1µg/m<sup>3</sup> to 18µg/m<sup>3</sup> while PM<sub>10</sub> ranged from 2µg/m<sup>3</sup> to 47µg/m<sup>3</sup> implying low dusty emission levels within the project area.

However, the level of works and machinery involved will be low, the distance travelled on the marram road will be about 26km especially and the duration of excavation works will be short to temporary in nature. The immediate sensitive receptors will be to the nearby local community along marram roads, and workers at the construction sites that will be exposed to dust from mixing of construction materials like sand and cement. The extent of this impact will be localized and the duration will be temporary in nature. The magnitude of the impact is expected to be very low and receptor sensitivity low as the project vehicles are expected not to change the baseline air quality substantially.

**Impact significance before mitigation: Moderate**

**Mitigation Measures:**

- Dusty areas will be sprinkled with water to suppress dust emissions;
- Personal protective equipment (PPE) like dust masks will be availed to workers whenever needed;
- Regular servicing of vehicles and machinery likely to produce excessive gaseous emissions will be done.
- The speed of haulage trucks and other vehicles shall be limited to 30km/hr to reduce dust emission along marram roads.
- Trucks transporting materials likely to emit dust will be covered with tarpaulins to prevent dust emission.
- All idle equipment or machinery shall be turned off to minimize on gaseous emission.
- On completion of construction works, unpaved areas as a result of the project will be restored by planting trees and grass;

**Impact significance after mitigation: Minor**

**7.3.4 Noise emission and vibrations**

Construction activities such as excavation works will increase noise and vibrations levels in the areas surrounding the project site. Haulage vehicles delivering construction materials on site and transporting waste material off site, construction machinery (bull dozers, caterpillars, concrete mixers, graders, and excavators) and construction supporting machinery such as generators etc. can also generate reasonable amounts of noise if ill-serviced.

The baseline noise of the project area was synonymous to that generated from urban areas ranging from Leq (T) 40.6 dB (A) to Leq (T) 70.5 dB (A) and the velocity of vibrations ranged from 0 to 3.5mm/s. The noise levels were mainly attributed to background traffic, wind, birds, people conversations and, automobiles.

Construction vehicles will also increase on the existing baseline noise and vibration levels within the project area. Increase in the prevailing noise levels can cause discomfort to the neighbouring people, and construction workers. The impact of noise emission and vibrations will be limited to the site neighbourhood (in a radius of 200m from site) and temporary in duration with a medium magnitude and moderate receptor sensitivity since the project area is relatively densely populated.

**Impact significance before mitigation: Moderate**

**Mitigation Measures:**

- Regular servicing, maintenance and appropriate repair of haulage vehicles and construction machinery with a potential to generate noise will be done.
- Appropriate PPE (ear muffs or plugs) will be provided to workers at the work site and the contractor will be advised to ensure that wearing of the ear protection device by workers is mandatory; especially for those who work close to the noisy machines.
- Construction, excavation activities, and movement of project vehicles will be limited to day time (6:00am to 7:00pm) since the noise impact is less felt during day than night time.
- The speed of project vehicles will be limited to 30km/hr to help minimize noise and vibration emission. To ensure adherence to the set speed limit, speed humps will be put in place where necessary along construction routes and penalty systems introduced.
- Since the impact of noise increases with increase in exposure time, the work schedules for workers will also be designed to limit the exposure time. No worker will be exposed to noise level greater than 85 dB (A) for a duration exceeding 8 hours per day as stated in the National Environment (Noise Standards and Control) Regulations, 2003.
- Machinery emitting vibrations will be placed on concrete plinth to help reduce on the amount of vibrations emitted to the surrounding environment.
- Noise and vibration monitoring will be done where necessary.

**Impact significance after mitigation: Minor**

### 7.3.5 Water contamination due to use of chemicals and oil spills

Contamination of surface water bodies during the construction phase of the project is possible in the following cases:

- i. Oil spill in case of poor storage of construction material such as oil, fuel and solvent, and or poor equipment and vehicles maintenance
- ii. If contaminated water is discharged during the earth works
- iii. If vehicles or equipment wash down water is discharged
- iv. In case of improper management of construction waste
- v. In case of improper management of storm waters, etc.

Oils and greases contain hydrocarbons and/or heavy metals such as lead, chromium and cadmium, which are known domestic water pollutants.

The level of surface water contamination risk on construction phase will depend on implementation of environmental management measures by the construction contractor as well as waste management and machinery maintenance quality.

Considering the scale of this project; The extent of the pollution will be local since the system source is Lake Kyoga, the magnitude of this potential impact is rated as low, duration as short term, and the receptor sensitivity as high due to implications resulting from surface water pollution.

**Impact significance before mitigation: Moderate**

**Mitigation Measures:**

- The contractor should ensure that all vehicle and equipment are regularly maintained to avoid oil or fuel leakages
- Vehicles / equipment and potentially polluting materials should be located less than 50 meters away from surface waters (where it is possible). If this is not possible, the permanent control and safety measures should be implemented in order to prevent water pollution (especially within the construction site)
- Washing of project vehicles and equipment in water courses should be prohibited
- Drainage / water channels should to be arranged throughout the perimeter of potentially polluting sites of wastewater
- The contractor should ensure proper management of generated waste in accordance with the National Environment (Waste management) Regulations, 2020.
- Ensure proper decommissioning and rehabilitation of all sites that potentially contain polluting material
- In case of spillage of oil/lubricants, spilled product should be localized / cleaned
- The contractor should conduct regular training and sensitization of workers on pollution prevention.

**Impact significance before mitigation: MINOR**

### 7.3.6 Sanitary waste disposal

All construction sites, however few the number of workers on site have facilities for proper sanitary waste management, short of which could lead to indiscriminate dumping of sanitary waste which can culminate into healthy issues, including outbreak of diseases such as cholera, dysentery and diarrhoea. Up to 50 workers are expected on site during the construction phase. Considering best industry practices, there's a low possibility of workers to practice indiscriminate dumping of sanitary waste; nevertheless, the impact would be localised to the area and temporary in nature. However, indiscriminate dumping of human waste can have overreaching impacts such as cholera out breaks which can easily claim people's lives.

The sensitivity of local communities in Uganda to water borne diseases can be very high due to low treated water coverage across the country as indicated by various reports of water borne disease

outbreaks. The sensitivity of the site to effects of indiscriminate human waste disposal is very high since there are nearby surface water sources which are used by local communities as a source of water for domestic purposes.

**Impact significance before mitigation: Moderate**

**Mitigation Measures:**

- Workers shall be made aware of the available sanitary facilities and their locations.
- Mobile toilets will be used along the pipeline corridor.
- Permanent sanitary facilities will be put in place at the water treatment facility to cater for the operation phase of the project, as these will be used by security guards and operators at those installations.
- During the operation phase, septic tanks will be emptied periodically by licensed cesspool for treatment and disposal at Serere sewage treatment facility.

**Impact significance after mitigation: Minor**

**7.3.7 Aesthetics, visual intrusion**

Site preparation and construction phase activities such as vegetation clearance, earthworks, and waste accumulation on site will depreciate the natural scenery and visual impression of the project site. However, after the construction phase of the project, the visual scenery of the project site will improve due to improvement of the infrastructure. A number of wastes including construction debris, comprising of stone, metal, pipes, wood and grass waste will be associated with the project. Heaping up, scattering and generally improper disposal of this waste could depreciate the scenery and natural beauty of the area. Gullies created (if any) as a result of erosion will also depreciate the visual impression of the area where the gullies will be created if appropriate mitigation measures are not implemented. The visual impact on the surrounding environment is expected to have a low magnitude and very low sensitivity considering the site environs are characterized as built environment and due to the fact that the water transmission lines will be buried into the ground.

**Impact significance before mitigation: Moderate**

**Mitigation Measures:**

- Clearing of vegetation will be limited to only the area where it is absolutely necessary for construction works.
- On completion of construction works, any areas that were cleared of vegetation but are not paved will be planted with grass and/or trees indigenous to the area.
- The woody waste will be given to the neighbouring local community for use as fuel wood.
- During site reinstatement, top soil removed from the project site during site clearance, excavation, and trenching will be used in landscaping and the area will be planted with grass and trees indigenous to the site.

- Water pipelines will be buried into the ground and thus reduce on the visual aesthetics of the project landscape once construction works are done.

**Impact significance before mitigation: Minor**

**7.3.8 Occupational health and safety of workers**

Construction will involve excavations, trenching, compacting works, working with cement, welding, and wood-work and working at height among others. Workers will be exposed to various forms of hazards including wastes, dust, noise, vehicle emissions, and possibility of accidents, injuries, and exposure to communicable diseases including HIV/AIDS.

About 50 workers will be contracted to work for the proposed project. These will be involved in a range of activities including offloading materials from trucks, actual construction activities, lifting, trenching and excavation works, welding, excavations and driving among others. There is also a high possibility that machines will be employed for example generators, compactors, graders and excavators, which will pose a risk for injuries to workers.

In the event that no mitigation measures are in place, the construction site with all its features presents a hazard to the health and safety of workers and the local community. Nevertheless most of the potential hazards are avoidable although minor injuries have been reported to be inevitable at most construction sites. These may include shallow cuts and bruises. Deaths have been reported at construction sites within Uganda, the probability of this occurring is really low considering that in most cases, death has occurred at sites due to other reasons mainly pertaining to inappropriate architectural drawings being adapted in areas other than those where structures were originally intended to be constructed or lack of supervision, adherence to building standards, and poor cement to sand ratio. There are also cases of failure of mechanized equipment. Occupational safety and health (OSH) impacts will be limited to the work site and the exposure to these impacts will be short term in nature since the construction period is estimated to last for less than one year. The magnitude of the OSH related impacts is expected to very high since about 50 workers will be employed onsite. The sensitivity of workers to OSH impacts is rated as very high because of continued reports of injuries and fatalities at construction sites in Uganda and due to lack of awareness about occupational safety and health among most construction workers in Uganda.

**Impact significance before mitigation: Major**

**Mitigation Measures:**

- The contractor and supervising engineer shall ensure that all construction workers are oriented on safe work practices and guidelines and ensure that they adhere to them. The contractor will conduct toolbox meeting every morning before work commences
- Adequate and appropriate personnel protective gear will be provided to the employees. A risk assessment shall be conducted and the appropriate gear provided. This shall be replaced whenever worn out.



- Construction sites; especially water treatment plant and reservoir sites shall be hoarded off to prevent access by unauthorized person
- The contractor shall recruit a qualified Health and Safety Officer to oversee OHS matters on a daily basis.
- Clear communication line will be set between workers and operators/ drivers of heavy equipment.
- All construction sites shall be provided with first Aid kits fully equipped with the necessary materials; and a first aider shall be trained to administer it.
- Appropriate signage will be used to warn staff and/ or visitors that are not involved in construction and operation activities in risky places.
- Strict instructions will be given to drivers and operators of equipment/ machinery.

**Impact significance after mitigation: Moderate**

**7.3.9 Community health and safety**

The various project activities, including site clearance, excavations, waste disposal including waste, transportation and construction, and increased population due to direct and indirect employment opportunities are likely to increase community exposure to associated risks and impacts. There is also the possibility of increased exposure to diseases due to project activities, including malaria, bilharzia, HIV/AIDS, respiratory diseases, water-borne diseases such as cholera, water related, and other vector borne diseases. The increased numbers of new persons in the project area can lead to increased crime and thus disrupt the security of the area.

The impacts will be local (affecting all project area villages) lasting the construction phase, thus the magnitude medium. The sensitivity to these impacts is considered medium considering the health facilities and infrastructure already in place.

**Impact significance before mitigation: Moderate**

**Mitigation Measures:**

- A traffic management plan will be developed– to spell out transportation routes to be used, safety features along the routes including features to slow down traffic, speed limits, and safety signage, sensitization of the community and drivers, and minimum standards for drivers.
- A grievance mechanism should be put in place to address complaints regarding the conduct of project workers and other complaints towards the project.
- Undertake HIV/AIDS awareness campaigns among project workers and the local community members.
- Ensure that dusty roads within community areas are sprayed with water before being used by project vehicles.
- Put in place flag men/women to direct traffic where necessary to avoid accidents to the local community;

- Put in place safety signage at community areas that have a high risk of road accidents like densely polluted areas and narrow roads.
- Ensure proper waste management and disposal of waste at designated facilities.
- Give way to community traffic and ensure speed limits of project vehicles are enforced.
- Ensure that project vehicles use designated project routes.

**Impact significance after mitigation: Minor**

**7.3.10 Solid and hazardous waste management.**

Various construction activities such as material stockpiling and earthworks among others will result into generation of construction waste. Further, substantial amount of domestic waste will also generate from workers camps. Examples of this waste includes domestic waste, excavated material, vegetation waste and general construction waste. Improper disposal of these wastes may obstruct water flow resulting in reduction in water carrying capacity of the water body. Indiscriminate disposal of domestic waste may cause filthy smell and harbour disease causing vectors resulting in health problems to workers and local residents.

Impact Evaluation: Such wastes generated do not only contaminate the environment but also cause diseases among the community and render some soils infertile. Excavated materials and residual wastes may give rise to impacts during their handling, temporary stockpiling or storage on site, transportation and final disposal. Heaping of debris affects the aesthetics of the area and leads to accidents like cuts from sharp objects. This impact is mainly short-term occurring during the construction phase. The extent of this impact will be limited to a small area and the magnitude is anticipated to be low, with about 20 tons of excavated earth/soil expected to be stripped off the proposed sites. Up to 50 workers will be involved, thus waste generated is considered low.

**Impact significance before mitigation: Moderate**

**Mitigation Measures:**

- Some of the excavated soil will be used in site levelling and restoration works during landscaping.
- Waste will be appropriately segregated into categories such as non-hazardous or potentially hazardous, metal, plastics, biodegradable, non-biodegradable etc.
- Well labelled waste bins with lids to cater for solid waste will be strategically located within the project site for use in waste collection.
- A licensed waste collector is to be contracted to collect and dispose of domestic waste, and any forms of hazardous waste from the site.
- Waste minimization will be emphasized and implemented throughout all stages of construction and operation.
- Waste shall be removed from the site in a manner consistent with national regulations (for example, transporters shall be licensed).
- While transporting waste, care will be taken to prevent it spreading to areas outside the site boundary.

- Waste will be regularly collected from the site by a contracted licensed waste collector to be disposed at designated sites. Waste consignment forms/transmittal to be kept on record.
- Solid waste will be disposed of at designated sites/landfills to avoid land pollution.
- Workers shall be made aware of the available sanitary facilities and their locations.
- Regular inspection of the site to identify sanitation non-conformances and ensure timely re-address will be done.
- Avoid or minimize the generation of waste materials, as far as practicable, as per the waste management hierarchy outlined below; Identify where waste generation cannot be avoided but can be minimized or where opportunities exist for, recovering and reusing waste; and Where waste cannot be recovered or reused, identify means of treating, destroying, and disposing of it in an environmentally sound manner

**Impact significance after mitigation: Minor**

**7.3.11 Damage to other utility service installations.**

The visible utility services in the project area include electricity and communication lines. When laying the transmission and distribution pipe network, there may be some disruptions in the supply of these utilities which may affect users.

Receptors; households, businesses and institutions like schools, health centres among others.

Generally, this impact is of medium significance. The magnitude of the impact is considered medium and the sensitivity of the third party installations is considered to be high due interruptions that can be caused by damage to these installations.

**Impact significance before mitigation: Moderate**

**Mitigation Measures:**

- Timely planning of relocation following an approved utilities relocation plan.
- Timely communication and notification of affected communities regarding planned relocation works.

**Impact significance before mitigation: Minor**

**7.3.12 Temporary loss of access to homes and businesses**

Laying of transmission pipes along the road reserves may result into temporary blocking of accesses to homes, private properties and social facilities. The practice results into considerable disruption of economic and social activities in the project area.

**Receptors:** homes, schools, health facilities

This impact is negative, moderate, short and medium term, reversible.

**Impact significance before mitigation: Moderate**

**Mitigation Measures:**

- All works should be carried out in accordance with an approved method statement

- Temporary accesses should always be provided wherever an existing access is affected.
- Existing accesses should be restored after works, or convenient alternatives provided.

**Impact significance before mitigation: Minor**

**7.3.13 Risk of increased spread of COVID-19**

Construction of the water and sanitation system will involve workers and service providers who will inevitably interact with the community within the project area. These interactions will create a conducive environment for the spread of COVID-19 and other contagious diseases. COVID-19 is a new virus that causes a respiratory illness in people and therefore no population-level immunity exists. The country has seen emergence and entry of different variants. Interactions among workers and between workers and local community presents a risk of transmission of the virus. Given its high rate of transmission and fatal effects, the intensity and sensitivity of this impact is high. Impact significance is therefore major.

**Impact Receptors:** Project workers, general population

**Impact significance:** The likelihood of the impact occurring is high. The duration of the impact will be long-term during construction therefore the intensity of the impact is assessed as high considering that transmissions can continue even after project construction. This results in major impact significance.

**Mitigation Measures**

- Adequate soap and water shall be provided at the site to ensure workers and visitors wash their hands frequently.
- The contractor shall continuously sensitize the workers on ways of preventing the spread of COVID-19. Such communication shall form part of the daily toolbox talks
- The contractor shall provide washable masks to all workers and visitors and enforce always wearing of the same while at the worksites
- Screening of all workers and visitors for signs of COVID-19 such as temperature shall be done before they access any work site.
- The contractor shall adhere to all measures and guidance issued by the Ministry of Health and presidential directives

**7.3.14 Misconduct of workers**

Construction workers, especially on electricity and water supply projects, are usually associated with obscene language while carrying out their work. Once introduced into the community, these can be picked up by children, in the long run leading to moral decline. Much as workers, especially casual labourers will be sourced from within the project area, there might be some foreign workers on the project who usually come with different habits such as obscene or/and abusive language, rape, disrespect to community norms and promiscuity.

Sensitivity is medium because construction workers will interact with community members, especially residents living in the immediate neighbouring community to the project site. Impact Intensity is rated

medium since due to the linear nature of some components of the project, i.e., transmission and distribution lines.

**Impact significance before mitigation: Moderate**

**Mitigation Measures**

- i. All construction workers will be sensitized about responsible behaviour with the communities.
- ii. Workers prohibited from interaction with students.
- iii. The contractor should involve local (LC) leaders in labour recruitment to ensure people hired have no criminal records and that no children below 18years are hired
- iv. Prioritise recruitment of workers from the project area
- v. MWE together with the Town Council/Sub county and District CDO will follow up any grievances from the community and the schools.
- vi. A register of all construction workers shall be maintained with local authorities to aid in tracking cases of child neglect
- vii. Workers shall sign a code of conduct that addresses the risks of sexual harassment, drug and substance abuse, and other social ills
- viii. A workers' Grievance redress mechanism shall be established and operationalized

**Impact significance before mitigation: Minor**

**7.3.15 Traffic disruption**

During the construction period, there will be an increase in vehicular traffic along community access roads and other district by vehicle/trucks transporting materials to and from the project sites. This will interfere with the normal traffic movement.

The impact due to disruption of traffic is expected to be temporary in nature and localized to the area near the project sites especially during laying of water transmission mains, the magnitude of this impact is rated as low since fewer project vehicles will be required, and the sensitivity of the project area to this impact is expected to be low considering the low level of traffic already existing within Serere district.

**Impact significance before mitigation: Moderate**

**Mitigation Measures:**

- Clearly visible traffic signs like adjoining road or people at work, reduce speed now shall be put in place near project sites.
- Speed reducing humps shall be put in place where practical, to enable drivers reduce speed along the access road to site.
- Flag men/women will be deployed to direct traffic especially in places where heavy trucks will be turning, loading or offloading.
- The speed limit of project vehicles shall be limited to 30km/hr and give right of way to other motorists within the project area.

- Where necessary, a vehicle tracking system with a GPS enabled feature will be installed in project vehicles to track movement of project vehicles and travel speeds.
- A traffic management plan will be put in place to control movement of project vehicles.
- Drivers will be inducted in road safety and defensive driving;
- Liaise with traffic police for better traffic control and management where necessary.
- Project drivers will give right of way to other road users.
- A traffic management plan indicating the routes to be used by project vehicles will be developed.

**Impact significance after mitigation: Minor**

## 7.4 Anticipated impacts during the operation phase

### 7.4.1 Water Quality and Quantity

Contamination of surface and underground water quality by wastewater and hazardous materials, including stored chemicals products, used for raw water treatment. Risk of water pollution as a result of discharge of wastewater and filterwashing waters and over-pumping of groundwater.

Water abstraction may lead to deterioration in water quality and quantity. Reduction in base-flow of groundwater to surface waters leading to a reduction in river flow may lead to migration of fish and other organisms. Also exacerbation of low levels of water in the lake has the potential to damage the ecology of rivers and associated wetlands. The sensitivity of the receptor is medium.

Receptor: Lake Kyoga

**Impact significance before mitigation: Moderate**

#### **Mitigation Measures:**

- Acquire a water abstraction permit from DWRM
- Regular monitoring of water quality at the abstraction point
- Construct silt traps upstream from the water supply intakes
- Regular maintenance of the intake point to remove surplus deposits of silts and debris
- Plan and set up on-site sanitary facilities for the disposal of wastewater.
- Maintain vehicles, machinery and equipment in good condition in order to avoid leaks and spill of hazardous materials (hydrocarbons, chemical products, etc.).
- Ensure a safe management of hazardous materials (hydrocarbons, chemical products, etc.).
- Take all precautions during the refuelling of vehicles and machinery, and forbid the refuelling near water bodies. Avoid crossing permanent waterways; if necessary, locate the crossing where the banks are stable and the waterway the narrowest. Conserve the vegetation along water bodies and near wetlands.
- Plan emergency response measures in case of accidental spill.
- Adjust the annual pumped water volumes in accordance with the aquifer annual refill.

**Impact significance after mitigation: Minor**

#### 7.4.2 Occupational health and safety of workers

During operation and maintenance of the water supply facilities, occupational health and safety problems may arise. Workers at the facilities might experience negative health impacts, particularly during operation of the chemical equipment like chlorine powder, injury while working with the electrified cables as well as potential falls due to slippery surfaces and falls into open water tanks.

Considering few workers will be engaged during operations, the magnitude of impact is assessed as low. The sensitivity is considered moderate given the incidences that can arise if no mitigation measures are in place. This impact will be limited to the operation facilities and maintenance areas and its magnitude is anticipated to be low. Occupational health hazards will be exposed to everyone at the WTP thus the sensitivity of the receptors will be medium.

**Impact significance before mitigation: Moderate**

#### **Mitigation Measures:**

- The developer should put in place an Occupational Health and Safety Management Plan, addressing all work place OHS issues in line with the Occupational Health and Safety Act.
- All workers should be provided with appropriate and adequate PPE
- An Emergency Preparedness and Response Plan should be put in place to address emergency issues, including flood risks.
- Put in place required resources and responsible personnel for managing OSH issues.
- Put in place evacuation plans, communication protocols and an emergency assembly point.
- Provide medical insurance for all workers.
- Guardrails will be put in place around high risk areas;
- Undertake pre-job risk assessments;
- Provide a safety induction training course for all workers to ensure that they are fully aware of the OSH hazards and ways to avoid/minimize them.
- Provide a safe escape/evacuation route for workers in case of any emergencies.
- Train workers in emergency and incident response;
- Put in place appropriate safety signage at the plant structures;
- Put in place First Aid kits for use during emergency;
- Undertake periodic medical examination of workers including pre-employment medical tests;
- Develop an HIV/AIDS program and undertake periodic awareness and sensitization of workers about HIV/AIDS.
- Use the lightest tools for any given job.
- Conduct regular tool box meetings.
- Obtain all necessary permits and approvals from relevant authorities, including work place registration permit from department of Occupational Health and Safety.
- Establish emergency entrances, exits and amenities;
- Ensure mechanical aids are used for movement or placement of heavy loads to prevent skeletal strains on workers;

- Ensure safe working heights through provision of work platforms, scaffolds and adequate supervision.
- Ensure proper record keeping of incidents at the workplace.
- Put in place pre-job permits for maintenance works.
- Put in place an emergency assembly point within the water treatment plant premises.
- Ensure that workers use ear plugs at the pumphouse where noise levels are considerably high.

