REPUBLIC OF UGANDA
MINISTRY OF WATER AND ENVIRONMENT (MWE)
WATER AND SANITATION DEVELOPMENT FACILITY – SOUTH WEST

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

FOR

WATER SUPPLY AND SANITATION SYSTEMS IN KIBAALE AND KIFAMBA RGCs LOCATED IN RAKAI DISTRICT



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Project index & Document control

Project Name:	**Individual Consultancy Services for Feasibility Studies and Detailed Design for Kibaale RGC Rwemikoma RGC, Nkungu RGC, Buremba Town Council and Kifamba RGC Water Supply and Sanitation System.**
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Report type:	**Environmental and Social Impact Statement for Kibaale and Kifamba RGCs**

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Page | ii

Contents

List of Tables

List of Figures

Acronyms

CAO:	Chief Administration Officer
CO:	Carbon monoxide
CO_2:	Carbon dioxide
COVID19:	Corona Virus Diseases 2019
DCDO:	District Community Development Officer
DEA:	Directorate of Environmental Affairs
DEO:	District Environment Officers
DHO:	District Health Officer
DLO:	District Labour Officer
DWD:	Directorate of Water Development
DWO	District Water Officer
DWRM:	Directorate of Water Resources Management
EH&S:	Environmental, Health and Safety
ESIA:	Environmental & Social Impact Assessment
ESIS:	Environmental & Social Impact Statement
ESMMP:	Environmental and Social Management and Monitoring Plan
ESMP:	Environmental and Social Management Plans
GIS:	Geographical information system
GoU:	Government of Uganda
HC:	Health center (e.g. HC I, II, III, IV)
IWRM:	Integrated Water Resources Management
LC:	Local Council (used for various tiers of local councils e.g. LC I, II, III, IV, V)
MGLSD	Ministry of Gender, Labour and Social Development
MoH:	Ministry of Health
MWE:	Ministry of Water and Environment
NEMA:	National Environment Management Authority
NGO:	Non-Governmental Organization
NOx:	Oxides of nitrogen
OHS:	Occupational Health & Safety
OP:	Operational Procedure
PCR:	Physical Cultural Resources
PH:	Public Health
PPE:	Personal Protective Equipment
RGC:	Rural Growth Center
RoW:	Right of Way
SDO	Senior Community Development Officer
SO:	Scheme Operator
SOPs:	Standard Operation Procedures
SOx:	Oxides of Sulphur
TOR:	Terms of Reference
UBOS:	Uganda Bureau of Statistics
UPHC:	Uganda Population and Housing Census
WSDF-SW:	Water and Sanitation Development Facility – South West
WSSS:	Water Supply and Sanitation System
WUC:	Water User Committee

EXECUTIVE SUMMARY

01. Background

The Water and Sanitation Development Facility – Southwest (WSDF-SW) commenced operations in July 2006, covering Twenty-eight (28) districts: Kabale, Kisoro, Rukungiri, Kanungu, Ibanda, Ntungamo, Bushenyi, Mbarara, Kiruhura, Isingiro, Kamwenge, Kabarole, Kasese, Sembabule, Rakai, Lyantonde, Kyenjojo, Kyegegwa, Buhweju, Rubirizi, Mitooma, Ntoroko, Bundibugyo, Sheema, Bunyangabu, Rukiga, Kyotera, and Rubanda.

WSDF-SWB received applications for water services from various towns and Rural Growth Centres (RGCs) within the region of operation and these were scores and ranked and 50No. towns were identified for implementation in the next funding cycle which is expected to run from 2019 to 2024.

Ministry of Water and Environment, through the WSDF-SW, engaged services of competent Consultants to conduct feasibility studies and detailed engineering designs of selected town water supply systems in the South Western and Mid – Western regions of Uganda.

Eng. Otwane Dan Etiange was awarded a contract by Water and Sanitation Development Facility – South West to carry out Feasibility Studies and Detailed Design for **Kibaale RGC** Water Supply and Sanitation Systems (Contract No. MWE/WSDF-SWB/CONS/20-21/00001) and Feasibility Study and Detailed Design for Rwemikoma RGC, Nkungu RGC, Buremba Town Council and **Kifamba RGC** Water Supply and Sanitation Systems (Contract No. MWE/WSDF-SWB/CONS/18-19/00006/2). Due to the proximity of the RGCs of Kibaale and Kifamba, the detailed designs of the pipe water systems have a common surface water source, Lake Kijjanebalola.

Consequently, Eng. Otwane Dan Etiange engaged a team of environmental experts to undertake and environmental and social impact assessment for the proposed piped water supply and sanitation systems.