**Minor Impact significance after mitigation: Minor**

#### **7.4.3 Solid waste management and disposal**

During the operational phase of the project, solid waste will be generated by workers at the water treatment plant and these may be composed of rubbish, food leftovers, papers, packaging, and sweepings from the premises. Storm water from the facility must be well disposed to avoid contamination of nearby water sources like Lake Kyoga. Disposal of sewage waste will be another issue of concern to address during the operational stage of the water treatment plant.

**Impact significance before mitigation: Moderate**

#### **Mitigation Measures:**

- Ensure solid waste is segregated into hazardous and non-hazardous waste by installing coded waste collection containers to allow for proper disposal.
- Solid waste generated from the operational phase of the water treatment facility will be disposed of to a designated waste disposal site within Serere district.
- Water borne toilets will be constructed and connected to concrete lined septic tanks with a soak away pit system.
- Separate toilets for men and women must be made available and labelled appropriately.
- Septic tanks will be periodically emptied by a licensed cesspool provider to designated sewage treatment facility.
- Ensure that toilets are kept clean at all times and have soap, running water and toilet paper, and that there is full time cleaner to ensure hygiene.
- Hazardous waste to be collected and disposed of by a licensed waste handler in line with the National Waste Management regulations.

**Impact significance after mitigation: Minor**

#### **7.4.4 Natural hazards, including floods that may damage the intake, storage tanks and water pipes**

Structural damage to in-stream water supply intakes may be caused by flooding and earthquakes. Intake structures should be designed to standards that consider damage by extreme natural forces. Also, intake head works may become blocked and filled with silt and debris due to flooding, landslides and soil erosion. Bursting of the water supply pipes might occur due to high pressure and damage by the locals who cultivate crops along the water pipeline corridor. The extensive nature of distribution systems increases their risk to natural hazards such as earthquakes, floods, cyclones and landslides. Pipeline failures and



leakages are common results of natural hazards. Thus water is wasted and does not reach the areas where it is required. Earthquakes may also cause structural damage to storage facilities that may result in either failure or leakage

**Impact significance before mitigation: Moderate**

**Mitigation Measures:**

- Construct Silt traps upstream from water supply intakes.
- Properly constructed infiltration galleries installed in-stream or adjacent to alluvial streams which may not be affected by flooding and debris caused by natural disasters
- Regular maintenance to remove surplus deposits of silts and debris.
- Ground movements following earthquakes may affect groundwater wells, boreholes and galleries causing them to collapse, damage pipe work and change alignment. Changes to water quantity and quality may result and these should be closely monitored
- The use of an appropriate pipe material can minimise breakages. PVC pipes should always be buried while steel pipes are most suited for out-of-ground use.
- Periodic maintenance of all types of valves is important for the efficient operation of a water supply system.
- Pipelines are susceptible to natural hazards and should be examined after major events to ensure their integrity
- It is good practice to monitor storage levels or volumes to account for changes. For example a broken water main or damage to the reservoir may cause a sudden unexpected decrease.
- Note that access to storage facilities should be controlled and restricted to authorised personnel thus avoiding possible man-made disasters
- Storage tanks should be covered to protect freshwater from contamination and evaporation.

## 7.5 Negative impacts during decommissioning

### 7.5.1 Demolition waste

The major problem resulting from demolished debris not being managed well is being washed away into the river and also wind migrating it to community, turning into a nuisance to the public. Also, it would have health implications on the employees too. This impact will be limited to the duration of the demolition and if the measures recommended are implemented, the impact will be kept negligible consequences and low risk.

**Proposed mitigation measures:**

- Generated waste that can be re-usable will be sold or given away to interested parties for re-use especially timber, metals or bricks.
- Waste generated will be taken off the site immediately to reduce any exposure to weather changes that could lead to erosion in rain.

- The contractor to ensure proper waste management practices and timely collection/disposal of generated waste to avoid piling waste/debris at the site.

### 7.5.2 Noise and vibration

The major concern will be with the noise from the demolition activities, equipment, and noise produced by the crumbling structures.

#### **Proposed mitigation measures:**

- Manual labour will be applied as much as possible
- Unless exceptional circumstances warrant, working at night shall be prohibited to avoid causing any sort of inconveniences to the nearest residents.
- Equipment used should be in good mechanical condition and thus generate less noise

### 7.5.3 Deterioration in ambient air quality due to dust emission

The demolition activities are bound to raise dust during this phase and it will affect the quality of the air at the site and possibly the vicinity of the site due to trucks and excavators in operation. The fumes from the operating equipment will also add to the unpleasant atmosphere. If unmitigated, the conditions created can lead to people acquiring breathing complications, flue, nausea, lung complications from carbon-monoxide inhaled, among others.

#### **Proposed mitigation measures:**

- Equipment used should be in good mechanical condition to avoid pollution of air;
- Nose masks will be provided as deemed necessary;
- Wetting of rubble and debris to limit raising dust.

### 7.5.4 Occupational safety concerns

During decommissioning, there are safety threats to both the workers and the public especially injuries from poorly managed rubble, falling debris, inhaled dust particles or excessive noise. This impact affects a limited area involving workers on onsite and the immediate neighbourhood. It's a temporary impact with substantial consequences.

#### **Proposed mitigation measures:**

- Implementing good house-keeping practices, such as the sorting and placing loose construction materials or demolition debris in established areas away from footpaths;
- Wearing appropriate PPE, such as safety glasses with side shields, face shields, hardhats, and safety shoes;
- Installing caution signage around the site to discourage the public from being close to site, for example, "falling debris", "keep off the site" etc.
- Follow all measures recommended by the risk assessment done before commencing the works.

#### 7.5.5 Loss of employment

It's consequential that after decommissioning, there will be no more work for some staff and this could lead to frustration. Decommissioning could be result of various reasons including failure to sustain business or change of business, political reasons and/or laws and regulations changing.

#### **Proposed mitigation measures:**

- If predictable, notification will be given to employees as soon as is practical so that they are prepared to seek employment elsewhere;
- Employees will be encouraged to explore various skills including agriculture so that even in the case of loss of the job, they can survive;
- Employees should be encouraged to save monthly.

#### 7.6 Residual Impacts

Upon successful implementation of the environmental and social management plan to address the environmental and social impacts of the project, most of the residual negative impacts are expected to be either small or minimal with a few exceptions like impacts on occupational health and safety and the public and cumulative impacts.

## 8 STAKEHOLDER IDENTIFICATION AND ANALYSIS

Public participation was encouraged throughout the process of conducting the ESIA study as recommended by regulation (16) of the National Environment (Environmental and Social Assessment) Regulations, 2020 – for Uganda. The environmental and social assessment team sought the views of the people neighbouring the different project component sites to inform the project affected persons about the project and capture their concerns.

### 8.1 Objectives of the stakeholder engagement

The main objectives for stakeholder engagements were;

- To inform the relevant stakeholders about the proposed project;
- To capture views and concerns of the relevant stakeholders with regard to the proposed project;
- To enhance ownership of the project by the relevant stakeholders and the host community;
- To provide a basis for stakeholder participation in impact identification and mitigation.

### 8.2 Stakeholder identification and analysis

Stakeholder consultations were carried out to obtain views and concerns about the proposed project, and identification of the most suitable approaches for implementation of the proposed development. Key stakeholders were identified and engaged during the process of conducting the ESIA study, and these included the Local community neighbouring the proposed sites, the LCI chairpersons, the Serere district, town council and sub county environment officers, the engineers and planners.

### 8.3 Methodology for stakeholder engagement

Qualitative methods such as key informant interviews (KIIs), informal conversational interviews (IIs), Telephone interviews, online meetings, and formal meetings were employed in gathering views and concerns of the stakeholders.

**Table 8-1: Stakeholder engagement and analysis**

Stakeholder	Project Interest	Information Requirements	Engagement Mechanism	Timing
Neighbouring local community and Local leadership	Views and concerns regarding the proposed project.	Anticipated impacts from the proposed project.	One on one informal discussions with project affected persons and LCI chairpersons.	08 <sup>th</sup> September 2022
Serere district and Serere Town officials	Disclosure of the proposed project  Area land use	Land use plan for the area  Baseline environmental	Formal meeting.	7 <sup>th</sup> & 8 <sup>th</sup> September 2022

Stakeholder	Project Interest	Information Requirements	Engagement Mechanism	Timing
	<p>Approval process of the project.</p> <p>Concerns related to the project.</p>	<p>economic &amp; social information</p> <p>Project sitting and approval requirements.</p> <p>Safety measures required in project implementation</p> <p>Views and concerns about the proposed project</p>		
<p>Kasilo Town Council</p>	<p>Disclosure of the proposed project</p> <p>Area land use</p> <p>Approval process of the project.</p> <p>Concerns related to the project.</p>	<p>Land use plan for the area</p> <p>Baseline environmental economic &amp; social information</p> <p>Project sitting and approval requirements.</p> <p>Safety measures required in project implementation</p> <p>Views and concerns about the proposed project</p>	<p>Formal meeting.</p>	<p>8<sup>th</sup> September 2022</p>

Stakeholder	Project Interest	Information Requirements	Engagement Mechanism	Timing
Bugondo sub county	<p>Disclosure of the proposed project</p> <p>Area land use</p> <p>Approval process of the project.</p> <p>Concerns related to the project.</p>	<p>Land use plan for the area</p> <p>Baseline environmental economic &amp; social information</p> <p>Project sitting and approval requirements.</p> <p>Safety measures required in project implementation</p> <p>Views and concerns about the proposed project</p>	Formal meeting.	8 <sup>th</sup> September 2022
Kidetok RGC	<p>Disclosure of the proposed project</p> <p>Area land use</p> <p>Approval process of the project.</p> <p>Concerns related to the project.</p>	<p>Land use plan for the area</p> <p>Baseline environmental economic &amp; social information</p> <p>Project sitting and approval requirements.</p> <p>Safety measures required in</p>	Formal meeting.	8 <sup>th</sup> September 2022

Stakeholder	Project Interest	Information Requirements	Engagement Mechanism	Timing
		project implementation  Views and concerns about the proposed project		
Directorate of Water Resources Management – DWRM (part of the Ministry of Water and Environment).	Ground water abstraction.  Disclosure about the proposed project.	Water abstraction permitting.  Discharge permit for backwash water from the treatment plant.	Formal meeting	
Telecommunication companies	Disclosure about the proposed project.	Concerns about the proposed project	Formal meeting	
UNRA	Disclosure about the proposed project.	Permission to use the road reserve	Formal meeting	

#### 8.4 Summary of stakeholder views and concerns

Views and concerns raised by the project stakeholders and the general public are detailed in Appendix 4 and summarized in Table 8-2 below. The list of stakeholders consulted is provided in Appendix 6 of this report.

#### 8.5 Stakeholder views and concerns

Issues and questions raised by stakeholders during meetings were recorded in minutes during the scoping and ESIA phases (see Appendix 4).

Views and concerns raised by stakeholders were summarized in Table 8-2 below;

**Table 8-2: Summarized Views and concerns raised by stakeholders**

<b>Key issues of concern raised by stakeholders</b>	<b>Narrative description of the issues raised</b>	<b>Remarks</b>
Traffic disruption	The developer should find measures to control traffic effectively since there are many road users.	The developer will put in place a Traffic Management Plan which will be followed
Safety of workers during construction and operation.	Workers will be exposed to a number of risks during project implementation	Provide proper and adequate Personal Protective Equipment to all workers like safety shoes, ear muffs and nose masks among others. Train, supervise, enforce and ensure usage of PPEs for compliance. Ensure proper signage
Child labor	Children may be employed to work as casual laborers during construction.	Child labour should be discouraged throughout the project implementation period.
Noise and vibrations	Noise is likely to affect peoples in communities where the project will be implemented especially during construction.	Noise abatement measures should be used to control noise. Limit construction, excavation activities, and movement of haulage vehicles to day time (7:00am to 7:00pm) since the noise impact is less felt during day than during the night.
Dust emission from transportation trucks	Dust is likely to affect people in communities where he proposed project will be implemented. Dust suppression measures should be adopted to control air contamination.	Dust suppression measures shall be adopted to control air contamination
Improper solid waste management.	Ensure that construction waste is properly handled/ disposed off	Provide proper waste management and proper drainage system
Water abstraction permit	Before water abstraction, developer should acquire a permit from DWRM	Acquire a water abstraction permit



Key issues of concern raised by stakeholders	Narrative description of the issues raised	Remarks
Construction permit	In case of construction, developer should acquire a construction permit from DWRM	Acquire a construction permit from DWRM
Permission from Serere DLG	Developer should acquire permission from Serere DLG before project implementation	Before project implementation, developer will request for permission from Serere DLG
Compensation issues	Compensation issues will arise especially for people with crops within the road reserve.	MWE acquired land through the Serere District Local Government (See Appendix 7 for MOUs and Land agreements) and therefore, there are no issues of compensation anticipated.
Thorough sensitization	Thorough sensitization of communities should be done before project implementation	Sensitization will be done before implementing the project
Employment	People in the project area should be considered for employment	Local people will be given priority
HIV and STDs concerns	Bothe the communities and the workers have to be sensitized on issues concerning HIV and STDs.	Sensitization will be done before implementing the project
Deforestation	Measures should be put in place to replant trees that may be cut during project implementation	The project entails afforestation program. A restoration plan will be put in place to ensure trees that may be cut during project implementation are replaced.
Duration of construction activities of concern to communities	When will the project start?	The project shall commence as soon as the developer obtains all the necessary permits and certificate
Audits	Submit periodic reports to the authorities	Environmental audits shall be submitted to relevant authorities
Structural drawings	Submit building plans to the relevant authorities for approval	Building plans shall be submitted
Memorandum of Understanding	Have in place MOUs for all sites to be used or wherever project components shall be located	MWE shall have MOUs for all project sites

Key issues of concern raised by stakeholders	Narrative description of the issues raised	Remarks
Access roads	Maintain all access roads within the project area	Noted
Improved hygiene	Presence of water in the society shall improve the hygiene within the targeted areas	Noted

## 8.6 THE STAKEHOLDER ENGAGEMENT PLAN (SEP)

The Stakeholder Engagement Plan (SEP) describes the planned stakeholder consultation and engagement process for the Project. It outlines a systematic approach to stakeholder engagement that will help MWE to develop and maintain over time a constructive relationship with their stakeholders throughout the duration of the Project.

The SEP will be regularly monitored, reviewed and updated by MWE throughout all stages of Project implementation.

### 8.6.1 Stakeholder Identification and Analysis

Stakeholder groups that may be affected by and/or interested in the implementation of the Project were identified, as well as proposed communication methods and media for each group, presented in the Table below.

**Table 8-3: Project stakeholders**

Stakeholder/s	Type of Communication and Proposed Method	Responsibility	Timing
External stakeholders including UMEME, telephone companies, UNRA, People residing (or using land) and owners of businesses operating in Project affected areas where land has been or will be acquired, as well as areas expected to be impacted by transportation. This includes areas of local	Information delivered to residents / businesses using the land or operating in areas affected by the Project, through community meetings, as well as public notice boards (in Kideok, Bugondo, Kasilo, Kadungulu and Serere T.C) and safety signs.  Local media (newspapers AICERIT & ETOP and radio) ESIS, and SEP published on the	MWE  (Water Sanitation Development Facility –East)  Contractor	Throughout the implementation of the Project, as appropriate at the district local government offices

Stakeholder/s	Type of Communication and Proposed Method	Responsibility	Timing
communities Kideok, Bugondo, Kadungulu and Serere T.C.	MWE website ( <a href="http://www.wsdb.mwe.go.ug">www.wsdb.mwe.go.ug</a> )		
Users of private and public land that will be disturbed during the project implementation.	Public meeting to explain the construction process and its impacts on land as well as the planned compensation measures and how they will be executed. Announced in public notice boards (in Kideok, Bugondo, Kasilo, Kadungulu and Serere T.C) and in local media (newspapers AICERIT & ETOP)	MWE Water and Sanitation Development Facility –East communication team	At least 3 months prior to commencement of construction activities
Local community representatives (L.C I team) for all project areas	Regular communication by phone and through meetings, project progress updates	MWE Water and Sanitation Development Facility –East communication & sociology team	Quarterly
Local government authorities (Kideok, Bugondo, Kadungulu, Kasilo and Serere T.C.), including departments in charge of environment and water	Official correspondence and meetings, project progress updates and reports  Permitting procedures	MWE Water and Sanitation Development Facility –East Contractor during construction	Quarterly
MWE senior management	Regular reporting on project progress, impacts and undertaken measures	Water and Sanitation Development Facility –East	Quarterly, Throughout the implementation of the Project

Stakeholder/s	Type of Communication and Proposed Method	Responsibility	Timing
Interested NGOs and other organisations	Local media (newspapers AICERIT & ETOP and voice of Teso radio, ESIS, ESAP and SEP published on the MWE website	Water and Sanitation Development Facility –East Team	Quarterly, Throughout the implementation of the Project
Relevant national level authorities for example:  • UNRA  • NEMA  • Directorate of Water Resources Management	Official correspondence and meetings, progress reports  Permitting procedures	Water and Sanitation Development Facility –East Team	At least once a month
<b>Internal stakeholders</b>			
Water and Sanitation Development Facility – East employees	Bulletin board Grievance procedure  Code of conduct	MWE	At least twice a year
Temporary construction workers and subcontractors	Information in contract, bulletin board, training.  Grievance procedure.  Code of conduct	MWE	At least once a month

### 8.6.2 DISCLOSURE OF INFORMATION AND STAKEHOLDER ENGAGEMENT

The ESIS, and SEP will be published on the MWE official website, in English. MWE will also provide translations of documents or document sections into Itesot languages widely spoken in the Project affected area.

Water and Sanitation Development Facility –East managers and staff will cooperate with relevant local authorities and departments during project design and throughout the implementation of each Project component. Regular meetings will be held to discuss any issues and progress reports will be submitted by Water and Sanitation Development Facility –East.

Water and Sanitation Development Facility –East Team with the assistance of local authorities and local community councils will ensure that the local population, particularly residents and businesses living or

operating in the vicinity of the Project or using land which may be affected are informed about the project. This particularly pertains to the start-up of construction activities and expected impacts.

An ESIA was also developed in accordance to NEA, 2019 and will be submitted to NEMA for approval. A public consultation process was and will be conducted in accordance to the National Environment (Environmental and Social Assessment) Regulations, 2020.

A meeting will be held with owners and users of private and public land that will be disturbed during construction for the proposed project, at least 3 months before construction begins. The topics to cover will include evaluation of crop and other damages, mechanism for making claims and receiving payment, any land use restrictions as well as expected difficulties in accessing land plots during project implementation.

MWE will create awareness campaigns on hygiene, HIV/AIDS, communicable diseases among others. Communities shall be trained and sensitized on how to use the sanitary facilities to be installed by MWE and be made aware on how to keep safe the installed infrastructure (especially water pipes) and other infrastructure that can be destroyed by local communities.

MWE- Water and Sanitation Development Facility –East will develop annual environmental and social reports which will describe Project impacts, undertaken mitigation and enhancement activities and a summary of processed external grievances. These reports will be provided to all interested stakeholders, including the NEMA.

MWE- Water and Sanitation Development Facility –East in addition to providing water supply system, will provide sanitation facilities including toilets and waste bins within project areas.

## 9 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

### 9.1 Introduction

This ESMMP for the proposed construction works and operation of the proposed piped water and supply project identifies the potential environmental and social aspects that should be managed and monitored. It identifies parties responsible for managing the impact, indicators, the monitoring authority, associated costs and any training or capacity building needs and reporting.

### 9.2 Management Plan Principles

The project is geared towards enhancing social and economic benefits through sustainable water supply. Development of the proposed piped Water Supply and sanitation Project would be expected to comply with the environmental conservation requirements in accordance with the established Ugandan laws and regulations. To realize these goals, acceptability by a majority of the beneficiaries and stakeholders as well as ensuring minimal effects to the physical environment will require to be ensured through participation in the project and continuous consultations, evaluations and review of the design aspects throughout project implementation cycles. It is also recommended that the environmental management guiding principles specific to this project improvement and water resources management be established to allow integration of environmental management considerations during construction and operations.

Among the factors that need to be considered in this particular project implementation will include;

- i. The procedure, materials and equipment used in the construction and operation of the water supply system should ensure low maintenance costs for sustainability;
- ii. Control of soil erosion and siltation of existing surface water sources, incorporation of project components sustainability and operational provisions and the associated components;
- iii. Enhancing integration of environmental, social and economic functions in project implementation;
- iv. The contractors and other players in the project activities be prevailed upon to implement the EMMP through a sustained supervision and continuous consultations, and
- v. Involvement of the community in the project implementation to enhance ownership and capacity building for long term operations of the facility.

### 9.3 The Monitoring and Reporting Arrangements

To ensure effective implementation of the project, monitoring will be done throughout the project life. Monitoring will verify if predicted impacts have actually occurred and check that mitigation actions recommended in the ESIA are implemented and their effectiveness. Monitoring will also identify any unforeseen impacts that might arise from project implementation. The usefulness and effectiveness of this ESIS will only be realized through a systematic monitoring programme. The monitoring plan will inform strategic and outline environmental decision making throughout the project lifecycle. All mitigation actions will be guided by prior actions undertaken on project sites. Monitoring in this phase will be done through site inspection, review of site records (Accident Log, issuance of PPE, waste records,

trainings and inductions etc.), review of grievances logged by stakeholders and any discussions with affected persons (construction workers, residents near the project facilities).

The monitoring team should most particularly check for the following issues among others;

- i. The general cleanliness and good housekeeping in and around the project premises
- ii. The project site preparedness capacity.
- iii. Proper storage, handling and final disposal of the waste generated at the project site.
- iv. Personal protective equipment of the workforce.
- v. Efficient and functional water and sanitation system during construction.
- vi. Check the monthly monitoring reports
- vii. Safety measures put in place
- viii. Number of sensitization meetings
- ix. Work plan updates.

The management structure proposed is expected mostly to address the impact issues arising from the construction and operation phases and it's intended to ensure that compliance pertaining to environmental, health and safety mitigation actions are part of the implementation process for the proposed project.

During operation phase, the project shall be handed over to Serere District Local Government for management and operation and will implement the ESMP. It's hoped that joint decision making will help minimize environmental and social risks and impacts while addressing community grievances and improving welfare and safety aspects of both the workers and the local community.

The contractors should be closely monitored to ensure that all technical (and where possible non – technical) measures are taken into consideration during the construction phase to minimize any likely ecological, social and physical impacts arising from the project's construction works. This can be done in consultation with the project environmentalist, health and safety officer.

### **9.3.1 Role of the developer (MWE) in ESMP implementation**

MWE will be responsible for monitoring the overall subproject implementation, including environmental compliance of the project. MWE will have the final responsibility for ESMP implementation and environmental performance of the project during the construction and operational phases. Specifically, the MWE will:

- (i) Closely coordinate with local authorities in the participation of the community during project preparation and implementation;
- (ii) monitor and supervise ESMP implementation including incorporation of ESMP into the detailed technical designs and bidding and contractual documents;
- (iii) ensure that an environmental management system is set up and functions properly;

- (iv) Be in charge of reporting on ESMP implementation to the NEMA and the AFDB. - In order to be effective in the implementation process, MWE will assign Environmental team (ES) to help with the environmental aspects of the project.

#### **9.3.1.1 MWE Environmental and Social Team (ES)**

The ES is responsible for monitoring the implementation of the project ESMP. Specifically, ES will be responsible for:

- (i) helping MWE incorporate ESMP into the detailed technical designs and civil works bidding and contractual documents;
- (ii) helping MWE incorporate responsibilities for ESMP and supervision into the TORs, bidding and contractual documents for the Construction Supervision Consultant (CSC) and other safeguard consultant as needed;
- (iii) providing relevant inputs to the consultant selection process;
- (iv) reviewing reports submitted by the CSC and safeguard consultants;
- (v) conducting periodic site checks;
- (vi) helping the MWE on solutions to handle social issues of the project; and
- (vii) preparing environmental and social performance section on the progress and review reports to be submitted to NEMA and the AFDB

#### **9.3.2 Role of civil contractor in the implementation of ESMP**

Environment & Social Risks (E&S) are identified in all construction works and the Contractors as well as sub-contractors should be made well aware of the compliance requirement within the environmental and social management plan (ESMP). The key risks to be addressed by the contractor should be identified from the ESIA report. The risks may arise during mobilization or construction phases.

Contractors will be responsible for implementation of all the mitigation actions during the project's construction phase, (where necessary in consultation with the Developer) as prescribed by the statutory permits and approvals as well as in conformity to good practices. The construction phase forms a significant part of the environmental and social risk management.

#### **Contractor (s) will be responsible for:**

- i. Liaising with Project Manager and the Social and Environmental Management Consultant to identify environmental and social issues prior to commencement of work.
- ii. Abide with compliance requirements stipulated in all the permits/licenses and other project related planning documents including the ESMP.
- iii. Ensure that mitigations are incorporated into construction design well in advance.
- iv. Incorporate site specific environmental, health and safety management interventions into the project's construction schedule, for effective implementation.



- v. Engagement of necessary staff to oversee implementation of the ESMP, providing them the necessary technical guidance, orientation and outsourcing any additional expertise to advise the contractors.
- vi. Ensure that the work zones are properly planned to minimise disruption to the public or local communities where the project is to be implemented.
- vii. Ensure that all the site specific staff including the supervisory staff of the contractors understand the content of the contract agreements where the impact mitigation actions are emphasized.
- viii. Ensure that high quality machinery and equipment are deployed for day to day work to maintain required environmental standards (noise/dust emission level).
- ix. Ensuring the provision of necessary and timely resources for the implementation of mitigation actions.
- x. Ensuring that employees engaged by the contractor and sub-contractors and suppliers adhere to the broader objective of accomplishing environmental, health and safety compliances during all stages of project implementation.
- xi. Ensure that site restoration work is completed after the construction stage is over, in accordance with the Project plan and layout and with guidance from the developer.
- xii. Contractors shall hire qualified environmental, health and safety personnel who will implement and oversee the environmental, health and safety requirements on site
- xiii. Induct workers in environmental, social, health and safety aspects.

### 9.3.3 Construction Supervision Consultant (CSC)

- (i) The CSC will assign Environmental and Social Staff(s) and will be responsible for routine supervising and monitoring all construction activities and for ensuring that Contractors comply with the requirements of the contracts and the Environmental Codes of Practice (ECOP). The CSC will engage sufficient number of qualified staffs (e.g. Environmental Engineers) with adequate knowledge on environmental protection and construction project management to perform the required duties and to supervise the Contractor's performance.
- (ii) The CSC will also assist the developer (MWE) in reporting and maintaining close coordination with the local community.

The ESMP identifies monitoring objectives and specifies the type of monitoring, with linkages to the impacts assessed in the impact assessment and the mitigation measures section. Objectives for monitoring during project implementation shall aim at

- Ensuring early detection of conditions that necessitate particular mitigation measures, thus protection of receptors systems.
- Furnish relevant authorities with information on the progress and results of mitigation because progress and impact monitoring are crucial during the construction phase.
- To ensure that proposed mitigation measures and commitments are properly maintained and implemented and that management procedures are being followed.
- To ensure compliance with regulatory standards as well as management system requirements.

Monitoring during project implementation provides information about key environmental and social aspects of the project, particularly the environmental and social impacts of the project and the effectiveness of mitigation measures. Such information shall enable the developer to evaluate the success of mitigations as part of project supervision and allow corrective action to be taken.

Systematic observation of the compliance status of construction related activities namely construction related noise levels, dust emissions, soil erosion and water pollution, public safety and general safety and working conditions of the workers and handling of community grievances are essential. Mitigation measures taken in respect to protecting soil erosion, spoil disposal methods, waste management measures etc. to be adopted by the civil contractor need to be monitored at site level, to ensure that they lead to risk reduction, safety and pollution abatement.

Progress monitoring as well as impact monitoring needs data and information. The information may be collected through regular field visits to visually observe, referring to literature maintained by the project site (labour attendance sheet, accident reports, health reports,), referring to technical drawings and discussion with the workers' / community members (on matters of working conditions/ community conflicts) etc. Aspects such as workers' safety, HIV/AIDS programs and local community grievances shall be subject to monitoring. Monitoring will mostly be done by MWE and Serere district officials, these will guide the contractor on parameters to be measured, methods to be used, sampling locations, frequency of measurements, detection limits (where appropriate), and definition of thresholds.

#### **9.3.4 Role of system operator (operation and maintenance phase)**

After establishment of the project, MWE will hand over the project to Serere District Local Government for operation and maintenance.

Serere District Local Government will oversee all aspects of water system operation, maintenance and monitoring. Assist in repair, testing and disinfection of water mains. Routinely flush and clean water mains. Keep water system plans up to date.

Responsibilities include;

- Operate and maintain well pumps and hydro pneumatic pressure tanks.
- Supervise treatment and assure proper monitoring and control.
- Clean and disinfect storage tanks.
- Protect equipment and facilities from corrosion.
- Monitor pump motors to detect unusual noises, vibrations or excessive heat.
- Adjust and clean pump seals and packing glands and clean mechanical seals.
- Repair and overhaul pumps, motors, chlorinators and control valves.
- Safely handle, store and utilize treatment chemicals.
- Keep records and prepare reports.
- Provide cost data and budget needs to the system owner.
- Perform efficiency tests on pumps, wells and other equipment.

- Troubleshoot and correct minor electrical and mechanical equipment problems.
- Monitor for hazardous atmospheres and confined spaces and correct any problems before entry.
- Conduct safety inspections, follow safety rules and provide safety training.
- Troubleshoot and address water related complaints.
- Discuss with customers their water-related concerns.
- Communicate effectively with owners, employees, customers, regulatory personnel and others.
- Respond to water system emergencies.

### 9.3.5 Monitoring Approach

Monitoring will be carried out by the relevant lead agencies. The following four types of inspections and monitoring will be employed:

- **Inspections** planned and conducted on a regular basis to ensure that mitigation measures and commitments are properly maintained and implemented, and that specific management procedures are being followed (e.g. practices on temporary waste storage and transport).
- **Receptor monitoring** undertaken to verify predictions made in the ESIA and to confirm that the activities at the site are not resulting in unacceptable impacts on receptor systems, including wetlands, water courses or sources, communities or infrastructure (e.g. monitoring air quality, water quality, noise and vibration emissions, and grievances from project affected communities).
- **Compliance monitoring** involving periodic sampling or continuous recording of specific environmental quality indicators to ensure compliance with project standards or regulatory requirements.
- **Auditing** to assess compliance of the project activities with both regulatory and site management system requirements.

The cost of monitoring during construction phase is UGX 293,250,000 and monitoring during operation phase is UGX 28,000,000

### 9.3.6 Penalties for non-conformance with ESMP requirements

MWE will ensure supervision of compliance of the contractor with the Environmental requirements. The ESMP will be updated upon issuance of the NEMA certificate of approval, permits and licenses from lead agencies. Compliance of the contractor will be rated, and a performance rating of less than 70% will attract penalties, including non-approval of payment Certificates.

### 9.4 ESMP Structure

The ESMP is divided into the construction and operation phases and the structure of the ESMP is as presented below;

- Likely impacts/issues;
- A description of the mitigation measures (actions) that the developer will implement;
- Monitoring indicators/tools to be checked during the construction and operation phases;
- Timing for implementation of the proposed mitigation measures;
- The responsible party for ensuring full implementation of the mitigation measures and also monitoring compliance with the ESMP.

The cost of monitoring during construction phase is UGX 293,250,000 and monitoring during operation phase is UGX 28,000,000

Table 9-I: Environmental and Social Management Plan

Issue/ impact	Mitigation measures/ enhancement	Monitoring indicators	Project phase	Responsible party	Mitigation Cost (UGX)
<b>Positive impacts</b>					
Creation of employment opportunities	<ul style="list-style-type: none"> <li>• During recruitment of workers, the local community should be given priority especially for casual work. This will not only financially benefit the project communities but also foster project ownership which is important for project success</li> <li>• All workers should sign contracts with clearly spelled out terms of employment and payments should be fair and prompt.</li> <li>• Opportunities should be given out without discriminating against women and persons with disabilities.</li> <li>• Employment of children should be strictly prohibited on the project. To achieve this, all applicants should present their National IDs to verify their age.</li> <li>• All workers should be provided with adequate personal protective equipment to protect them from occupational hazards.</li> </ul>	<p>Employment of local people</p> <p>Contracts</p> <p>Women and people with disabilities employed</p> <p>Children on site</p> <p>Adequate PPE</p>	During Construction and operation	Contractor  MWE	-

ESIA for the proposed for Water Supply Systems in Serere district

Generation of revenue	<ul style="list-style-type: none"> <li>Operational licenses should be obtained by developer from the town councils once the proposed water supply system is ready for commissioning.</li> </ul>	operation license	Operation phase	Contractor	-
Income to material/equipment suppliers	<ul style="list-style-type: none"> <li>Whenever possible, construction material such as aggregate (stones and sand) should be obtained from the project affected villages to ensure that project communities directly benefit from the construction phase of the project.</li> <li>The contractor should sign agreements with suppliers and ensure prompt payment</li> <li>The contractor should ensure fair, adequate and timely payment of suppliers.</li> </ul>	<p>Locally purchased material</p> <p>Agreements between supplier and contractor</p> <p>Timely payment</p>	Construction phase	Contractor	-
Creation of business opportunities	<ul style="list-style-type: none"> <li>The contractor shall ensure adequate, fair, and prompt payments to local suppliers</li> <li>During the project progress meetings with local community, the local residents will be informed about the project and</li> </ul>	<p>Timely pay</p> <p>Evidence of progressive meetings</p>	Construction phase	Contractor	-

	how their businesses can benefit from the project.				
Improved access to water	<ul style="list-style-type: none"> <li>Water and Sanitation Development Facility – East and Serere district will ensure that the system is well operated and maintained</li> </ul>	Well maintained system	Operation phase	Contractor	-
Clean water supply	<ul style="list-style-type: none"> <li>Additional improvements to drinking water quality at home, such as boiling especially for drinking water, are examples of simple and cheap measures that will be encouraged in the community.</li> <li>Communities shall be sensitized on safe ways of collection and storage of water to avoid contamination</li> </ul>	<p>Improved water quality</p> <p>Water contamination</p>	Operational phase	<p>Contractor</p> <p>MWE</p>	-
Improved sanitation and hygiene	<ul style="list-style-type: none"> <li>Communities shall be sensitized on hygienic practices such as hand washing and personal hygiene at home</li> </ul>	Improved hygienic practices	Operational phase	Contractor	-
Impact on education	<ul style="list-style-type: none"> <li>To the extent possible, the district will ensure that the standpipes are extended as close as possible to the communities' households.</li> </ul>	Involvement of district officials	Operational phase	Contractor	-

	<ul style="list-style-type: none"> <li>The district will ensure that sensitization of project communities on gender equality, children rights</li> </ul>	Community sensitization			
<b>Site preparation and construction phase</b>					
Loss of vegetation cover and crops	<ul style="list-style-type: none"> <li>Vegetation clearance will be limited to areas where it is absolutely necessary.</li> <li>Immediately after the project works, during reinstatement, all areas cleared of vegetation and not paved shall be planted with grass and trees indigenous to the area. The grass and trees shall be planted on top of a black cotton (loam) soil layer.</li> <li>Existing roads will be used wherever possible as access roads in order to minimize clearance of vegetation.</li> <li>Stockpiles of excavated soils will not be placed where there is vegetation, particularly young plants which have been planted deliberately.</li> <li>Vegetation that might have been excavated accidentally near the</li> </ul>	<p>Extent of vegetation clearance.</p> <p>Crops with the construction site</p> <p>Restoration of natural vegetation</p> <p>Number of access roads to the site.</p>	During construction phase	MWE  Contractor	15,750,000



	proposed sites will be restored to near their natural state.				
Soil erosion & pollution of surface water	<ul style="list-style-type: none"> <li>Vegetation clearance will be limited to only areas where it is absolutely necessary to minimize the areas exposed to agents of soil erosion.</li> <li>Immediately after the project works, during reinstatement, all areas cleared of vegetation and not paved shall be planted with grass and trees indigenous to the area to minimize surface runoff.</li> <li>Existing roads will be used wherever possible as access roads in order to minimize clearance of vegetation.</li> <li>The site will be hoarded off during construction works to prevent soil erosion to the neighbouring areas.</li> <li>Adequate drainage channels to direct storm water within the proposed site will be constructed for better storm water management.</li> <li>Soil erosion checks will be put in place wherever necessary along drains. These checks will include</li> </ul>	<p>Site barriers</p> <p>Covered stockpiles of building material.</p> <p>Adequate drainage channels within the site.</p> <p>Vegetation replanted</p> <p>Volume of excavated soils on site.</p> <p>Soil erosion checks in place.</p> <p>Time of commencing construction works.</p> <p>Soil erosion checks in place.</p> <p>Open trenched</p>	During preparation and construction phase	MWE  Contractor  Serere District Environment Officer	

	<p>scour checks and silt traps/fences. In addition, drains will be regularly de-silted.</p> <ul style="list-style-type: none"> <li>• Stock piles of loose materials like sand will be covered to prevent them from being washed away by surface runoff into nearby wetland and the lake.</li> </ul>	Extent of vegetation clearance.			
Air pollution	<ul style="list-style-type: none"> <li>• Dusty areas will be sprinkled with water to suppress dust emissions;</li> <li>• Personal protective equipment (PPE) like dust masks will be availed to workers whenever needed;</li> <li>• Regular servicing of vehicles and machinery likely to produce excessive gaseous emissions will be done.</li> <li>• The speed of haulage trucks and other vehicles shall be limited to 30km/hr to reduce dust emission along marram roads.</li> <li>• Trucks transporting materials likely to emit dust will be covered with tarpaulins to prevent dust emission.</li> <li>• All idle equipment or machinery shall be turned off to minimize on gaseous emission.</li> </ul>	<p>Complaints from the local community.</p> <p>Visible dust emissions by project vehicles.</p> <p>Frequency of water sprinkling on dusty areas.</p> <p>PPE used</p> <p>Over speeding of project vehicles.</p> <p>Tarpaulins on tracks transporting materials.</p>	During preparation and construction phase	<p>MWE</p> <p>Contractor</p> <p>Serere District Environment Officer</p>	4,000,000

	<ul style="list-style-type: none"> <li>On completion of construction works, unpaved areas as a result of the project will be restored by planting trees and grass;</li> </ul>	<p>Servicing of project vehicles</p>			
Noise emission and vibrations	<ul style="list-style-type: none"> <li>Regular servicing, maintenance and appropriate repair of haulage vehicles and construction machinery with a potential to generate noise.</li> <li>Appropriate PPE (ear muffs) will be provided to the workers at the work sites and contractors should ensure that wearing of the ear protection device by workers is mandatory; especially for those who work close to the noisy machines.</li> <li>Limit construction, excavation activities, and movement of haulage vehicles to day time (7:00am to 7:00pm) since the noise impact is less felt during day than during the night.</li> <li>Since the impact of noise increases with increase in exposure time, the work schedules for workers should also be designed to limit the exposure time. No worker should be exposed to noise level</li> </ul>	<p>Silencers fitted on noisy machinery.</p> <p>Serviced vehicles</p> <p>PPE used by workers.</p> <p>Working hours</p>	<p>During preparation and construction phase</p>	<p>MWE</p> <p>Contractor</p> <p>Serere District Environment Officer</p>	<p>3,000,000</p>

	<p>greater than 85 dB (A) for a duration exceeding hours per day as stated in the National Environment (Noise Standards and Control) Regulations, 2003.</p> <ul style="list-style-type: none"> <li>• Machinery emitting vibrations should be placed on concrete plinth to help reduce on the amount of vibrations emitted.</li> </ul>	Noisy machinery placed on concrete plinths.			
Water contamination due to use of chemicals and oil spills.	<ul style="list-style-type: none"> <li>• The contractor should ensure that all vehicle and equipment are regularly maintained to avoid oil or fuel leakages</li> <li>• Vehicles / equipment and potentially polluting materials should be located less than 50 meters away from surface waters (where it is possible). If this is not possible, the permanent control and safety measures should be implemented in order to prevent water pollution (especially within the construction site)</li> <li>• Washing of project vehicles and equipment in water courses should be prohibited</li> <li>• Drainage / water channels should to be arranged throughout the perimeter of potentially polluting sites of wastewater</li> </ul>	<ul style="list-style-type: none"> <li>• Visible oils in surface water</li> <li>• High turbidity in surface water.</li> <li>• Complaints from the local community regarding the quality of surface water.</li> </ul>	During preparation and construction phase	MWE  Contractor  Serere District Environment Officer	5,500,000

	<ul style="list-style-type: none"> <li>• The contractor should ensure proper management of generated waste in accordance with the National Environment (Waste management) Regulations, 2020.</li> <li>• Ensure proper decommissioning and rehabilitation of all sites that potentially contain polluting material</li> <li>• In case of spillage of oil/lubricants, spilled product should be localized / cleaned</li> <li>• The contractor should conduct regular training and sensitization of workers on pollution prevention.</li> </ul>				
Sanitary waste disposal.	<ul style="list-style-type: none"> <li>• Workers shall be made aware of the available sanitary facilities and their locations.</li> <li>• Mobile toilets will be used along the pipeline corridor.</li> <li>• Permanent sanitary facilities will be put in place at the water treatment facility to cater for the operation phase of the project, as these will be used by security guards and operators at those installations.</li> <li>• During the operation phase, septic tanks will be emptied</li> </ul>	<ul style="list-style-type: none"> <li>• Complaints from the local community.</li> <li>• Sanitary facilities in place.</li> <li>• Indiscriminate Human waste disposal within the project area.</li> </ul>	During preparation and construction phase	MWE  Contractor  Serere District Environment Officer	15,000,000

	periodically by licensed cesspool for treatment and disposal at Serere sewage treatment facility.				
Aesthetics and visual intrusion	<ul style="list-style-type: none"> <li>• Clearing of vegetation will be limited to only the area where it is absolutely necessary for construction works.</li> <li>• On completion of construction works, any areas that were cleared of vegetation but are not paved will be planted with grass and/or trees indigenous to the area.</li> <li>• The woody waste will be given to the neighbouring local community for use as fuel wood.</li> <li>• During site reinstatement, top soil removed from the project site during site clearance, excavation, and trenching will be used in landscaping and the area will be planted with grass and trees indigenous to the site.</li> <li>• Water pipelines will be buried into the ground and thus reduce on the visual aesthetics of the project landscape once construction works are done.</li> </ul>	<ul style="list-style-type: none"> <li>• Extent of vegetation clearance.</li> <li>• Site aesthetics.</li> <li>• Areas restored.</li> <li>• Ornamental plants like flowers, grass and trees planted.</li> </ul>	During preparation and construction phase	MWE  Contractor  Serere District Environment Officer	2,000,000

<p>Occupational safety and health of construction workers</p>	<ul style="list-style-type: none"> <li>• The contractor and supervising engineer shall ensure that all construction workers are oriented on safe work practices and guidelines and ensure that they adhere to them. The contractor will conduct toolbox meeting every morning before work commences</li> <li>• Adequate and appropriate personnel protective gear will be provided to the employees. A risk assessment shall be conducted and the appropriate gear provided. This shall be replaced whenever worn out.</li> <li>• Construction sites; especially water treatment plant and reservoir sites shall be hoarded off to prevent access by unauthorized person</li> <li>• The contractor shall recruit a qualified Health and Safety Officer to oversee OHS matters on a daily basis.</li> <li>• Clear communication line will be set between workers and operators/ drivers of heavy equipment.</li> </ul>	<ul style="list-style-type: none"> <li>• Complaints from workers.</li> <li>• PPE used by workers.</li> <li>• First Aid kit in place.</li> <li>• Records of incidents at site.</li> <li>• Scaffolds and guardrails in place.</li> <li>• Workers trained in occupational health and safety.</li> <li>• Inspection reports.</li> <li>• Safety signage in place.</li> <li>• Sanitary facilities in place.</li> <li>• Area of the site hoarded off.</li> <li>• Emergency assembly point in place.</li> </ul>	<p>Operation phase</p>	<p>Safety and Health under Ministry of Gender, Labour and Social Development.</p> <p>Serere DLG Labour officer</p>	<p>8,000,000</p>
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	<ul style="list-style-type: none"> <li>• All construction sites shall be provided with first Aid kits fully equipped with the necessary materials; and a first aider shall be trained to administer it.</li> <li>• Appropriate signage will be used to warn staff and/ or visitors that are not involved in construction and operation activities in risky places.</li> <li>• Strict instructions will be given to drivers and operators of equipment/ machinery.</li> </ul>				
Community health and safety	<ul style="list-style-type: none"> <li>• A traffic management plan will be developed– to spell out transportation routes to be used, safety features along the routes including features to slow down traffic, speed limits, and safety signage, sensitization of the community and drivers, and minimum standards for drivers.</li> <li>• A grievance mechanism should be put in place to address complaints regarding the conduct of project workers and other complaints towards the project.</li> <li>• Undertake HIV/AIDS awareness campaigns among project</li> </ul>	<ul style="list-style-type: none"> <li>• Traffic management plan in place.</li> <li>• Project related accidents / incidents.</li> <li>• Complaints from the local community.</li> <li>• Traffic wardens or flag men in place.</li> <li>• Disease outbreaks due to project wastes.</li> <li>• Speed limits of project vehicles.</li> <li>• Un slightly scenes of waste scattered at the site and its surrounding.</li> </ul>	During preparation and construction phase	MWE  Contractor  Serere District Environment Officer	5,000,000



	<p>workers and the local community members.</p> <ul style="list-style-type: none"> <li>• Ensure that dusty roads within community areas are sprayed with water before being used by project vehicles.</li> <li>• Put in place flag men/women to direct traffic where necessary to avoid accidents to the local community;</li> <li>• Put in place safety signage at community areas that have a high risk of road accidents like densely polluted areas and narrow roads.</li> <li>• Ensure proper waste management and disposal of waste at designated facilities.</li> <li>• Give way to community traffic and ensure speed limits of project vehicles are enforced.</li> <li>• Ensure that project vehicles use designated project routes.</li> </ul>	<ul style="list-style-type: none"> <li>• Speed humps and signage along the haulage routes.</li> <li>• Approved waste disposal sites.</li> <li>• HIV/AIDS awareness campaigns</li> </ul>			
Solid and hazardous waste management	<ul style="list-style-type: none"> <li>• Some of the excavated soil will be used in site levelling and restoration works during landscaping.</li> <li>• Waste will be appropriately segregated into categories such as non-hazardous or potentially hazardous, metal, plastics,</li> </ul>	<ul style="list-style-type: none"> <li>• Piles of excavated soils</li> <li>• Marked waste collection containers</li> <li>• Waster handler</li> <li>• License/permit of the waste handler</li> <li>• Trucks covered with tarpaulins</li> </ul>	During preparation and construction phase	MWE	5,000,000
				Serere District	

	<p>biodegradable, non-biodegradable etc.</p> <ul style="list-style-type: none"> <li>• Well labelled waste bins with lids to cater for solid waste will be strategically located within the project site for use in waste collection.</li> <li>• A licensed waste collector is to be contracted to collect and dispose of domestic waste, and any forms of hazardous waste from the site.</li> <li>• Waste minimization will be emphasized and implemented throughout all stages of construction and operation.</li> <li>• Waste shall be removed from the site in a manner consistent with national regulations (for example, transporters shall be licensed).</li> <li>• While transporting waste, care will be taken to prevent it spreading to areas outside the site boundary.</li> <li>• Waste will be regularly collected from the site by a contracted licensed waste collector to be disposed at designated sites. Waste consignment</li> </ul>	<ul style="list-style-type: none"> <li>• Complaints from stakeholders</li> <li>• Evidence of collection on waste disposal sites</li> <li>• Sanitary facilities</li> <li>• Signage</li> <li>• Reports of inspection</li> <li>• Records of waste disposal</li> <li>•</li> </ul>		<p>Environment Officer</p>	
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	<p>forms/transmittal to be kept on record.</p> <ul style="list-style-type: none"> <li>• Solid waste will be disposed of at designated sites/landfills to avoid land pollution.</li> <li>• Workers shall be made aware of the available sanitary facilities and their locations.</li> <li>• Regular inspection of the site to identify sanitation non-conformances and ensure timely re-address will be done.</li> <li>• Avoid or minimize the generation of waste materials, as far as practicable, as per the waste management hierarchy outlined below; Identify where waste generation cannot be avoided but can be minimized or where opportunities exist for, recovering and reusing waste; and Where waste cannot be recovered or reused, identify means of treating, destroying, and disposing of it in an environmentally sound manner</li> </ul>				
<p>Damage to other utility service installations.</p>	<ul style="list-style-type: none"> <li>• Utility service lines within the project area will be identified and demarcated to prevent damage to these utilities during trenching.</li> </ul>	<p>Damage to utility installations.</p>	<p>During preparation and construction phase</p>	<p>MWE</p>	<p>5,000,000</p>

	<ul style="list-style-type: none"> <li>• Third party utility owners will be informed and consulted before trenching works commence.</li> <li>• Road reserves will be used as the right of way for water lines.</li> <li>• Trenching will be done using handheld tools to control damage to other utility service lines.</li> <li>• During trenching, a surveyor will be onsite to guide the trenching team on the location of third party utility lines.</li> <li>• Authorisation will be sought from relevant authorities on use of road reserves as right of way for water transmission lines.</li> <li>• Third party utility owners will be informed of any maintenance works along water transmission lines.</li> <li>• Any damage to a third party utility installation will be addressed in liaison with the MWE and the contractor.</li> </ul>	<p>Demarcation of third party utility lines or installations.</p> <p>Consent/approval from relevant authorities on use of road reserves as right of way for water transmission lines.</p>		<p>Serere District Environment Officer</p>	
<p>Temporary loss of access to homes and businesses</p>	<ul style="list-style-type: none"> <li>• All works should be carried out in accordance with an approved method statement</li> <li>• Temporary accesses should always be provided wherever an existing access is affected.</li> </ul>	<ul style="list-style-type: none"> <li>• Approved method</li> </ul> <p>Temporary accesses</p> <p>Restoration plan</p>	<p>Pre-construction and Construction</p>	<p>MWE</p>	<p>15,000,000</p>

	<ul style="list-style-type: none"> <li>Existing accesses should be restored after works, or convenient alternatives provided.</li> </ul>				
Risk of increased spread of COVID-19	<ul style="list-style-type: none"> <li>Adequate soap and water shall be provided at the site to ensure workers and visitors wash their hands frequently.</li> <li>The contractor shall continuously sensitize the workers on ways of preventing the spread of COVID-19. Such communication shall form part of the daily toolbox talks</li> <li>The contractor shall provide washable masks to all workers and visitors and enforce always wearing of the same while at the worksites</li> <li>Screening of all workers and visitors for signs of COVID-19 such as temperature shall be done before they access any work site.</li> <li>The contractor shall adhere to all measures and guidance issued by the Ministry of Health and presidential directives</li> </ul>	<p>Adequate hand washing facilities with water and soap</p> <p>Sensitization of workers</p> <p>Facemasks</p> <p>Medical check-ups and screening</p>	Operation & operation Phases	Contractor	5,000,000
Misconduct of workers	<ul style="list-style-type: none"> <li>All construction workers will be sensitized about responsible behaviour with the communities.</li> </ul>	<ul style="list-style-type: none"> <li>Sensitization of workers</li> </ul>	Operation & operation Phases	Contractor	-

	<ul style="list-style-type: none"> <li>• Ensure people hired have no criminal records and that no children below 18 years are hired</li> <li>• Prioritise recruitment of workers from the project area</li> <li>• MWE together with the Town Council/Sub county and District CDO will follow up any grievances from the community and the schools.</li> <li>• A register of all construction workers shall be maintained with local authorities to aid in tracking cases of child neglect</li> <li>• Workers shall sign a code of conduct</li> <li>• A workers' Grievance redress mechanism shall be established and operationalized</li> </ul>	<ul style="list-style-type: none"> <li>• under aged children</li> <li>• Local people employment</li> <li>• Grievance redress mechanism</li> <li>• Code of conduct</li> </ul>			
Traffic disruption	<ul style="list-style-type: none"> <li>• Truck drivers should be sensitized on the proper driving code of conduct including defensive driving skills</li> <li>• Put in place signage along the road warning road users of the construction site ahead.</li> <li>• Flag men/traffic wardens should be deployed to direct traffic especially in places where heavy</li> </ul>	<p>Qualified truck drivers.</p> <p>Warning signage on the road.</p> <p>Flag men/traffic wardens in place.</p>	During construction phase	<p>Developer</p> <p>Contractor</p> <p>Traffic police.</p>	5,000,000

	<p>trucks will be turning, loading or offloading.</p> <ul style="list-style-type: none"> <li>The speed limit of project vehicles should be limited to 30km/hr and give right of way to other motorists within the project area.</li> <li>Develop and implement a traffic management plan for all the roads likely to be affected by the project activities</li> </ul>	<p>Speed of project vehicles.</p> <p>Traffic management plan in place.</p>			
<b>Operation phase</b>					
Water Quality and Quantity	<ul style="list-style-type: none"> <li>Acquire a water abstraction permit from DWRM</li> <li>Regular monitoring of water quality at the abstraction point</li> <li>Construct silt traps upstream from the water supply intakes</li> <li>Regular maintenance of the intake point to remove surplus deposits of silts and debris</li> </ul>	<p>A water abstraction permit</p> <p>Water quality analysis</p> <p>Silt traps upstream</p> <p>Surplus deposits of silts and debris at the intake</p>	During operation phase	Developer Operator	15,000,000
Occupational Health and Safety at workplace.	<ul style="list-style-type: none"> <li>Provide PPE for workers at the WTP and should include safety shoes, uniform and enforce their usage.</li> <li>Provide a safety induction training course for all workers to ensure that they are fully</li> </ul>	<p>PPE Used by workers.</p> <p>Evidence of safety induction training by workers.</p>	During operation phase.	Developer OSH department Serere District	8,000,000

	<p>aware of the OHS hazards and ways to avoid/minimize them.</p> <ul style="list-style-type: none"> <li>• An emergency plan should be put in place to deal with any accidents. Minor incidents should be treated at the nearest medical Centre while major cases should be handled by a referral hospital;</li> <li>• Put in place First Aid kits for use during emergency;</li> <li>• Obtain all necessary permits and approvals from relevant authorities, including work place registration certificate from the department of Occupational Health and Safety.</li> <li>• Establish a contact with the nearest referral medical facility for assistance during emergency.</li> <li>• Have in place an updated workers' compensation insurance policy</li> </ul>	<p>Evidence of trained workers in emergency response.</p> <p>Emergency plan to deal with any accidents in place.</p> <p>First Aid kits in place.</p> <p>Records of medical examination of workers.</p> <p>HIV/AIDS program in place.</p> <p>Permits from relevant authorities.</p> <p>Compensation insurance policy in place</p>		<p>Environment Officer</p> <p>Sub County Environmental Focal Persons</p>	
Poor solid waste management and sanitation	<ul style="list-style-type: none"> <li>• Ensure solid waste is segregated into hazardous and non-hazardous waste by installing coded waste collection containers to allow for proper disposal.</li> </ul>	Segregated waste.	During operation phase.	Developer Serere District Environment officer.	5,000,000



	<ul style="list-style-type: none"> <li>• Solid waste generated from the operational phase of the water treatment facility will be disposed of to a designated waste disposal site within Serere district.</li> <li>• Water borne toilets will be constructed and connected to concrete lined septic tanks with a soak away pit system.</li> <li>• Separate toilets for men and women must be made available and labelled appropriately.</li> <li>• Septic tanks will be periodically emptied by a licensed cesspool provider to designated sewage treatment facility.</li> <li>• Ensure that toilets are kept clean at all times and have soap, running water and toilet paper, and that there is full time cleaner to ensure hygiene.</li> <li>• Hazardous waste to be collected and disposed of by a licensed waste handler in line with the National Waste Management regulations.</li> <li>• Ensure timely trimming of grass, trees and ornamental plants</li> </ul>	<p>Licensed solid waste contractor to handle solid waste.</p> <p>Water borne toilets in place.</p> <p>Gender sensitive sanitary facilities</p> <p>Licensed cesspool provider to handle sewage.</p> <p>Clean toilets in place</p> <p>Trimmed grass, trees and ornamental plants</p>		<p>Sub County Environmental Focal Persons</p> <p>Health Inspector of Serere District</p>	
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	<p>within the water treatment premises.</p> <ul style="list-style-type: none"> <li>Waste Management hierarchy (3 or 4Rs – reduce, reuse, recycle (and recover) which is an acceptable guide for prioritizing waste management practices should be considered</li> </ul>				
<b>Decommissioning phase</b>					
Demolition waste	<ul style="list-style-type: none"> <li>Generated waste that can be re-usable will be sold or given away to interested parties for re-use especially timber, metals or bricks.</li> <li>Waste generated will be taken off the site immediately to reduce any exposure to weather changes that could lead to erosion in rain.</li> <li>The contractor will ensure proper waste management practices and timely collection/disposal of generated waste to avoid piling waste/debris at the site.</li> </ul>	<p>➤ Volume of waste on site.</p>	During decommissioning phase.	Developer Contractor	-
Noise and vibration	<ul style="list-style-type: none"> <li>Manual labour will be applied as much as possible.</li> <li>Unless exceptional circumstances warrant, working at night shall be prohibited to avoid causing any sort of inconveniences to the nearest residents.</li> </ul>	<p>Noise levels at the site.</p> <p>Working schedules for demolition works.</p>	During decommissioning phase.	Developer Contractor  Serere District Environment Officer	-

	<ul style="list-style-type: none"> <li>Equipment used should be in good mechanical condition and thus generate less noise.</li> </ul>				
Deterioration in ambient air quality due to dust emission	<ul style="list-style-type: none"> <li>Equipment used should be in good mechanical condition to avoid pollution of air;</li> <li>Nose masks will be provided as deemed necessary;</li> <li>Wetting of rubble and debris to limit raising dust.</li> </ul>	<p>Gaseous emissions from mechanical equipment.</p> <p>Nose masks provided to workers.</p> <p>Dust emission on site.</p>	During decommissioning phase	<p>Developer</p> <p>Contractor</p> <p>Serere District Environment Officer</p>	
Occupational safety concerns	<ul style="list-style-type: none"> <li>Implementing good house-keeping practices, such as the sorting and placing loose construction materials or demolition debris in established areas away from footpaths;</li> <li>Wearing appropriate PPE, such as safety glasses with side shields, face shields, hardhats, and safety shoes;</li> <li>Install caution signage around the site to discourage the public from being close to site, for example, “falling debris”, “keep off the site” etc.</li> <li>Follow all measures recommended by the risk assessment done before commencing the works.</li> </ul>	<p>Good housekeeping practices in place.</p> <p>PPE usage by workers.</p> <p>Caution signage in place.</p> <p>Risk assessment records.</p>	During decommissioning phase	<p>Developer</p> <p>Contractor</p> <p>OSH department</p> <p>Serere District Environment Officer</p>	-

<p>Loss of employment</p>	<ul style="list-style-type: none"> <li>• If predictable, notification will be given to employees as soon as is possible so that they are prepared to seek employment elsewhere;</li> <li>• Employees will be encouraged to explore various skills including agriculture so that even in the case of loss of the job, they can survive;</li> <li>• Employees should be encouraged to save monthly.</li> </ul>	<p>Notification about the project.</p> <p>Monthly savings for employees.</p>	<p>During Operation /Before decommissioning.</p>	<p>Developer Employees</p>	
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## 10 INSTITUTIONAL CAPACITIES AND STRENGTHENING PLAN

The project will follow the already existing Joint Partnership Fund (JPF) modalities agreed with the development partners in the water and sanitation sector. This will ensure use of existing structures with improvement where required. The capacity building component of the program includes support in community mobilisation before and during program implementation; water catchment management; hygiene & sanitation and other technical & institutional capacity building activities. All these activities support the enhancement and implementation of the program environmental and social management plan. The complementary awareness components focusing on hygiene and sanitation issues will be widened to include awareness of waterborne, water related diseases, in particular the issues of malaria and bilharzias, and also HIV-AIDS. There is need for institutional strengthening of the Environmental and Social Assessment review and permitting process and the program has already included this in the training/awareness sessions. The MVE will be guided by Environment and social management plan in this report that will ensure that sub-projects are implemented in line with the AFDB's procedures.

**Table 10-I: Key institutions / agencies relevant for the project.**

Institution	Roles and Responsibilities
<b>National level</b>	
Department of Occupational Safety and Health, Ministry of Gender, Labour and Social Development	<ul style="list-style-type: none"> <li>• Responsible for implementing the Occupational Safety and Health Act (2006) and carrying out statutory inspections to ensure proper management of health and safety at workplaces.</li> </ul>
Directorate of Water Development (part of the Ministry of Water and Environment)	<ul style="list-style-type: none"> <li>• Provides support to local governments and other service providers with respect to water resource issues</li> </ul>
Directorate of Water Resources Management – DWRM (part of the Ministry of Water and Environment)	<ul style="list-style-type: none"> <li>• Develops and maintains national water laws, policies and regulations</li> <li>• Manages, monitors and regulates water resources through issuing water use, abstraction and wastewater discharge permits</li> <li>• Integrates water resources management activities</li> <li>• Coordinates Uganda's participation in joint management of transboundary waters resources and peaceful cooperation with Nile Basin countries.</li> </ul>

Institution	Roles and Responsibilities
Ministry of Water and Environment (MWE)	<ul style="list-style-type: none"> <li>• Responsible for setting national policies and standards, managing and regulating water resources and determining priorities for water development and management</li> <li>• MWE has three directorates:               <ul style="list-style-type: none"> <li>o Directorate of Water Resources Management (DWRM)</li> <li>o Directorate of Water Development</li> <li>o Directorate of Environmental Affairs.</li> </ul> </li> <li>• Reporting to MWE are the:               <ul style="list-style-type: none"> <li>o National Environment Management Authority (NEMA),</li> <li>o National Forestry Authority (NFA)</li> <li>o National Water and Sewerage Corporation.</li> </ul> </li> </ul>
National Environment Management Authority (NEMA)	<p>Established in May 1995 under the National Environment Act Cap 153 (now the National Environment Act, No 5, 2019) as the principal agency in Uganda charged with the responsibility of coordinating, monitoring, regulating and supervising environmental management. NEMA's functions:</p> <ul style="list-style-type: none"> <li>• coordinates the implementation of government policies and decisions of the Policy Committee on Environment</li> <li>• ensures the integration of environmental concerns in overall national planning through coordination with the relevant ministries, departments and government agencies</li> <li>• liaises with the private sector, intergovernmental organisations, nongovernmental and government agencies of other states on issues relating to the environment</li> <li>• proposes environmental policies and strategies to the Policy Committee</li> <li>• initiates legislative proposals, standards and guidelines on the environment in accordance with the law</li> <li>• reviews and approves environmental and social impact assessment statements</li> </ul>

Institution	Roles and Responsibilities
<b>Serere District Local Government / Serere Town Council</b>	
District Environment Committee	<ul style="list-style-type: none"> <li>• Coordinates the activities of the district council and the local environment committees relating to the management of the environment and natural resources</li> <li>• Ensures that environmental concerns are integrated in all plans and projects approved by the district council</li> <li>• Assists in developing and formulating byelaws relating to managing the environment</li> <li>• Coordinates with NEMA on all issues relating to environment management</li> </ul>
Environment Officers (Serere district and Serere Town Council and sub county officials).	<ul style="list-style-type: none"> <li>• Advises the district environment committee on all matters relating to the environment</li> <li>• Assists local environment committees in the performance of their functions</li> <li>• Gathers information on the environment and the utilisation of natural resources in the district</li> <li>• Serves as the secretary to the district environment committee</li> </ul>
Community Development Officers (Serere district and Serere Town Council and sub county officials).	Plays a key role in stakeholder engagement and community projects

## II GRIEVANCE REDRESS MECHANISM

There will be a necessity to resolve conflicts swiftly in order to expedite the project's planning and construction phase and for the smooth eventual operational activities. Therefore, a grievance redressing mechanism is essential for the Water Supply System project. This procedure will address this need in detail. The objectives of the grievance process as explained in the subsequent chapter of these guidelines will be as follows:

- Provide affected people with avenues for making a complaint or resolving any dispute that may arise;
- Ensure that appropriate and mutually acceptable corrective actions are identified and implemented to address complaints;
- Verify that complaints are satisfied with outcomes of corrective actions;
- Avoid the need to resort to judicial proceedings.

Grievance management is an important step in community engagement. There had been and will be community grievances throughout the project's various development stages. It is expected that all such grievances be amicably resolved if the developer is to abide by the global and country specific Social Safeguard guidelines. In practice, in similar compensation and resettlement activities, many grievances arise from misunderstandings of the Project policy, or result from conflicts between neighbors, which can usually be solved through adequate mediation using customary rules or local administration at the lowest level. Most grievances can be settled with additional explanation efforts and some mediation using customary dispute settlement mechanisms.

The purpose of Grievance management shall be to provide opportunity for the aggrieved parties to resolve issues through arbitration and negotiation based on transparent and fair hearing. It will allow the parties in the dispute to arrive at a win-win solution. Final outcome thus be that the extra-judicial systems will work smoothly and that number of disputes seeking interventions at the country judiciary will be made minimal. The functioning a proper grievance management mechanism is a requirement in view of the above. The overall management of grievances is the responsibility of the developer or/and the contractor. The Project, thus, will put in place an amicable, extra-judicial mechanism for managing grievances and disputes based on explanation and mediation by third parties. Procedures relevant to this amicable mechanism are detailed below. It will include three different levels:

Registration by project of the complaint, grievance or dispute;

Processing by project of the grievance or dispute until closure is established based on evidence that acceptable action was taken; and

In the event where the complainant is not satisfied with action taken by project as a result of the complaint, an amicable mediation can be triggered involving a mediation committee independent from the Project.



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Managing grievances needs a clear and transparent procedure well instituted within the management structure of the project. At minimum, such a procedure should consist of the following steps:

to receive the grievances,  
to acknowledgement the receipt,  
investigation and resolution,  
Closeout and follow-up.

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i. The need for maintain a Grievance Register

There should be Grievance Register which would record all the grievances, complaints and issues the stakeholders would wish to bring to the attention of the Developer or the Contractor. It should be kept at a place where all will have easy access; preferably this should be placed at the office (allocated for the Grievance Committee (GC)). It should contain the date of the entry, name and contact details of the complainant; nature of grievance, Signature (on one side of the Register) and actions taken to address or reasons the grievance was not acted on, the signature of the GC and Complainant as to how the grievance was closed and date (on the other side of the Register).

ii. Recording of the complaints into the Grievance Register

The following steps are to be followed when the complaints will be received: Receipt of complaint (a verbal or in written) will be received by the Community Liaison Officer or any other officer (a member of the Grievance committee).

The complainant can obtain the assistance from a member of the grievance committee or the Site welfare officer to lodge such an entry in to the Grievance Register.

The Officer Responsible or the GC member, who is at present, will communicate with the complaint in a language acceptable to the complainant.

Since the site working is carried out in English Language, the Site welfare officer or the member of the Grievance committee may lodge the entry in English language

After lodging the complaint in the register, the officer recorded such complain shall read to the complaint what is recorded and sign the entry made into the Grievance Register

iii. Formation of a Grievance Committee

In Uganda at the local level, the village leaders and the LC (I) play a key role in managing disputes. The Parish level committees formed for the management of disputes is the lowest level of accepted forms of reconciliation board at which the complainants can have access to for justice if issues will not be resolved at the village level. However, in order to strengthen the village level reconciliation of disputes especially over the issues arising from the project related matters, appointing of a Grievance Committee has been considered a viable option according to the accepted practices. It is expected that grievances depending on the complexity and nature can be resolved either at the site level, at the grievance committee level or

at the project developer's top management level or at the judiciary level. It means that if a complainant is not satisfied with the site level solution offered by the site manager or the project's administration manager, the matter can be taken up by the Grievance Committee (GC).

The constituency of the grievance committee and its role is explained in the following section. This GC is to be considered the vital body which prevents any grievances to be heard at higher levels. In parallel and where necessary, the GC holds meetings or other appropriate communication with the complainant, with the aim of reducing any tensions and preventing them from escalating. During closeout, the GC seeks to confirm that its actions have satisfied the complainant. During follow-up, the GC, with the assistance of the Site Construction Manager or the system operator investigates the causes of grievances, where necessary, to ensure that the grievance does not recur.

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**The composition of Grievance Committee is depicted below:**

Representative from area – 01 Members (preferably from Sub County/)

Representative of Women – 01 Members

Representative of the Local Government – 02 Community Development Officers

Representative from the developer – 01 Member

Representative from the contractor or the system operator – 01 Member

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Members of the Grievance will be provided training on conflict resolution and given more exposure on procedures of managing grievances.

Performance Indicators in respect of the functioning of the Grievance Committee

Key interventions include:

Setting up of a Functional Grievance Committee;

Addressing stakeholders and employee's grievances in all project phases.

## 12 CONCLUSION AND RECOMMENDATIONS

### 12.1 Conclusion

In general, the proposed project will not have significant negative impacts on the environment and the neighbouring local community considering the nature of the project and its location in a built environment. The significance of impacts after implementation of mitigation measures (residual impact) is predicted to range from negligible to moderate based on the ranking used in the ESIA.

Negative environmental impacts likely to accrue from the proposed project have been identified and an ESMP developed to ensure that the proposed project is implemented in an environmentally and socially sound manner during construction and operation phases.

### 12.2 Recommendation

MWE should work closely with Serere Town Council, Kasilo Town Council, Kadungulu town council, Bugondo Sub County, Kidetok Sub County and Serere District Local Government, and Government agencies like DWRM to ensure smooth implementation of the Environmental and Social Management Plan. If impacts not contemplated during this environmental and social impact assessment arise, the management of MWE should immediately address them in consultation with NEMA and other lead agencies.

In compliance with ESIA and Environmental Audit Regulations, regular environmental audits for the water treatment plant and associate components should be carried out by certified environmental auditors and reports submitted to NEMA for review and guidance to ensure continuous environmental performance and improvement and help identify and address any environmental and social issues that might come up in due course of project implementation.

### 13 REFERENCES

1. The National Environment Management Authority, published in April 2004, Environmental Legislation of Uganda, Vol. I
2. Uganda Bureau of statistics, revised edition November 2014, National population and housing census 2014, provisional results
3. KKATT Consult Ltd, October 2019, Draft Feasibility Study and Preliminary Design Report
4. US Environment Protection Agency, NATIONAL AMBIENT AIR QUALITY STANDARD FOR PARTICULATE MATTER, 1997
5. SERERE DISTRICT LOCAL GOVERNMENT DISTRICT DEVELOPMENT PLAN 2015/16 – 2019/20
6. NEMA (1997). Environment Impact Assessment Guidelines, 1997
7. NEMA (2002). The National Environment (Noise) Regulations for Uganda.
8. NEMA (2019). The National Environment Act, No.5 of 2019.
9. NEMA (2020). Environment and Social Impact Assessment Regulations, 2020
10. NEMA (2020). The National Environment (Waste Management) Regulations, 2020

## **14 APPENDICES**

Appendix 1: Approved Terms of Reference for undertaking the ESIA

Appendix 2: Site layout plan for the proposed development

Appendix 3: Water Analysis

Appendix 4: Stakeholder comments

Appendix 5: Pictures for stakeholder engagement meetings

Appendix 6: Attendance lists of stakeholders consulted

Appendix 7: Land Ownership Documents and Memorandum Of Understanding between MWE and Serere DLG

APPENDIX I: APPROVED TERMS OF REFERENCE FOR UNDERTAKING THE ESIA



NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY (NEMA)

NEMA House  
Plot 17, 18 & 21, Jinja Road,  
P.O.Box 22250, Kampala, UGANDA.  
Tel: 256-414- 251064, 251065, 251068  
342758, 342759, 342717  
Fax: 256-414-257521 / 232680  
E-mail: info@nemaug.org  
Website: www.nemaug.org

**NEMA/4.5**

8<sup>th</sup> November 2022

The Branch Manager,  
Water and Sanitation Development Facility-East,  
Ministry of Water and Environment,  
P.O. Box 1324,  
**MBALE.**

**Tel:** +256 352 275 817  
**Email:** wsdfe@mwe.go.ug

**RE: REVIEW OF SCOPING REPORT AND TERMS OF REFERENCE FOR ENVIRONMENT AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED WATER SUPPLY AND SANITATION PROJECT IN SEERER TOWN COUNCIL, KASILO TOWN COUNCIL, KIDETOK TOWN COUNCIL AND BUGONDO SUB COUNTY IN SERERE DISTRICT (EIATOR 9741)**

Reference is made to the Scoping Report and Terms of Reference for carrying out Environmental and Social Impact Assessment for the above-mentioned Water Supply and Sanitation Project that was submitted to this Authority for review and approval. This Authority has finalized the review and grants formal **APPROVAL** of the said TOR.

Please note that the approval of the TOR **DOES NOT GRANT** permission to start implementing any of the proposed project activities. This is not a Certificate of Approval.

In addition, you are advised to incorporate the considerations below during the conduct of the environmental impact study and the preparation of the ESIA report.

- (i) Provide a comprehensive description of the proposed Water Supply and Sanitation System, the specific components and associated infrastructure, and the activities that will be undertaken during both the construction and operational phases of the project and the size of the work force.
- (ii) Undertake detailed hydrological studies of the Lake Kyoga and its catchment. Include in the report key findings from the study and measures that will be taken

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to address the likely impacts of the project taking into account the mitigation hierarchy.

- (iii) Provide a detailed description of the waste streams that will be generated from the activities of the Water Supply and Sanitation System, and the measures and equipment that will be put in place to handle such waste.
- (iv) Include in the report other relevant baseline information that is project site-specific, on the soils, water, air quality and noise; as well as, clear-colored photographs depicting the current status of the project area and the neighboring environs.
- (v) Provide clear, colored and well-labelled location maps/images (preferably *each covering A-3 size paper*) and accurate sets of GPS coordinates clearly indicating the site boundaries. Ensure that all GPS coordinates are provided in UTM format.
- (vi) Provide a clear and legible copy of the site layout plan (*preferably on A-3 sized paper*).
- (vii) Carry out comprehensive consultations with all the relevant key stakeholders including Serere District Local Government authorities, the Directorate of Water Resources Management (DWRM) particularly in regard to the potential impacts of the proposed project on water resources in the project area. The views of the stakeholders consulted should be well documented and appended to the ESIA report.
- (viii) Include in the ESIA report, comprehensive analysis of alternatives/options to the selected project location, design and technology, among other aspects.
- (ix) Carry out a comprehensive evaluation of the negative environmental impacts associated with the proposed project activities and the relevant mitigation measures to minimize the identified negative impacts and environmental management/monitoring plans that relate to the identified environmental impacts of the proposed project.
- (x) Make reference to all the relevant provisions of applicable policies, laws, regulations, guidelines and standards, in particular, the National Environment Act, No.5 of 2019.
- (xi) Append to the ESIA report authentic copies of land ownership and acquisition documents.

- (xii) Indicate the actual total project (investment) cost including costs of works, machinery/equipment and land where applicable; and these should be submitted by a Certified Valuer and Valuation Certificate attached to the ESIA.
- (xiii) In line with Regulation 49 (2) of the National Environment (Environmental and Social Assessment) Regulations S.I. No. 143/2020, pay a non-refundable administration fee of thirty percent (30%) of the total fees payable on submission of the Environmental and Social Impact Statement

Note that only registered EIA Practitioners including the team leader should be contracted to carry out the ESIA for the proposed project.

This is, therefore, to recommend that you proceed with carrying out the ESIA for the Water Supply and Sanitation System. We look forward to your cooperation and receipt of comprehensive copies of the ESIA report, for our further action.

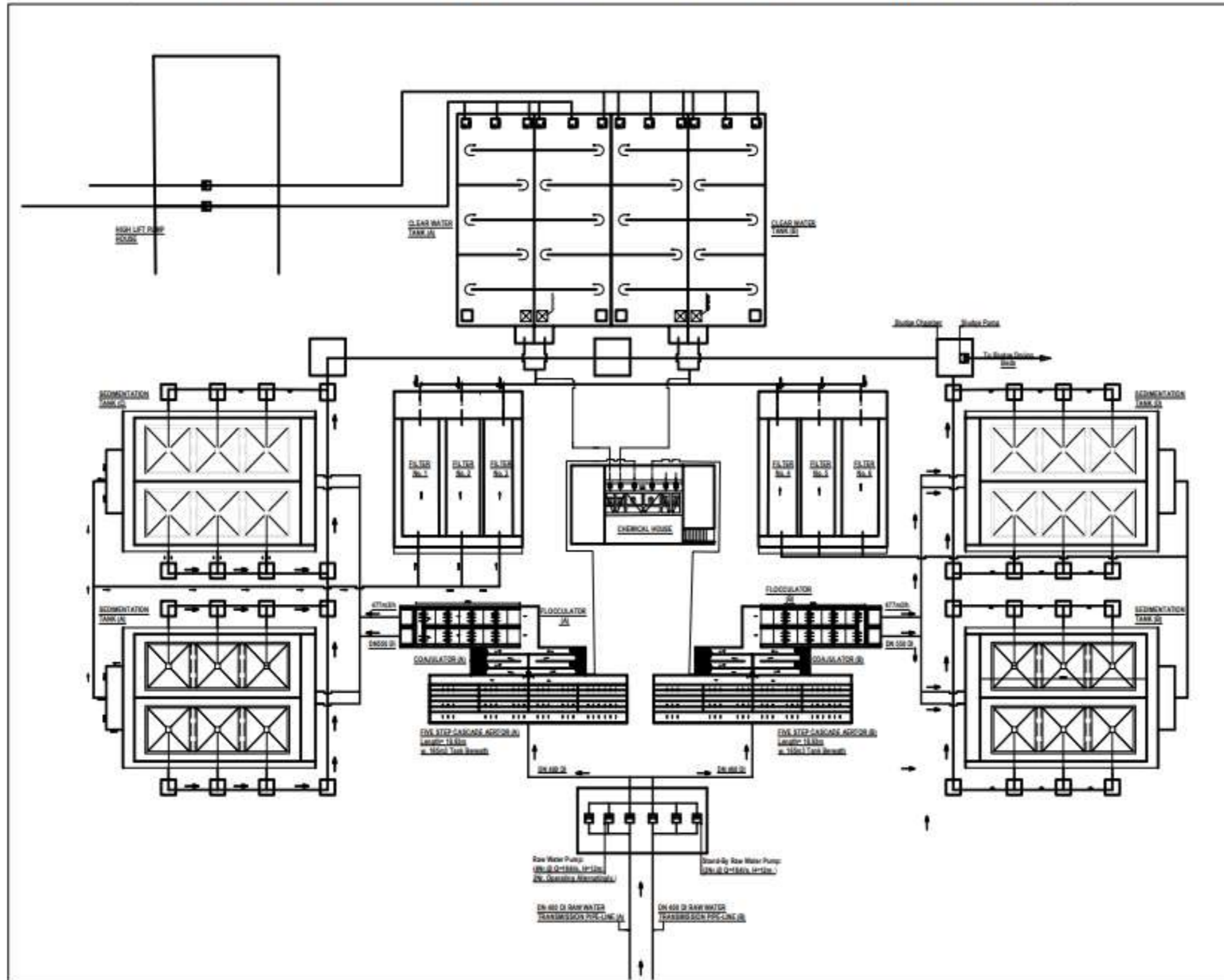


Waiswa Ayazika  
**FOR: EXECUTIVE DIRECTOR**

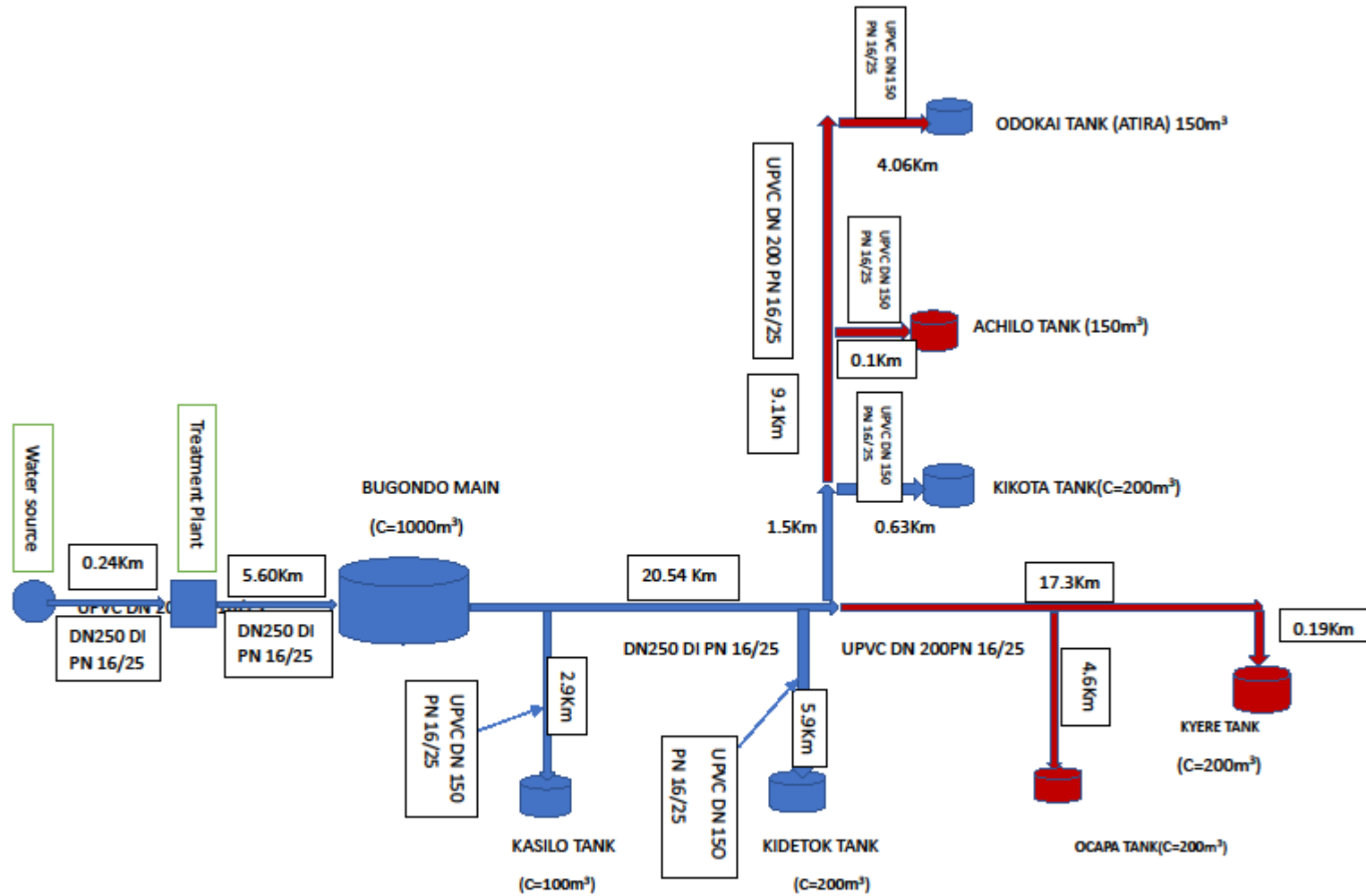


APPENDIX 2: SITE LAYOUT PLAN FOR THE PROPOSED DEVELOPMENT

### GENERAL LAYOUT OF THE PROPOSED WATER TREATMENT PLANT



ESIA for the proposed for the four (04) large urban Water Supply Systems in Serere district



APPENDIX 3: WATER ANALYSIS



MINISTRY OF WATER AND ENVIRONMENT  
MBALE REGIONAL WATER QUALITY LABORATORY

Certificate of Analysis

Client Name : Water and Sanitation Development Facility East  
 Client Address : P.O.Box 20026, Mbale  
 Sample type & Location : Ground Water from Bugondo Borehole 1, Serere District  
 Date received : 07<sup>th</sup> October 2022  
 Analysis Completion date : 18<sup>th</sup> October 2022

TEST RESULTS

Source Name	Bugondo HC111 BH		Drinking water standards (DEAS12:2018 Maximum permissible for Natural potable Water)
Village	Bugondo		
Parish			
Laboratory Number	Units	MBL 22/288	
Colour	PtCo	<0.243	25
pH	pH Units	6.7	5.5-9.5
Electrical Conductivity	µS/cm	3800	2500
Total Dissolved Solids	mg/l	2660	1500
Turbidity	NTU	3.01	25
Total Hardness as CaCO <sub>3</sub>	mg/l	1000	600
Calcium hardness as CaCO <sub>3</sub>	mg/l	500	600
Magnesium hardness as CaCO <sub>3</sub>	mg/l	500	600
Calcium	mg/l	200	150
Magnesium	mg/l	120	100
Total Alkalinity	mg/l	166	
Bicarbonates	mg/l	203	
Sodium	mg/l	182.5	200
Potassium	mg/l	1	50
Fluoride	mg/l	0.1	1.5
Chlorides	mg/l	767	250
Sulphates	mg/l	2299	400
Nitrates as N	mg/l	12	10
Nitrites as N	mg/l	<0.001	0.003
Phosphates as P	mg/l	<0.002	0.7
Total Iron	mg/l	0.3	<0.5

Note; Samples are analyzed on as received basis. The client does bear sampling responsibility as to the representative characters of the sample delivered. Results are therefore based on the sample delivered and analyzed. mg/l- stands for milligrams per liter



Ministry of Water and Environment  
 Mbale Regional Water Quality Laboratory  
 Kyoga Water Management Zone  
 P.O.BOX 1324, Mbale  
 Plot 14, Works Road



**MINISTRY OF WATER AND ENVIRONMENT**  
**MBALE REGIONAL WATER QUALITY LABORATORY**  
 Certificate of Analysis

Client Name : Water and Sanitation Development Facility East  
 Client Address : P.O.Box 20026, Mbale  
 Sample type & Location : Ground Water from Bugondo Borehole 1, Serere District  
 Date received : 07<sup>th</sup> October 2022  
 Analysis Completion date : 18<sup>th</sup> October 2022

**TEST RESULTS**

Source Name	Bugondo BH1		Drinking water standards (DEAS12:2018 Maximum permissible for Natural potable Water)
	Bugondo		
Village			
Parish			
Laboratory Number	Units	MBL 22/287	
Colour	PtCo	<0.243	25
pH	pH Units	6.6	5.5-9.5
Electrical Conductivity	µS/cm	836	2500
Total Dissolved Solids	mg/l	585	1500
Turbidity	NTU	7.2	25
Total Hardness as CaCO <sub>3</sub>	mg/l	120	600
Calcium hardness as CaCO <sub>3</sub>	mg/l	81	600
Magnesium hardness as CaCO <sub>3</sub>	mg/l	39	600
Calcium	mg/l	32	150
Magnesium	mg/l	9	100
Total Alkalinity	mg/l	170	
Bicarbonates	mg/l	207	
Sodium	mg/l	67.5	200
Potassium	mg/l	1	50
Fluoride	mg/l	0.3	1.5
Chlorides	mg/l	62	250
Sulphates	mg/l	131	400
Nitrates as N	mg/l	1	10
Nitrites as N	mg/l	<0.001	0.003
Phosphates as P	mg/l	<0.002	0.7
Total Iron	mg/l	0.18	<0.5

Note; Samples are analyzed on as received basis. The client does bear sampling responsibility as to the representative characters of the sample delivered. Results are therefore based on the sample delivered and analyzed. mg/l- stands for milligrams per liter



Ministry of Water and Environment  
 Mbale Regional Water Quality Laboratory  
 Kyoga Water Management Zone  
 P.O.BOX 1324, Mbale  
 Plot 14, Works Road



**MINISTRY OF WATER AND ENVIRONMENT  
MBALE REGIONAL WATER QUALITY LABORATORY**

Certificate of Analysis

Client Name : Water and Sanitation Development Facility East  
 Client Address : P.O.Box 20026, Mbale  
 Sample type & Location : Surface Water from Lake Kyoga at Bugondo landing site, Serere District  
 Date received : 16<sup>th</sup> September 2022  
 Analysis Completion date : 14<sup>th</sup> October 2022

**TEST RESULTS**

Source Name	L. Kyoga at Bugondo landing site 5m from proposed abstraction point		Drinking water standards (DEAS12:2018 Maximum permissible for Natural potable Water)
	Village	Parish	
	Bugondo		
Laboratory Number	Units	MBL 22/182	
Colour	PtCo	3	25
pH	pH Units	8.5	5.5-9.5
Electrical Conductivity	µS/cm	264	2500
Total Dissolved Solids	mg/l	185	1500
Turbidity	NTU	3.6	25
Total Hardness as CaCO <sub>3</sub>	mg/l	80	600
Calcium hardness as CaCO <sub>3</sub>	mg/l	33	600
Magnesium hardness as CaCO <sub>3</sub>	mg/l	47	600
Calcium	mg/l	13	150
Magnesium	mg/l	11	100
Total Alkalinity	mg/l	135	
Bicarbonates	mg/l	165	
Sodium	mg/l	32.6	200
Potassium	mg/l	1	50
Fluoride	mg/l	0.5	1.5
Chlorides	mg/l	15.7	250
Sulphates	mg/l	<0.02	400
Nitrates as N	mg/l	<0.02	10
Nitrites as N	mg/l	<0.001	0.003
Phosphates as P	mg/l	<0.002	0.7
Total Iron	mg/l	0.03	<0.5

Note: Samples are analyzed on as received basis. The client does bear sampling responsibility as to the representative characters of the sample delivered. Results are therefore based on the sample delivered and analyzed. mg/l- stands for milligrams per liter



Ministry of Water and Environment  
 Mbale Regional Water Quality Laboratory  
 Kyoga Water Management Zone  
 P.O. BOX 1324, Mbale  
 Plot 14, Worka Road



581



**MINISTRY OF WATER AND ENVIRONMENT  
MBALE REGIONAL WATER QUALITY LABORATORY**

Certificate of Analysis

Client Name : Water and Sanitation Development Facility East  
 Client Address : P.O.Box 20026, Mbale  
 Sample type & Location : Surface Water from Lake Kyoga at Bugondo landing site, Serere District  
 Date received : 16<sup>th</sup> September 2022  
 Analysis Completion date : 14<sup>th</sup> October 2022

**TEST RESULTS**

Source Name	L.Kyoga at Bugondo landing site 10m from proposed abstraction point		Drinking water standards (DEAS12:2018 Maximum permissible for Natural potable Water)
	Village	Parish	
	Bugondo		
Laboratory Number	Units	MBL 22/181	
Colour	PtCo	3	25
pH	pH Units	8.5	5.5-9.5
Electrical Conductivity	µS/cm	269	2500
Total Dissolved Solids	mg/l	188	1500
Turbidity	NTU	3.5	25
Total Hardness as CaCO <sub>3</sub>	mg/l	83	600
Calcium hardness as CaCO <sub>3</sub>	mg/l	42	600
Magnesium hardness as CaCO <sub>3</sub>	mg/l	41	600
Calcium	mg/l	17	150
Magnesium	mg/l	10	100
Total Alkalinity	mg/l	130	
Bicarbonates	mg/l	159	
Sodium	mg/l	32.6	200
Potassium	mg/l	1	50
Fluoride	mg/l	0.5	1.5
Chlorides	mg/l	15.2	250
Sulphates	mg/l	<0.02	400
Nitrates as N	mg/l	<0.02	10
Nitrites as N	mg/l	<0.001	0.003
Phosphates as P	mg/l	<0.002	0.7
Total Iron	mg/l	0.03	<0.5

Note: Samples are analyzed on as received basis. The client does bear sampling responsibility as to the representative characters of the sample delivered. Results are therefore based on the sample delivered and analyzed. mg/l- stands for milligrams per liter



Ministry of Water and Environment  
 Mbale Regional Water Quality Laboratory  
 Kyoga Water Management Zone  
 P.O.BOX 1324, Mbale  
 Plot 14, Works Road



580



**MINISTRY OF WATER AND ENVIRONMENT**  
**MBALE REGIONAL WATER QUALITY LABORATORY**  
 Certificate of Analysis

Client Name : Water and Sanitation Development Facility East  
 Client Address : P.O.Box 20026, Mbale  
 Sample type & Location : Surface Water from Lake Kyoga at Bugondo landing site, Serere District  
 Date received : 16<sup>th</sup> September 2022  
 Analysis Completion date : 14<sup>th</sup> October 2022

**TEST RESULTS**

Surname	L.Kyoga at Bugondo landing site at proposed abstraction point		Drinking water standards (DEAS12:2018 Maximum permissible for Natural potable Water)
	Bugondo		
Village			
Parish			
Laboratory Number	Units	MBL 22/180	
Colour	PtCo	3	25
pH	pH Units	8.4	5.5-9.5
Electrical Conductivity	µS/cm	511	2500
Total Dissolved Solids	mg/l	358	1500
Turbidity	NTU	3.4	25
Total Hardness as CaCO <sub>3</sub>	mg/l	86	600
Calcium hardness as CaCO <sub>3</sub>	mg/l	40	600
Magnesium hardness as CaCO <sub>3</sub>	mg/l	46	600
Calcium	mg/l	16	150
Magnesium	mg/l	11	100
Total Alkalinity	mg/l	130	
Bicarbonates	mg/l	159	
Sodium	mg/l	33.7	200
Potassium	mg/l	1	50
Fluoride	mg/l	0.4	1.5
Chlorides	mg/l	15	250
Sulphates	mg/l	<0.02	400
Nitrates as N	mg/l	<0.02	10
Nitrites as N	mg/l	<0.001	0.003
Phosphates as P	mg/l	<0.002	0.7
Total Iron	mg/l	0.02	<0.5

Note: Samples are analyzed on as received basis. The client does bear sampling responsibility as to the representative characters of the sample delivered. Results are therefore based on the sample delivered and analyzed. mg/l- stands for milligrams per liter



Ministry of Water and Environment  
 Mbale Regional Water Quality Laboratory  
 Kyoga Water Management Zone  
 P.O.BOX 1324, Mbale  
 Plot 14, Works Road



579





COMMENTS FORM

Name:	ACAMUN PETER	Telephone:	0782877578
Organisation:	KIBERIC TOWN Council	Fax:	
Designation:	TOWN CLERK	E-mail address:	acamunpeter37@gmail.com
Address:	P.O. Box 93, SERERE DISTRICT		
Comments and issues of concern:			
<p>The project is welcome based on its objectives          Areas of concern:</p> <ul style="list-style-type: none"> <li>- Proper sensitization and training of communities &amp; stakeholders so that they own the project.</li> <li>- Engage key stakeholders in value chain in every stage of the project</li> <li>- Periodic performance reports be shared always with stakeholders so that they appreciate the progress</li> <li>- Project designs be awarded to town council and other stakeholders.</li> <li>- Involvement of unskilled and skilled labour within the community where possible</li> </ul>			





COMMENTS FORM

Name: AKITENG RHODA	Telephone: 0774 550507
Organisation: BUGANDA S/C	Fax:
Designation: CDO	E-mail address: cho.lankaty@gmail.com
Address:	
Comments and issues of concern:	
The Community needs more sensitization concerning the project	
Concerns	
There is need for enhancement of more piped water sources	
The water sources need to be protected to ensure safe and clean water for the communities	
Need for sustainability of the project and set change. Most of the community is negative about government projects which needs to be changed	
Inclusiveness. There is need for all community members who are to be beneficiaries involvement in the project from all walks of life.	



COMMENTS FORM

Name:	EYOKU DENNIS	Telephone:	0784679252
Organisation:	Serere District local Govt	Fax:	
Designation:	Environment officer	Email address:	eyokudennis@gmail.com
Address:	Se P.O BOX 93 Serere		
Comments and issues of concern:			
<p>The project will improve on daily household income of the community members due reduced burden on diseases caused by dirty water.</p> <p>The project will bring employment opportunities to the local community member.</p> <p>- During implementation there is need to protect workers with personal protective equipments for purposes of safety.</p> <p>- provision of first aid kit at the operational site.</p> <p>- Community sensitization H/W/ADS to be conducted during the implementation.</p>			



### COMMENTS FORM

Name:	Telephone:
Organisation:	Fax:
Designation:	E-mail address:
Address:	
Comments and issues of concern:	
When the project is successful, it will help in	
- reduction of diseases	
- it will improve the livelihoods of the communities	
- it will bridge the problem of long distances to access clean water	
- it will help prevent HIV/AIDS	
- prevent early pregnancies and rape	
- prevent school drop outs which will help children continue with education	
- help in <del>the</del> the production of food for communities through irrigation	
it will lead to income generating activities	



COMMENTS FORM

Name:	DINE WALTER	Telephone:	0754783740
Organisation:	SERERE TOWN COUNCIL	Fax:	
Designation:	ENGINEER	E-mail address:	dine.walter@gmail.com
Address:	P.O. BOX 582 SOROTI		
Comments and issues of concern:			
<ul style="list-style-type: none"> <li>• Lack of a physical development plan that indicates possible positions of the water pipe lines</li> <li>• Different land tenure systems that call for many stake holders to be consulted for permission</li> <li>• Likelihood of damaging roads to accommodate the trenches and restoration of tarmac should be considered</li> <li>• what happens to the management and operation of the waste emptier</li> <li>• what exactly should the Lower Local Government staff do to ensure the success of the project.</li> <li>• What is the monitoring and the evaluation plan</li> <li>• Will the costs of the unit be reduced</li> </ul>			





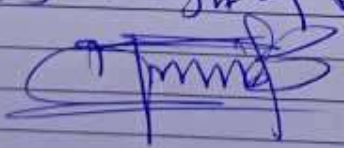


COMMENTS FORM

Name: AMECHU SAM	Telephone: 0773407199
Organisation: SERERE DISTRICT LG	Fax:
Designation: SENIOR COMMUNITY DEVELOPER	E-mail address: samamechu@gmail.com
Address: KASILO TOWN COUNCIL	
Comments and issues of concern:	
- The project is welcome and we hope it will address the following issues -	
* Reduced distance and Travel time spent to access safe water for consumption -	
* Improved hygiene and Sanitation at household level.	
* Reduced spread of water-borne diseases -	
* Improved household incomes as a result of less expenditure on medical costs.	
However it's also important to note the following concerns.	
* Mainstream HIV/AIDS in water projects -	
* Mainstream Gender Concerns in the water project.	
* Plan for environmental restoration by planting trees along the roads.	



COMMENTS FORM

Name: <b>OKOLIMONYI DANIEL</b>	Telephone: <b>0782-314508</b>
Organisation: <b>SERERE DISTRICT LG.</b>	Fax:
Designation: <b>DISTRICT WATER OFFICER</b>	E-mail address: <b>odanjose@gmail.com</b>
Address: <b>DISTRICT WATER RESOURCES &amp; DEVT-SERERE P.O BOX 93, SERERE LG</b>	
Comments and issues of concern:	
<ul style="list-style-type: none"> <li>- The project should have been implemented yesterday as noted from the community.</li> <li>- Land for the project is readily available</li> <li>- The only environment issue is the location of the reservoir on the top of Bugondo hill</li> <li>- The other agent hill higher than Bugondo hill has 2 telecommunications towers</li> <li>- Project should be approved and its highly recommended.</li> </ul>	
	







**APPENDIX 5: PICTURES FOR STAKEHOLDER ENGAGEMENT MEETINGS**



**Figure 14-1: Showing the inspection team engaging with the local community within Bugondo Landing site.**



**Figure 14-2: Showing consultative meeting with the leadership of Bugondo Sub-county.**



Figure I4-3: Showing an engagement and consultative meeting at Kidetok Town Council.



Figure I4-4: Showing consultative meeting at Serere Town Council.



Figure I4-5: Consultations with stakeholders in Serere





APPENDIX 6: ATTENDANCE LISTS OF STAKEHOLDERS CONSULTED

ENVIRONMENTAL ASSESSMENT FOR THE GREATER SERERE WATER SUPPLY SYSTEM IN SERERE AREA

STAKEHOLDER ENGAGEMENT ATTENDANCE LIST

DATE: 24/9/2022

VENUE: Kasulo Town Council Offices

NO	NAME	DESIGNATION/TITLE	INSTITUTION	CONTACT (Telephone and E-mail)	SIGNATURE
01	OKIOT FANUUS	TOWN CLERK	KASULO	0743088892 okiotfanuus@gmail.com	
02	KISUUI AIED	COORDINATOR SENIOR	KOLUBO WARD	0718235214	
03	AMEZHU SAM	CEO	WASTO TIC	078407199 samemed@gwam1.com	
04	ADZEKE SAM	LCM, C/P	KASULO TIC	0794573386	





Ministry Of Water and Environment Water and Sanitation Development Facility – East

ENVIRONMENTAL ASSESSMENT FOR THE GREATER SERERE WATER SUPPLY SYSTEM IN  
SERERE AREA

STAKEHOLDER ENGAGEMENT ATTENDANCE LIST

DATE: 04/9/2022

VENUE: Serere Town Council Office








NO	NAME	DESIGNATION/ TITLE	INSTITUTION	CONTACT (Telephone and E-mail)	SIGNATURE
01	NOBU SIMON RUSO	Town Clerk	SERERE TC	0728534451 nruusimw@serere.gov.ug	
02	AKELBA FRIMMANU	LC 3 CLM	Serere TC	0772940863	
03	DINE WALTER	EXAMINER	SERERE TC	0754783740	
04	OMUAT RUTH .A.	CDO	SERERE TC	0772-373015	

 Ministry Of Water and Environment Water and Sanitation Development Facility – East

ENVIRONMENTAL ASSESSMENT FOR THE GREATER SERERE WATER SUPPLY SYSTEM IN  
SERERE AREA  
STAKEHOLDER ENGAGEMENT ATTENDANCE LIST

DATE: 7<sup>th</sup> / 9 / 2022

VENUE: Serere District Local Government Headquarters




NO	NAME	DESIGNATION/ TITLE	INSTITUTION	CONTACT (Telephone and E-mail)	SIGNATURE
1.	Oml Nelson	Ag. DNRO	Female	0772423238	
2.	OPio Sam	CEO	SALG	0782338259	
3.	Dr. Guyeri David	Dr. DHO	SOLG	0774-751351	
4.	Fyorku Dennis	Environment officer	SRG	0784679252	
5.	Deborah Rutebo	HRSD	SOLG	0762-579686	
6.	SKOLIMOSTI DANIEL DISCIPIL	DNRO	SALG	0782319588	
7.	Wingener Helmut	Key L.O	SOLG	0774022073	

Ministry Of Water and Environment Water and Sanitation Development Facility – East

ENVIRONMENTAL ASSESSMENT FOR THE GREATER SERERE WATER SUPPLY SYSTEM IN  
SERERE AREA  
STAKEHOLDER ENGAGEMENT ATTENDANCE LIST

DATE: 8th/9/2022

VENUE: KIBETIOLK Town Council Office

NO	NAME	DESIGNATION/ TITLE	INSTITUTION	CONTACT (Telephone and E-mail)	SIGNATURE
01	Brechtu Sima Ababir	CEO	KIBETIOLK TC	mobile: 0773416530 Com: 0773416530	
02	Dawid (George) Udima	Mayor	KIBETIOLK TC	0752873578	
03	At Amwal Peter	Town Clerk	KIBETIOLK TC	0752873578	

 Ministry Of Water and Environment Water and Sanitation Development Facility – East





REPUBLIC OF UGANDA

MINISTRY OF WATER AND ENVIRONMENT

WATER AND SANITATION DEVELOPMENT FACILITY – EAST

REGISTRATION FORM

ACTIVITY: Environmental Assessment

DATE:    /    / 2022 Town: Serere

No.	Name	Designation	Sex	Sign
1.	Ochola Stephen	Chairperson	M	
2.	ABEJA ANN BEATRICE	vice clp. SALL	F	
3.	OKWIMONG DANIEL JOSEPH	DVD	M	
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Greater Serere

REPUBLIC OF UGANDA

MINISTRY OF WATER AND ENVIRONMENT

WATER AND SANITATION DEVELOPMENT FACILITY - EAST

REGISTRATION FORM

ACTIVITY: Environmental-socio-economic Assessment

DATE: 2/9/2022 Town: Kidepo - Serere

No.	Name	Designation	Sex	Sign
1.	ACAMUA Peter	Town clerk	M	
2.	EPICHA JOHN ROBERT	CDD	M	
3.	LIWO GEORGE WILLIAM	MAYOR	M	
4.	OHUPA Dennis R.	ASS Engineer	M	
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REPUBLIC OF UGANDA

MINISTRY OF WATER AND ENVIRONMENT

WATER AND SANITATION DEVELOPMENT FACILITY – EAST

REGISTRATION FORM

ACTIVITY: Environmental Assessment

DATE:  / / 2022 Town: .....

No.	Name	Designation	Sex	Sign
1.	<u>PRIDIA FRANCIS</u>	<u>TOWN CLERK</u>	<u>M</u>	<u>[Signature]</u>
2.	<u>ASURU [Signature]</u>	<u>COUNCILLOR</u>	<u>M</u>	<u>[Signature]</u>
3.	<u>AMECHU SAM</u>	<u>SCNO</u>	<u>M</u>	<u>[Signature]</u>
4.	<u>ODEKE SAM</u>	<u>C/P, LEU</u>	<u>M</u>	<u>[Signature]</u>
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REPUBLIC OF UGANDA

MINISTRY OF WATER AND ENVIRONMENT

WATER AND SANITATION DEVELOPMENT FACILITY – EAST

**REGISTRATION FORM**

ACTIVITY: Environmental Assessment  
 DATE: 1 / 1 / 2022 Town: Serere

No.	Name	Designation	Sex	Sign
1.	Dinal Nelson	Ag. DNRD	M	
2.	OPIO SAM	SEO	M	
3.	Dr. August Daniel	Ag. DHD	M	
4.	MURIEL KATHE	M.H.D	F	
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Bugondo Landing Site  
A. Kyoga

REPUBLIC OF UGANDA

MINISTRY OF WATER AND ENVIRONMENT

WATER AND SANITATION DEVELOPMENT FACILITY – EAST

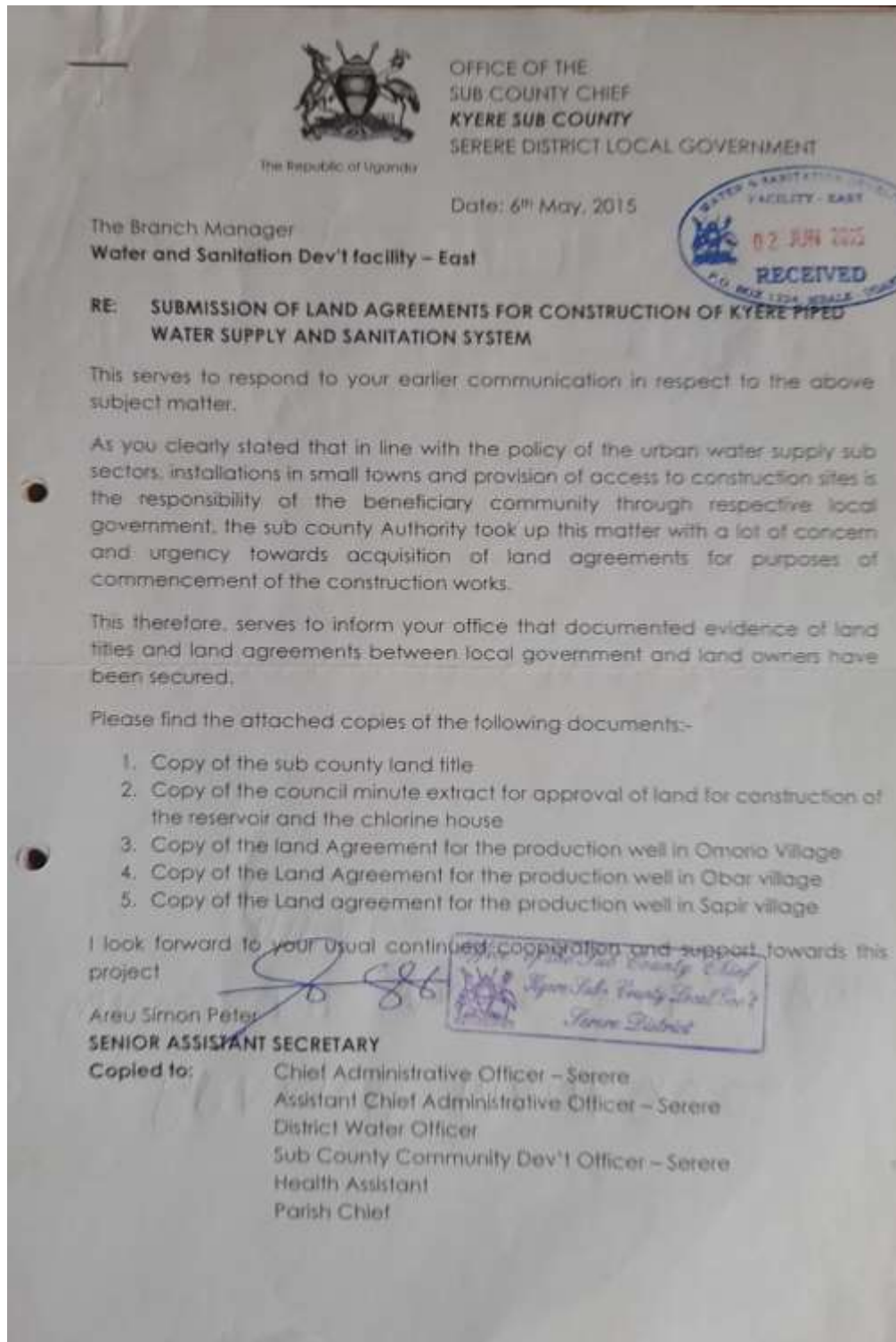
**REGISTRATION FORM**

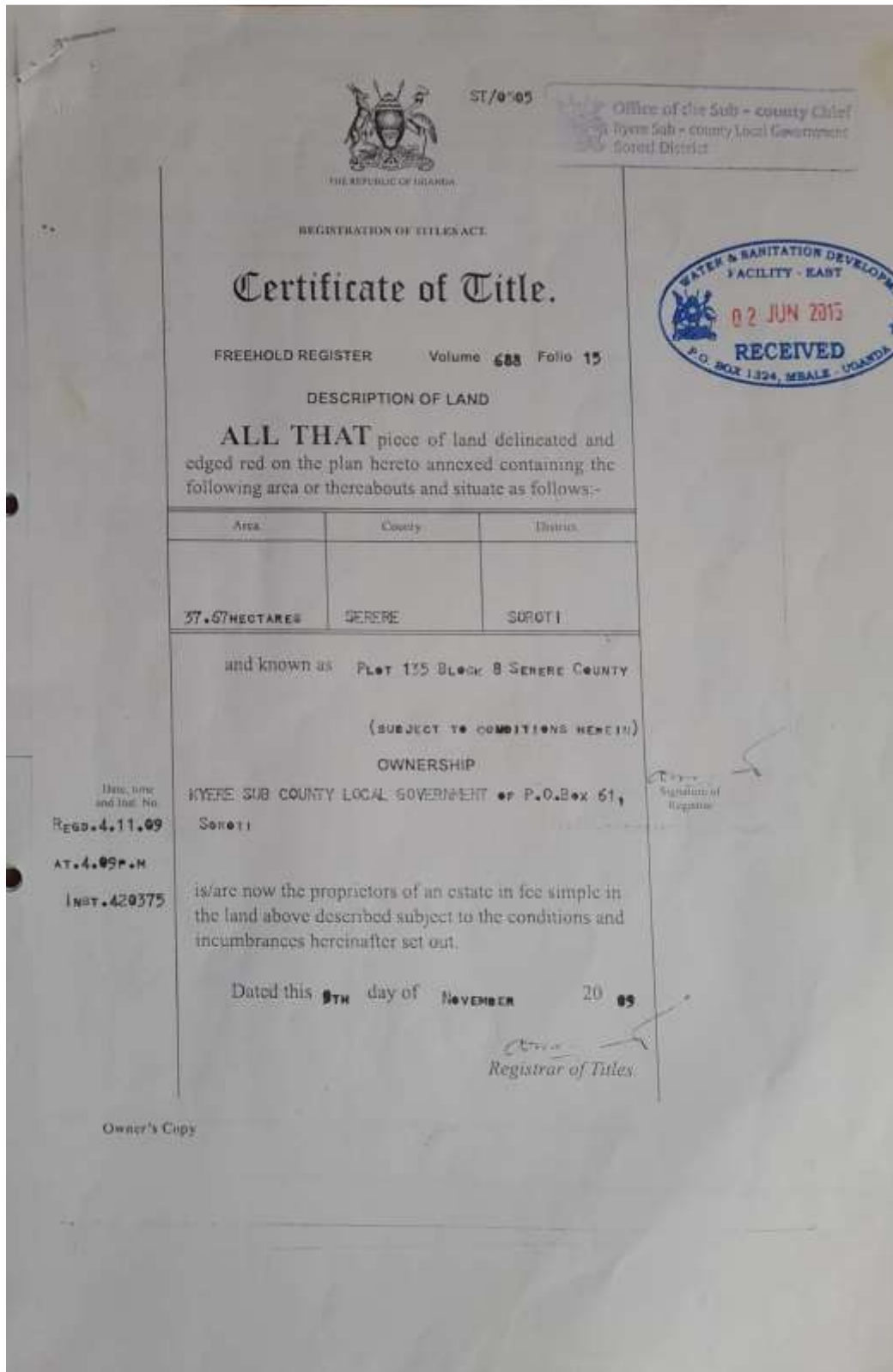
ACTIVITY: Environmental Assessment

DATE: 1 / / 2022 Town: .....

No.	Name	Designation	Sex	Sign	
1.	Opolot Ki Arnold	Parish chief	M		
2.	Akibonyo Rhoda	CDO	F		
3.	Dmyatru Sanyam	SAS	F		
4.	D. S. SIA SAM	CIP L. C. III	M		
5.	OBUNGO GREGORY	AFD	M		
6.	MAWUNGA MARTIN	CIP L. C. I	M		
7.	OKA - STEPHEN	F. P. U	M		0773347905
8.	OPID Joshua	M. F. P. U	M		
9.	MAWUNGA JAMES	M. F. P. U	M		076765664
10.	QWANGE DANIEL		M		
11.	OGEN PETER	M	M		0782236001
12.	ELIJAH NG (SON)				0777755586
13.	EBOSHO MICHAEL				0779828475
14.	ADUPA MOSES				078336559
15.	AKELLO MERAB				078044699
16.	OCYOLA JOHN-SON		M		077490312
17.	EWEKU BANO	Community m	m		077821975
18.	AKIA GRACE	F			47
19.	OSAURO James Paul	Community m	m		
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## APPENDIX 7: LAND OWNERSHIP DOCUMENTS AND MEMORANDUM OF UNDERSTANDING BETWEEN MWE AND SERERE DLG



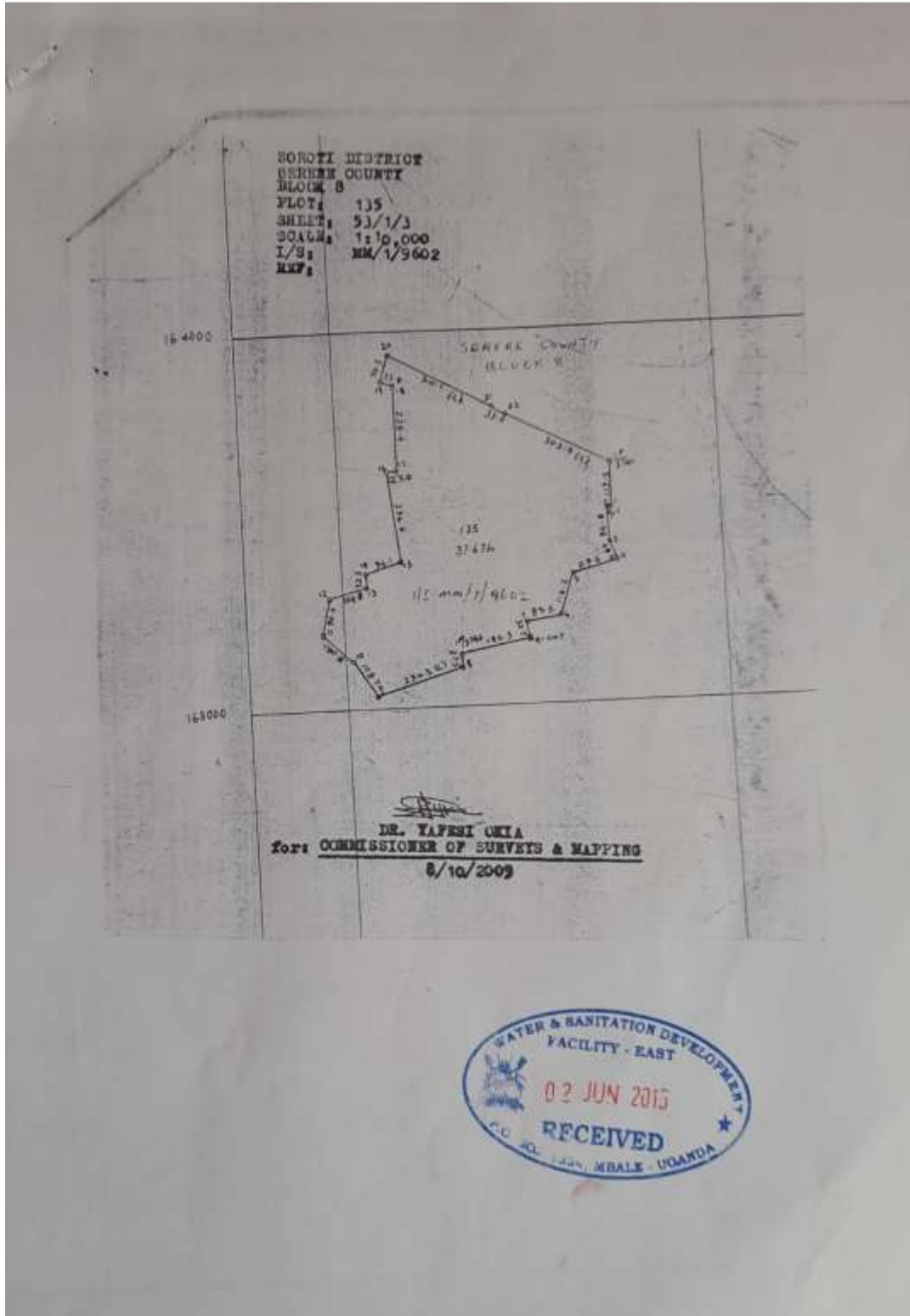


**CONDITIONS  
RENT**

Date, time and dist. No.	Particulars	Signature of Register
A)	USE TO BE RESTRICTED TO ADMINISTRATION HEADQUARTERS	<i>[Signature]</i>
B)	COMPENSATION TO ANY TENANT ON THE LAND WILL BE DONE BY THE APPLICANT	

WATER & SANITATION DEVELOPMENT  
FACILITY - EAST  
02 JUN 2015  
RECEIVED  
P.O. BOX 1124, NGALE - UGANDA





**MIN83/5/COUN/2015 MATTERS FROM THE SUB COUNTY EXECUTIVE COMMITTEE:**

- i) Approval of Land for construction of the Water reservoir tank and the chlorine house for the piped water system.

The vice chairperson moved a motion to approve land for the construction of the water reservoir tank and the chlorine house for the piped water system and the seconded by the secretary Finance.

The Senior Assistant Secretary advised that the land where the water reservoir tank and the chlorine house for the piped water system should have the land agreements or the land title.

The Secretary for Health and Education appreciated the project of the construction of the water reservoir tank and the chlorine house for the piped water system in kyere Sub County because communities will drink safe clean water.

Hon. Ogango Stephen requested to know where the proposed site for the construction of the water reservoir and the chlorine house will be located.

The vice chairperson informed the August house that then proposed site will be within the sub county headquarters near the farmers store for the construction of the chlorine house and then the water tank will be put on top of the rock.

The sub county chairperson proposed that this land be utilized because the sub county has the land title to this effect and there will be protection in terms of security within the sub county.

The August house having appreciated the matter on consensus agreed to approve the land for the purpose of construction of the water reservoir and the chlorine house.

*SPEAKER*  
KYERE SUB COUNTY  
DATE

Chairperson  
Hon. Ekuma Martin



*Areu Simon Peter*  
Minute Scribe

*Office of the Sub County Chairperson*  
*Kyere Sub-County Local B*  
*Serere District*

KYERE SUBCOUNTY LOCAL GOV;  
21/4/2015

REF: LAND AGREEMENT BETWEEN  
EDENYU JOHN AND KYERE SUBCOUNTY  
LOCAL GOVERNMENT;

I Edenyu John have accepted to offer my  
piece of land to Kyere subcounty local  
government for construction of production well  
for piped water scheme programme.  
This agreement has been entered in on 21 APRIL  
2015.

The owner of land —  
(i) Edenyu John  
(ii) OLEGA MICHEAL ~~MWES~~ Son to Edenyu John

witness by representative of local government  
below

- 1 Ompit Robert ~~to CBA~~
- 2 ASAYO MARY MARGARET ~~Ukweili~~ AMR. &
- 3 Oluke James Peter ~~Ukweili~~ / ~~Asay~~


for SAs

KYERE SUBCOUNTY LOCAL GOVT  
21/4/2015


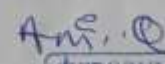
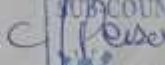
REF: LAND AGREEMENT BETWEEN OTIM CHARLES  
AND KYERE SUBCOUNTY LOCAL GOVT

I Otim Charles have accepted to offer my  
piece of land to Kyere subcounty local government  
for construction of production well for piped water  
scheme programme.

This agreement land is entered in on 21/april  
2015


The land owner - OTIM CHARLES 


Witness by representative of local government  
below:

1. Omyait Robert Ag CAO 
2. ASAYO MARY MARGRET U/c/HELL AMI. 
3. Ouka James Peter. U/c/HELL C 

for M.A.

Office of the Sub County Chief  
Kyere Sub-County Local Gov't  
Serere District

  
SUBCOUNTY CHIEF'S OFFICE  
Kyere  
21 APR 2015  
011294160  
KYERE SUB-COUNTY  
SERERE DISTRICT

  
WATER & SANITATION DEVELOPMENT FACILITY - EAST  
02 JUN 2015  
RECEIVED  
P.O. BOX 1200, SERERE, UGANDA



THE REPUBLIC OF UGANDA

**Office of the**  
Sub County Chief,  
Bugondo Sub County,  
P.O. Box 93, Serere (U

Date: 2<sup>nd</sup> /3/, 2023.

Our Ref

Your Ref

The chief administrative officer

**Serere District Local Government**

**RE: AVAILABILITY OF LAND FOR THE IMPLEMENTATION OF WATER AND  
SANITATION PROJECT IN BUGONDO SUB-COUNTY**

Following the letter received from the ministry of water and environment on proposed urban water supply system in Eastern Uganda. As one of the requirement from the funder being the availability of land from the sub-county or District local government, Bugondo sub-county has an approximate of five (5) acres of land within Bugondo landing site suitable for the project implementation and is free from any land conflict. The people currently occupying the land are temporal occupants (squatters) who were already informed about the project and are willing to vacate.

The purpose of this communication therefore to confirm to your office the availability of land for the implementation of the above project.

Thank you

INYARU SARAH

SENIOR ASSISTANT SECRETARY



THE REPUBLIC OF UGANDA  
 THE PROJECT FOR RURAL WATER SUPPLY PHASE III IN LAKE KYOGA BASIN, EASTERN  
 UGANDA

Agreement on Land Use for Water Supply Facilities (Kidetok RGC)

I, EMIT, CHARLES, hereby agree to contribute my land(s) indicated in the attached page(s) to the use for the water supply facilities to be constructed under the Project for Rural Water Supply Phase III in Lake Kyoga Basin, Eastern Uganda free of charge.

Date: 13-4-....., 2016

Landowner:

Name: EMIT, CHARLES Signature: [Signature]

Witness:

<p>LC 3 chairperson  <u>PINGIRE</u>                  Sub county council</p> <p>Signature: <u>[Signature]</u></p> <p>Name: <u>OKWARA MICHAEL</u></p> <p>Date: <u>13-4-</u>....., 2016</p>	<p>Sub-county chief  <u>PINGIRE</u>                  Sub county</p> <p>Signature: <u>[Signature]</u></p> <p>Name: <u>EDWENYU MICHAEL</u></p> <p>Date: <u>13/4/</u>....., 2016</p>
<p>LC 1 chairperson  <u>OKOLONGA</u>                  LC1</p> <p>Signature: <u>[Signature]</u></p> <p>Name: <u>OKOLONGA GLORIA</u></p> <p>Date: <u>13/04/</u>....., 2016</p>	<p>Parish chief  <u>KIDETOK</u>                  Parish</p> <p>Signature: <u>[Signature]</u></p> <p>Name: <u>Odiong George Wilson</u></p> <p>Date: <u>13/04/</u>....., 2016</p>
<p>District Water Office  <u>SERERE</u>                  District</p> <p>Signature: <u>[Signature]</u></p> <p>Name: <u>AGARINA RICHARD</u></p> <p>Date: <u>13/APRIL/</u>....., 2016</p>	<p>Signature: .....</p> <p>Name: .....</p> <p>Date: ....., 2016</p>

Attachment to Agreement on Land Use for Water Supply Facilities (...../.....)  
(Kidetok RGC)

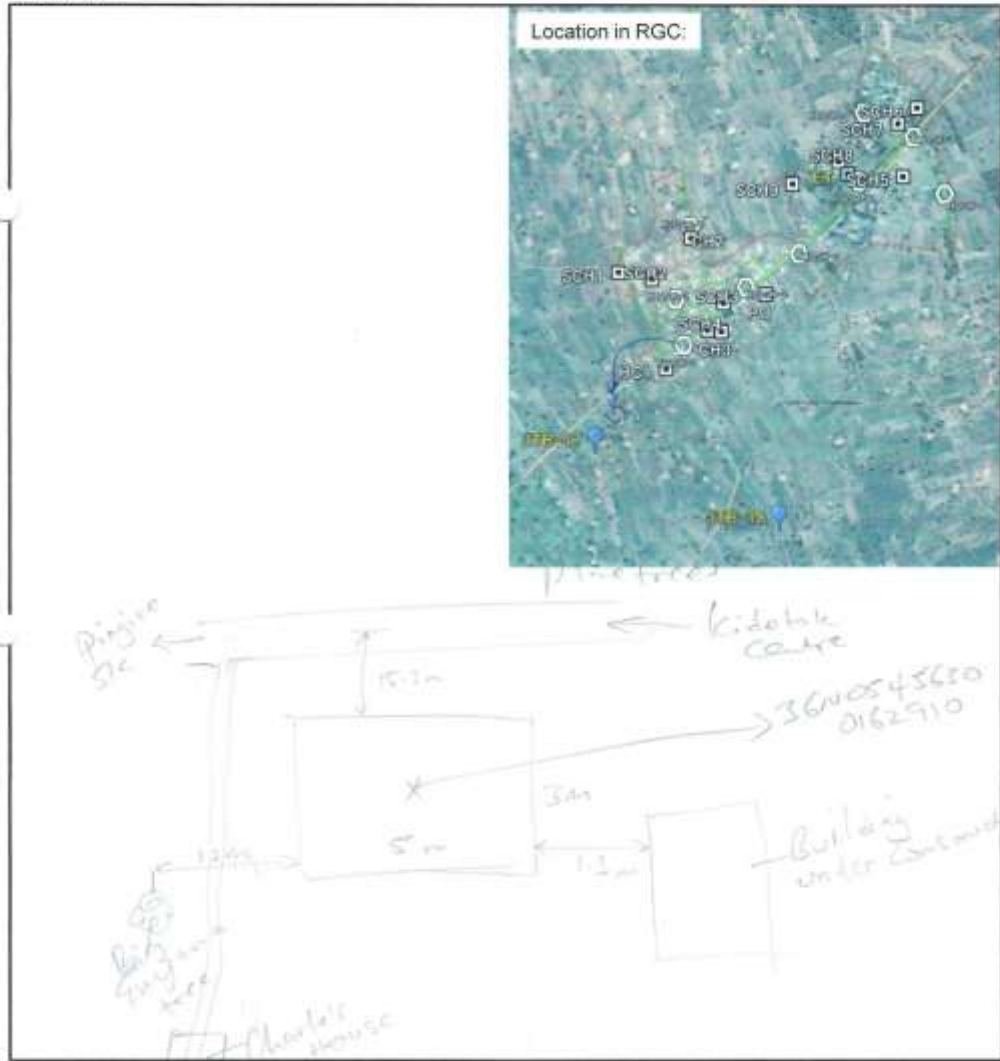
Landowner:

Name: EMITI CHARLES Signature: [Signature]

Size of Contributed Land: 15 m<sup>2</sup>, 3 m x 5 m for water kiosk 1

Description: .....

Site Sketch:



Prepared by:

Tubonase Lawrence Signature: [Signature]

THE REPUBLIC OF UGANDA  
 THE PROJECT FOR RURAL WATER SUPPLY PHASE III IN LAKE KYOGA BASIN, EASTERN  
 UGANDA

Agreement on Land Use for Water Supply Facilities (Kidetok RGC)

I, Odyang George Wilson, hereby agree to contribute my land(s) indicated in the attached page(s) to the use for the water supply facilities to be constructed under the Project for Rural Water Supply Phase III in Lake Kyoga Basin, Eastern Uganda free of charge.

Date: 13-4- 2016

Landowner:

Name: Odyang George Wilson, Signature: [Signature]

Witness:

<p>LC 3 chairperson  <u>Pindika</u> Sub county council                    Signature: <u>[Signature]</u>                  Name: <u>NGANDA MICHAEL</u>                  Date: <u>13-4-</u> 2016</p>	<p>Sub-county chief  <u>Pindika</u> Sub county                    Signature: <u>[Signature]</u>                  Name: <u>EDENYU MICHAEL</u>                  Date: <u>13/4/</u> 2016</p>
<p>LC 1 chairperson  <u>KIDETOK CENTRAL</u> LC1                    Signature: <u>[Signature]</u>                  Name: <u>FRONTO SILVANO ABATA</u>                  Date: <u>13/04/</u> 2016</p>	<p>Parish chief  <u>KIDETOK</u> Parish                    Signature: <u>[Signature]</u>                  Name: <u>Odyang George Wilson</u>                  Date: <u>12/04</u> 2016</p>
<p>District Water Office  <u>SERERE</u> District                    Signature: <u>[Signature]</u>                  Name: <u>OGARIMA RICHARD</u>                  Date: <u>13 APRIL</u> 2016</p>	<p>Signature: _____                  Name: _____                  Date: _____ 2016</p>





THE REPUBLIC OF UGANDA  
 THE PROJECT FOR RURAL WATER SUPPLY PHASE III IN LAKE KYOGA BASIN, EASTERN  
 UGANDA

Agreement on Land Use for Water Supply Facilities (Kidetok RGC)

I, Obyang George Wilson, hereby agree to contribute my land(s) indicated in the attached page(s) to the use for the water supply facilities to be constructed under the Project for Rural Water Supply Phase III in Lake Kyoga Basin, Eastern Uganda free of charge.

Date: 13-4-....., 2016

Landowner:

Name: Obyang George Wilson, Signature: [Signature]

Witness:

<p><b>LC 3 chairperson</b>                  Sub county council</p> <p>Signature: <u>[Signature]</u>                  Name: <u>Edenyo Michael</u>                  Date: <u>13-4-</u>....., 2016</p>	<p><b>Sub-county chief</b>                  Sub county</p> <p>Signature: <u>[Signature]</u>                  Name: <u>Edenyo Michael</u>                  Date: <u>13/4/</u>....., 2016</p>
<p><b>LC 1 chairperson</b>                  LC1</p> <p>Signature: <u>[Signature]</u>                  Name: <u>Okolonga Aliso</u>                  Date: <u>13/4/</u>....., 2016</p>	<p><b>Parish chief</b>                  Parish</p> <p>Signature: <u>[Signature]</u>                  Name: <u>Obyang George Wilson</u>                  Date: <u>13/4/</u>....., 2016</p>
<p><b>District Water Office</b>                  District</p> <p>Signature: <u>[Signature]</u>                  Name: <u>Clarina Richard</u>                  Date: <u>13/APRIL</u>....., 2016</p>	<p>Signature: .....                  Name: .....                  Date: ..... , 2016</p>

Attachment to Agreement on Land Use for Water Supply Facilities (...../.....)  
(Kidetok RGC)

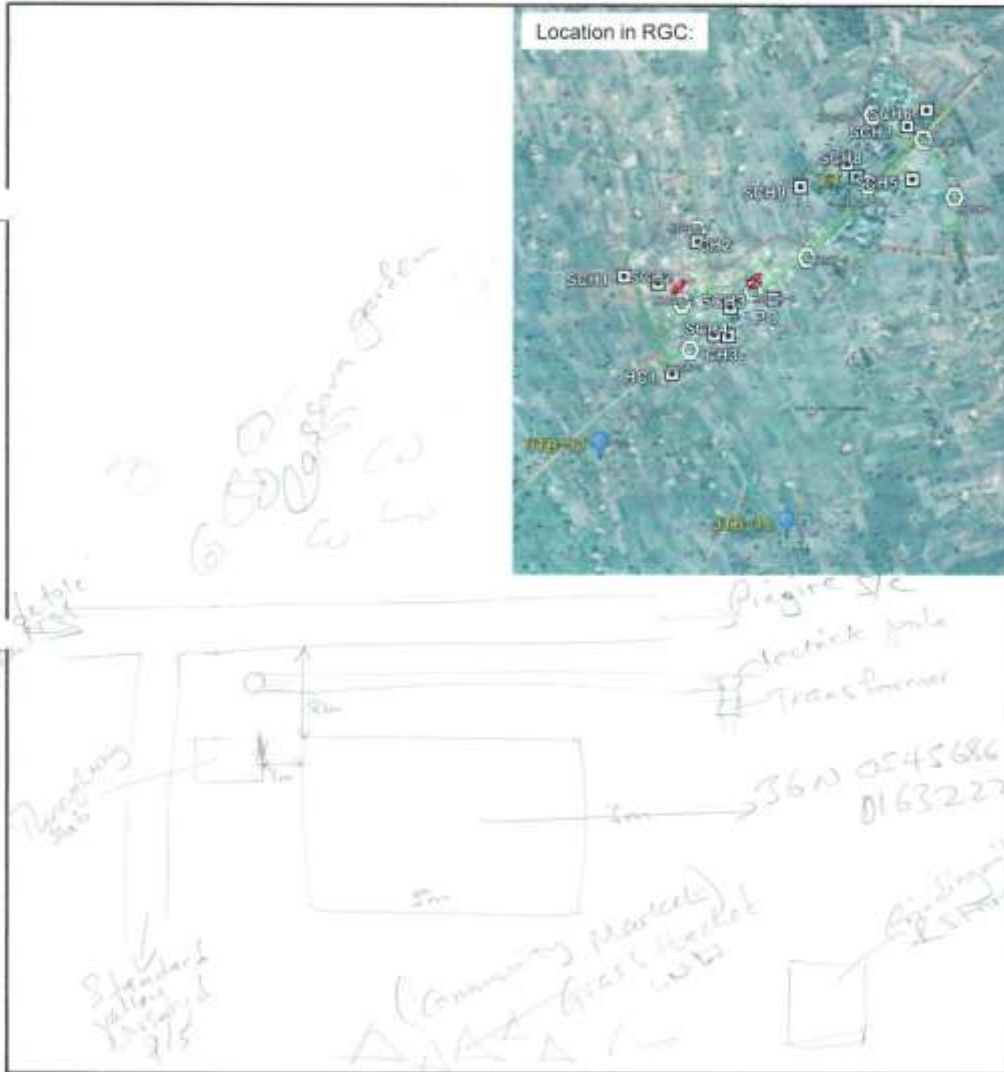
Landowner:

Name: Richard George Wilson, Signature: [Signature]

Size of Contributed Land: 15 m<sup>2</sup>, 3 m x 5 m for Water Kiosk

Description: .....

Site Sketch:



Prepared by:

Tubano Lawrence Signature: [Signature]

THE REPUBLIC OF UGANDA  
 THE PROJECT FOR RURAL WATER SUPPLY PHASE III IN LAKE KYOGA BASIN, EASTERN  
 UGANDA

Agreement on Land Use for Water Supply Facilities (Kidetok RGC)

I, Odyang George Wilson, hereby agree to contribute my land(s) indicated in the attached page(s) to the use for the water supply facilities to be constructed under the Project for Rural Water Supply Phase III in Lake Kyoga Basin, Eastern Uganda free of charge.

Date: 13-4- 2016

Landowner:

Name: Odyang George Wilson Signature: [Signature]

Witness:

<p><b>LC 3 chairperson</b>  <u>PINGIRE</u> Sub county council</p> <p>Signature: <u>[Signature]</u></p> <p>Name: <u>OKWARA MICHAEL</u></p> <p>Date: <u>13-4-</u> 2016</p>	<p><b>Sub-county chief</b>  <u>PINGIRE</u> Sub county</p> <p>Signature: <u>[Signature]</u></p> <p>Name: <u>EDENTU MICHAEL</u></p> <p>Date: <u>13/4/</u> 2016</p>
<p><b>LC 1 chairperson</b>  <u>OKOLONGA</u> LC1</p> <p>Signature: <u>[Signature]</u></p> <p>Name: <u>OKELLO GLASIO</u></p> <p>Date: <u>13/04/</u> 2016</p>	<p><b>Parish chief</b>  <u>KIDETOK</u> Parish</p> <p>Signature: <u>[Signature]</u></p> <p>Name: <u>Odyang George Wilson</u></p> <p>Date: <u>13/04</u> 2016</p>
<p><b>District Water Office</b>  <u>SERERE</u> District</p> <p>Signature: <u>[Signature]</u></p> <p>Name: <u>CHARINA RICHARD</u></p> <p>Date: <u>13/APRIL/</u> 2016</p>	<p>Signature: _____</p> <p>Name: _____</p> <p>Date: _____ 2016</p>

Attachment to Agreement on Land Use for Water Supply Facilities (...../.....)  
(Kidetok RGC)

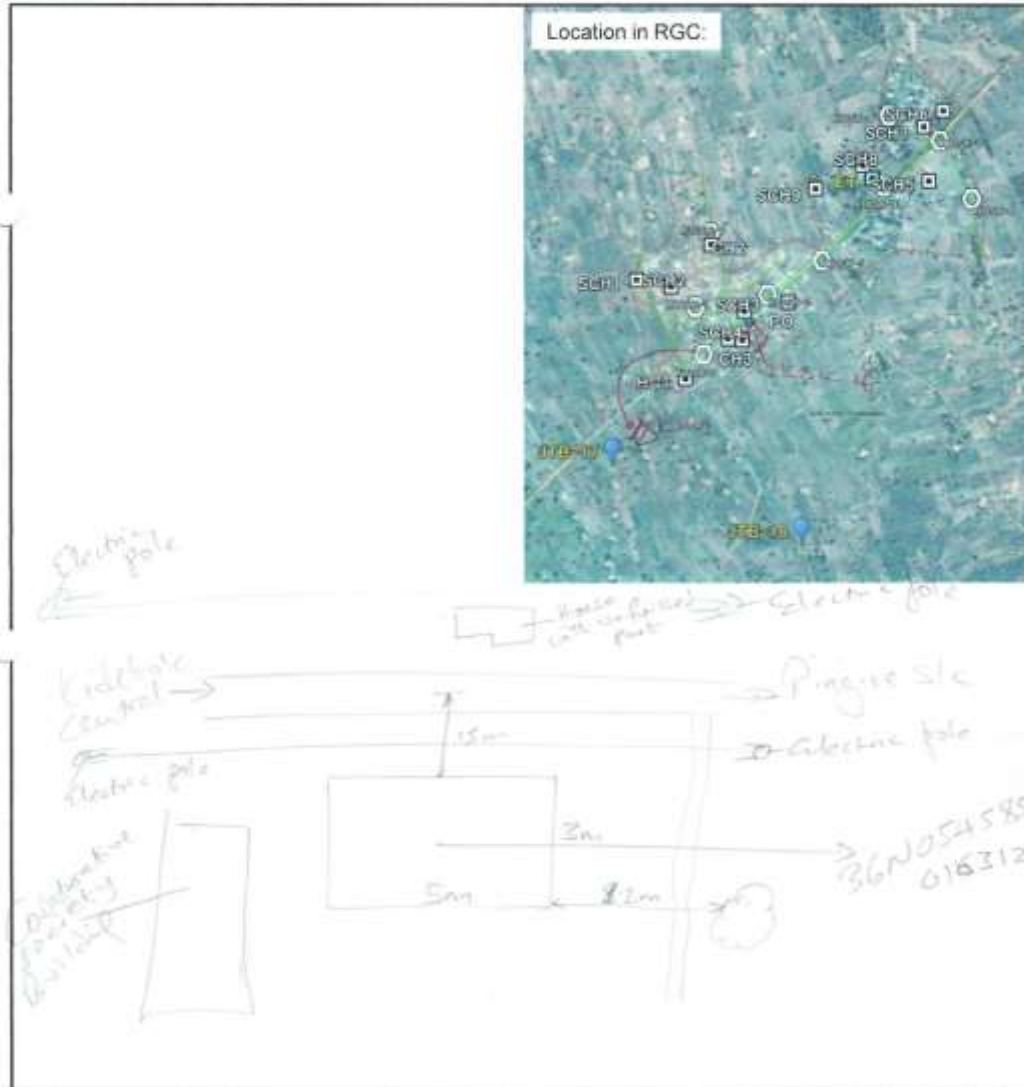
Landowner:

Name: Adyang Rugeziro Signature: [Signature]

Size of Contributed Land: 15 m<sup>2</sup>, 3 m x 5 m for Water pole

Description: .....

Site Sketch:



Prepared by:

Tubonase Lawrence Signature: [Signature]

THE REPUBLIC OF UGANDA  
THE PROJECT FOR RURAL WATER SUPPLY PHASE III IN LAKE KYOGA BASIN, EASTERN UGANDA

Agreement on Land Use for Water Supply Facilities (Kidetok RGC)

I, AIRO ANGELO JOSEPHINE hereby agree to contribute my land(s) indicated in the attached page(s) to the use for the water supply facilities to be constructed under the Project for Rural Water Supply Phase III in Lake Kyoga Basin, Eastern Uganda free of charge.

Date: 13<sup>th</sup> 04/2016, 2016

Landowner:

Name: AIRO ANGELO JOSEPHINE, Signature: [Signature]

Witness:

<p><b>LC 3 chairperson</b> <u>PINGIRE</u> Sub county council</p> <p>Signature: <u>[Signature]</u></p> <p>Name: <u>DEWARA MICHAEL</u></p> <p>Date: <u>13-4-</u>, 2016</p>	<p><b>Sub-county chief</b> <u>PINGIRE</u> Sub county</p> <p>Signature: <u>[Signature]</u></p> <p>Name: <u>EDONYO MICHAEL</u></p> <p>Date: <u>13/4/1</u>, 2016</p>
<p><b>LC 1 chairperson</b> <u>KIDETOK CENTRAL</u> LC1</p> <p>Signature: <u>[Signature]</u></p> <p>Name: <u>FRANCIS SOLOMON AFASA</u></p> <p>Date: <u>13/04/</u>, 2016</p>	<p><b>Parish chief</b> <u>KIDETOK</u> Parish</p> <p>Signature: <u>[Signature]</u></p> <p>Name: <u>Oduyo George Wilson</u></p> <p>Date: <u>13/04</u>, 2016</p>
<p><b>District Water Office</b> <u>SERERE</u> District</p> <p>Signature: <u>[Signature]</u></p> <p>Name: <u>OGARMA RICHARD</u></p> <p>Date: <u>13/APRIL</u>, 2016</p>	<p>Signature: _____</p> <p>Name: _____</p> <p>Date: _____, 2016</p>

Attachment to Agreement on Land Use for Water Supply Facilities (...../.....)  
(Kidetok RGC)

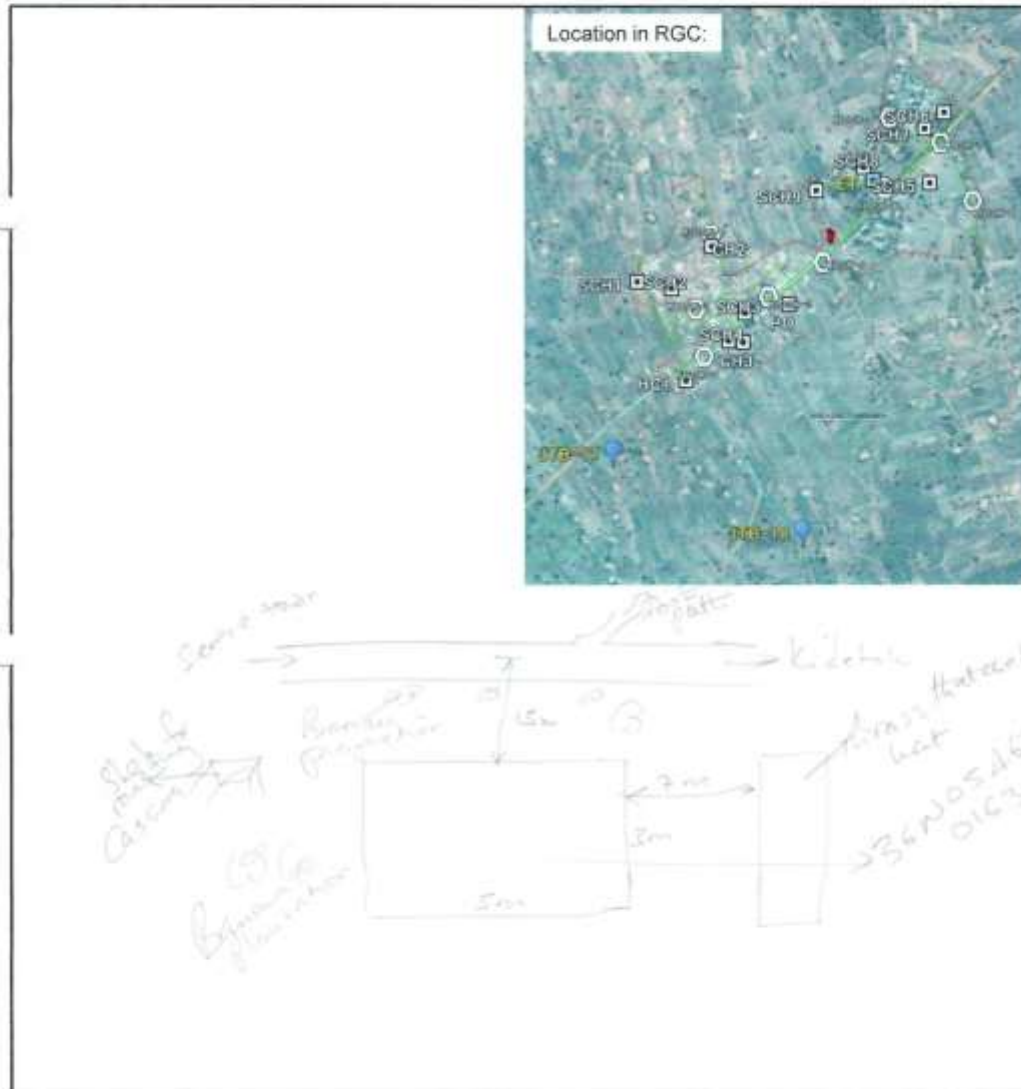
Landowner:

Name: AIBO ANGLISA JOSEPHINE Signature: [Signature]

Size of Contributed Land: 15 m<sup>2</sup>, 3 m x 5 m for water kiosks

Description: .....

Site Sketch:



Prepared by:

Tubense Lawrence Signature: [Signature]

THE REPUBLIC OF UGANDA  
 THE PROJECT FOR RURAL WATER SUPPLY PHASE III IN LAKE KYOGA BASIN, EASTERN  
 UGANDA

Agreement on Land Use for Water Supply Facilities (Kidetok RGC)

I, Adoua Simon, hereby agree to contribute my land(s) indicated in the attached page(s) to the use for the water supply facilities to be constructed under the Project for Rural Water Supply Phase III in Lake Kyoga Basin, Eastern Uganda free of charge.

Date: 13-4- 2016

Landowner:

Name: Adoua Simon, Signature: Adoua Simon

Witness:

<p><b>LC 3 chairperson</b>  <u>Pingire</u> Sub county council                    Signature: <u>[Signature]</u>                  Name: <u>OGWARA MICHAEL</u>                  Date: <u>13-4-</u> 2016</p>	<p><b>Sub-county chief</b>  <u>Pingire</u> Sub county                  Signature: <u>[Signature]</u>                  Name: <u>EDENYO MICHAEL</u>                  Date: <u>13/4/</u> 2016</p>
<p><b>LC 1 chairperson</b>  <u>Okolonga</u> LC1                    Signature: <u>[Signature]</u>                  Name: <u>Okolonga Gasio</u>                  Date: <u>13/02/</u> 2016</p>	<p><b>Parish chief</b>  <u>Kidetok</u> Parish                  Signature: <u>[Signature]</u>                  Name: <u>Adyang George Wilson</u>                  Date: <u>13/02/</u> 2016</p>
<p><b>District Water Office</b>  <u>Serere</u> District                  Signature: <u>[Signature]</u>                  Name: <u>OGARWA RICHARD</u>                  Date: <u>13/APRIL/</u> 2016</p>	<p>Signature: _____                  Name: _____                  Date: _____ 2016</p>



Attachment to Agreement on Land Use for Water Supply Facilities (...../.....)  
(Kidetok RGC)

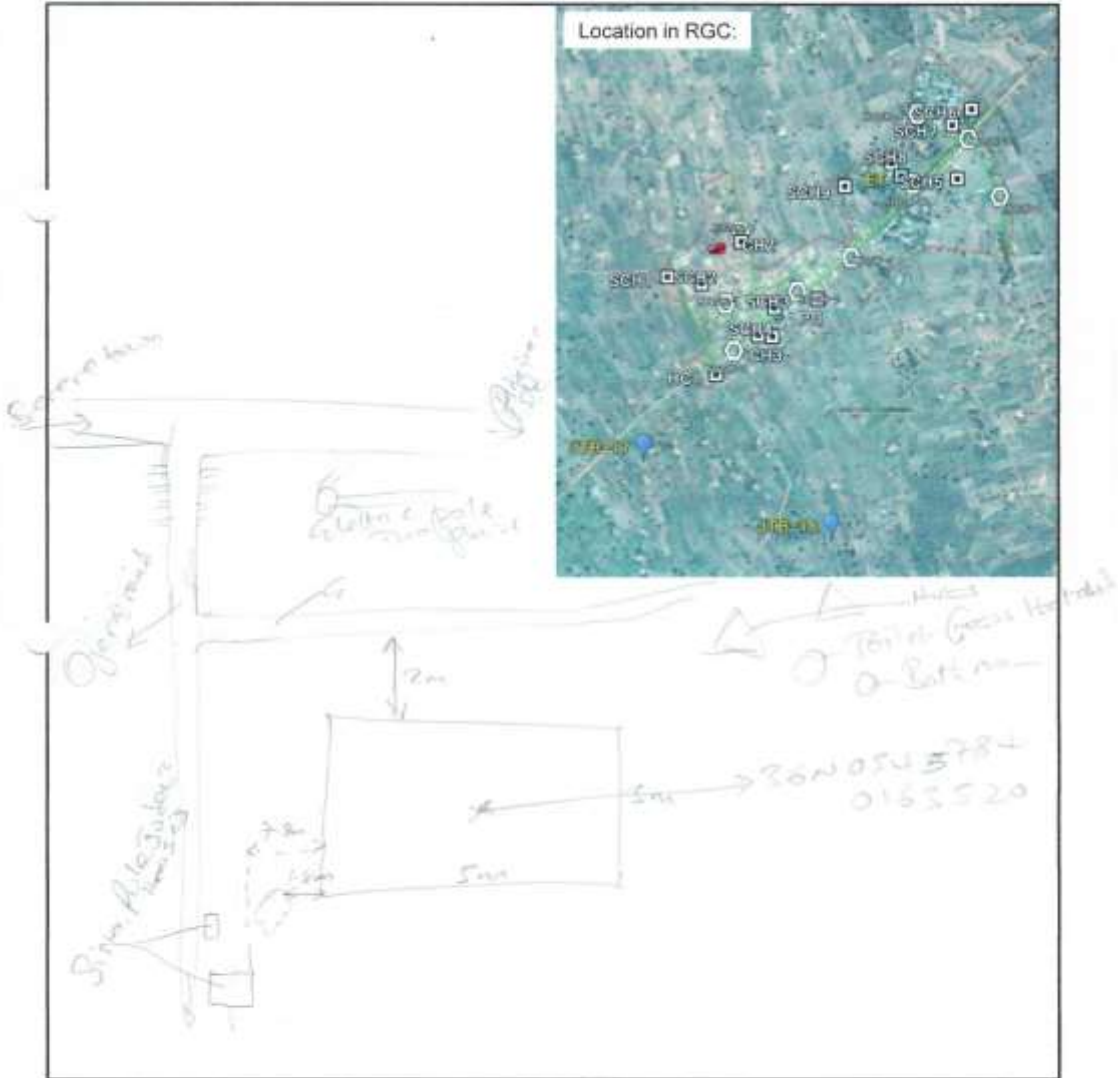
Landowner:

Name: ADWA SIMON Signature: ADWA SIMON

Size of Contributed Land: 15 m<sup>2</sup>, 3 m x 5 m for Water Kiosk 6

Description: .....

Site Sketch:



Prepared by:

Tubane Lawrence Signature: ALAW

THE REPUBLIC OF UGANDA  
 THE PROJECT FOR RURAL WATER SUPPLY PHASE III IN LAKE KYOGA BASIN, EASTERN  
 UGANDA

Agreement on Land Use for Water Supply Facilities (Kidetok RGC)

I, OWEN S. ASU hereby agree to contribute my land(s) indicated in the attached page(s) to the use for the water supply facilities to be constructed under the Project for Rural Water Supply Phase III in Lake Kyoga Basin, Eastern Uganda free of charge.

Date: 13-4- 2016

Landowner:

Name: OWEN S. ASU Signature: [Signature]

Witness:

<p><b>LC 3 chairperson</b>  <u>PINGIRE</u> Sub county council</p> <p>Signature: <u>[Signature]</u>                  Name: <u>OLUJARA MICHAEL</u></p> <p>Date: <u>13-4-</u> 2016</p>	<p><b>Sub-county chief</b>  <u>PINGIRE</u> Sub county</p> <p>Signature: <u>[Signature]</u>                  Name: <u>EDWYTO MICHAEL</u></p> <p>Date: <u>13/4/</u> 2016</p>
<p><b>LC 1 chairperson</b>  <u>AGONYO J</u> LC1</p> <p>Signature: <u>[Signature]</u>                  Name: <u>OKOTO PETER</u></p> <p>Date: <u>13-04</u> 2016</p>	<p><b>Parish chief</b>  <u>KIDETOK</u> Parish</p> <p>Signature: <u>[Signature]</u>                  Name: <u>ADYANG GEORGE WILSON</u></p> <p>Date: <u>13/04</u> 2016</p>
<p><b>District Water Office</b>  <u>SERERE</u> District</p> <p>Signature: <u>[Signature]</u>                  Name: <u>OGARIMA RICHARD</u></p> <p>Date: <u>13/APRIL</u> 2016</p>	<p>Signature: _____                  Name: _____                  Date: _____ 2016</p>

Attachment to Agreement on Land Use for Water Supply Facilities (...../.....)  
(Kidetok RGC)

Landowner:

Name: AKURU S. AISO Signature: [Signature]

Size of Contributed Land: 15 m<sup>2</sup> 3 m x 5 m for Water kiosk

Description: .....

Site Sketch:



Prepared by:

Tulomwe Lawrence Signature: [Signature]

THE REPUBLIC OF UGANDA  
 THE PROJECT FOR RURAL WATER SUPPLY PHASE III IN LAKE KYOGA BASIN, EASTERN  
 UGANDA

Agreement on Land Use for Water Supply Facilities (Kidetok RGC)

I, ESIKEIT JOSEPH, hereby agree to contribute my land(s) indicated in the attached page(s) to the use for the water supply facilities to be constructed under the Project for Rural Water Supply Phase III in Lake Kyoga Basin, Eastern Uganda free of charge.

Date: 13-4-, 2016

Landowner:

Name: ESIKEIT JOSEPH Signature: [Signature]

Witness:

<p><b>LC 3 chairperson</b>  <u>PINGIRE</u> Sub county council                  Signature: <u>[Signature]</u>                  Name: <u>DEWATA MICHAEL</u>                  Date: <u>13-4-</u>, 2016</p>	<p><b>Sub-county chief</b>  <u>PINGIRE</u> Sub county                  Signature: <u>[Signature]</u>                  Name: <u>EDENYU MICHAEL</u>                  Date: <u>13/4/</u>, 2016</p>
<p><b>LC 1 chairperson</b>  <u>OKOLONGA</u> LC1                  Signature: <u>[Signature]</u>                  Name: <u>OKOLONGA LASIO</u>                  Date: <u>13/04/</u>, 2016</p>	<p><b>Parish chief</b>  <u>KIDETOK</u> Parish                  Signature: <u>[Signature]</u>                  Name: <u>Obyang George Wilson</u>                  Date: <u>13/04</u>, 2016</p>
<p><b>District Water Office</b>  <u>SERERE</u> District                  Signature: <u>[Signature]</u>                  Name: <u>DEARIMA RICHARD</u>                  Date: <u>13 APRIL</u>, 2016</p>	<p>Signature: _____                  Name: _____                  Date: _____, 2016</p>

Attachment to Agreement on Land Use for Water Supply Facilities (...../.....)  
(Kidetok RGC)

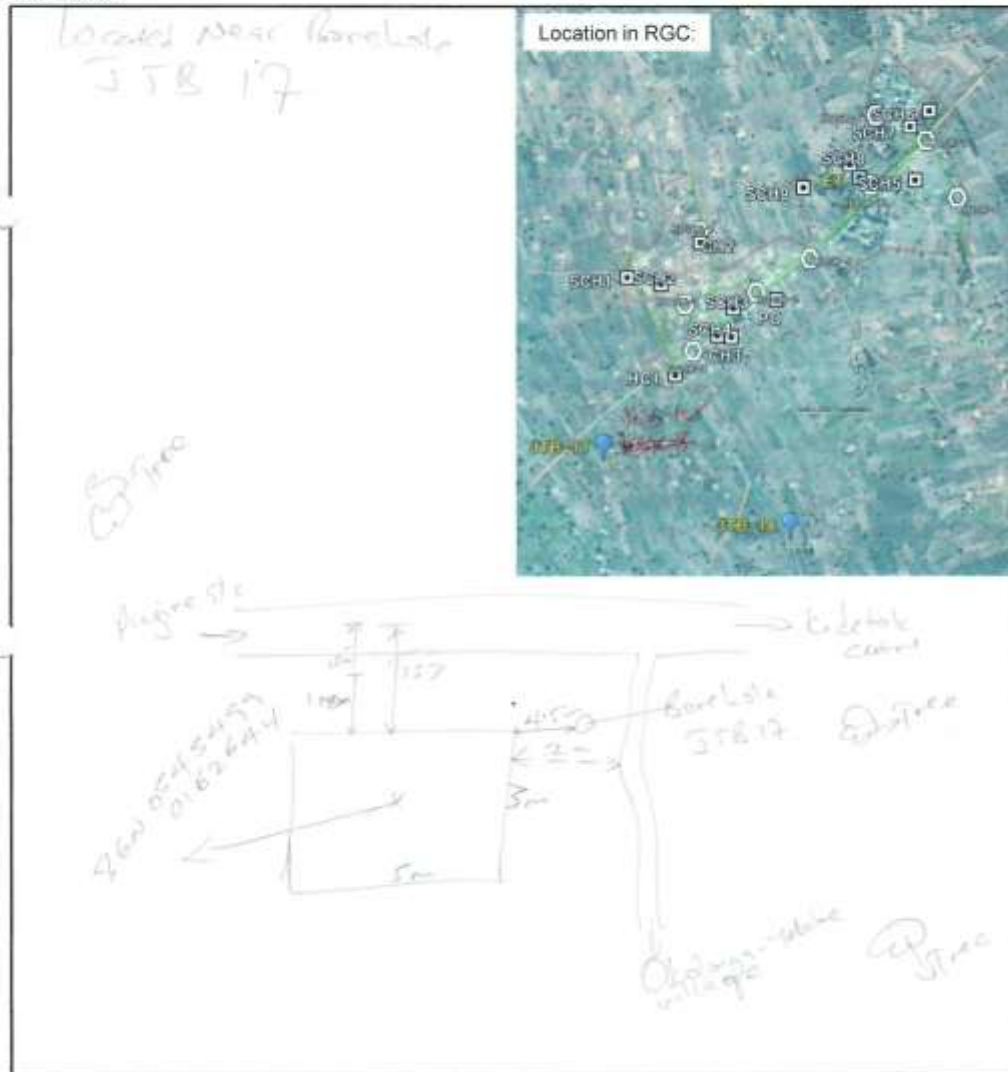
Landowner:

Name: ESIKETI JOSEPH Signature: [Signature]

Size of Contributed Land: 15m m<sup>2</sup> x 7 m x 5 m for Water kiosk

Description: .....

Site Sketch:



Prepared by:

Tubouwe Lawrence Signature: [Signature]

THE REPUBLIC OF UGANDA  
 THE PROJECT FOR RURAL WATER SUPPLY PHASE III IN LAKE KYOGA BASIN, EASTERN  
 UGANDA

Agreement on Land Use for Water Supply Facilities (Kidetok RGC)

I, OKIROR JOYCE, hereby agree to contribute my land(s) indicated in the attached page(s) to the use for the water supply facilities to be constructed under the Project for Rural Water Supply Phase III in Lake Kyoga Basin, Eastern Uganda free of charge.

Date: 13-4- 2016

Landowner:

Name: OKIROR JOYCE Signature: ACAA

Witness:

<p><b>LC 3 chairperson</b>  <u>Oklongo</u> Sub county council                  Signature: <u>[Signature]</u>                  Name: <u>OKONGA MICHAEL</u>                  Date: <u>13-4-</u> 2016</p>	<p><b>Sub-county chief</b>  <u>Oklongo</u> Sub county                  Signature: <u>[Signature]</u>                  Name: <u>EDOMO MICHAEL</u>                  Date: <u>13/2/1</u> 2016</p>
<p><b>LC 1 chairperson</b>  <u>Oklongo</u> LC1                  Signature: <u>[Signature]</u>                  Name: <u>OKELLO FLAVIO</u>                  Date: <u>13/2/1</u> 2016</p>	<p><b>Parish chief</b>  <u>KIDETOK</u> Parish                  Signature: <u>[Signature]</u>                  Name: <u>Obyang George Hilson</u>                  Date: <u>12/2/1</u> 2016</p>
<p><b>District Water Office</b>  <u>Serere</u> District                  Signature: <u>[Signature]</u>                  Name: <u>DEARMA RICHARD</u>                  Date: <u>13/APRIL</u> 2016</p>	<p>Signature: _____                  Name: _____                  Date: _____ 2016</p>

Attachment to Agreement on Land Use for Water Supply Facilities (.../...)  
(Kidetok RGC)

Landowner:

Name: Okoloh Joyce Signature: ACA

Size of Contributed Land: 15 m<sup>2</sup>, 3 m x 5 m for Water kiosk

Description: .....

Site Sketch:



Prepared by:

Tobias Lawrence Signature: [Signature]