02. Project Location

Kibaale RGC is a rural growth centre located in Rakai District. The RGC is accessed by a gravel road approximately 13km South West from Rakai town. Kibaale town is earmarked to be upgraded to a Town Council. Kibaale Town Council comprises of the 20No. villages in Kalungi parish in Kyalulangira Sub County. The Kibaale RGC Project Area covers 4No. Sub County in Rakai District, namely, Kyalulagira, Byakabanda, Kiziba and Kibanda. 7No. parishes and 75No. villages will be supplied by the piped water supply system.

Kifamba RGC is a rural growth centre located in Kifamba Sub County of Rakai District. The RGC is accessed by a gravel road approximately 16km from Rakai town. The Kifamba RGC Project Area covers 1No. Sub County in Rakai District, namely, Kifamba. All the four parishes in Kifamba Sub County will be supplied by the piped water supply system.

Rakai District is bordered by the districts of Lwengo and Lyantonde to the North, Kiruhura to the North West, Isingiro to the West, The Republic of Tanzania to the South and Kyotera to the East.

03. 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. <u>Design and planning phase</u>:

The Piped Water supply and sanitation system was based on the conducted feasibility study and preliminary design 2020, 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 Maximum Day Demand in the Ultimate Year is 2,559.44m^3/day
ii. The water supply and sanitation system will rely on one water source, Lake Kijjanebalola, shared water treatment plant, command reservoir and independent distribution networks.
iii. The selected option for the Kifamba RGC piped water supply system is extension from Lugongo reservoir.
iv. The selected option for the Kibaale RGC piped water supply system is utilization of Lake Kijjanebalola as the water source for the piped water supply systems for Kibaale and Kifamba RGCs.

The population to be served by the piped water supply system is **Table 0-1.**

Table 0-1: Population Served

Project Area	**Served Population**					
	2020	**2025**	**2030**	**2035**	**2040**	**2045**
Kibaale	21,343	23,635	26,170	28,978	32,093	35,538
Kifamba	10,131	11,219	12,420	13,754	15,231	16,866
Total	**31,474**	**34,854**	**38,590**	**42,732**	**47,324**	**52,403**
Source: Design Reports, 2021						

The maximum day demand for the piped water supply system is shown in **Table 0-2.**

Table 0-2: Maximum Day Demand

Project Area	**Maximum Day Demand (m^3/day)**					
	2020	**2025**	**2030**	**2035**	**2040**	**2045**
Kibaale	984.21	1,107.57	1,246.48	1,403.03	1,579.74	1,772.75
Kifamba	443.45	497.46	558.01	626.19	702.78	786.69
Total	**1,427.66**	**1,605.03**	**1,804.50**	**2,029.21**	**2,282.52**	**2,559.44**
Source: Design Reports, 2021						

The System Configuration has been designed as follows:
i. Raw Water Abstraction from Lake Kijjanebarola in Kibaale RGC, Rakai District.
ii. Raw Water Pumping Main to the adjacent Water Treatment Plant. The Water Treatment Plant is located in Kiina in Lukondo village, Kamukalo parish, Byakabanda sub county.
iii. Combined Treated Water Pumping Main from the WTP to the Lugongo Command Reservoir, containing water for both Kibaale and Kifamba Towns.
iv. Dedicated Gravity Transmission Main from the Lugongo Command Reservoir to the Kifamba Reservoir and Kibaale Reservoir.
v. Separate Distribution Networks from the reservoirs to the respective Towns.

B. <u>Construction phase</u>:

The proposed piped water supply and sanitation system project will involve construction of the following components:

<u>Water supply</u>:

i. Intake structures on Lake Kijjanebalola
ii. A conventional water treatment plant
iii. Installation of pumping mains and, transmission and distribution pipe work

iv. Construction of the command reservoir to be located in Lugongo, Byakabanda parish, Byakabanda sub county. The storage capacity of the command reservoir will be 550m³
v. Construction of storage reservoirs as follows; 3No. storage reservoirs for Kibaale RGC (Kibaale, Ndaga and Kizinga Storage Reservoirs) and 2No. storage reservoirs for Kifamba RGC (Kifamba and Nabunga storage reservoirs)
vi. Construction of booster stations to feed the reservoirs in both Kibaale and Kifamba supply areas

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

Sanitation:

The proposed sanitation facilities for public spaces are 1No. 6 stance waterborne toilet for Kibaale RGC and Kifamba RGC. The location of the proposed sanitation facilities will be agreed upon with the local authorities.

The sanitation facilities will have the following features:
i. 3No. stances for female users inclusive of 1No. stance for the physically disabled
ii. 3No. stances for male users inclusive of 1No. stance for the physically disabled
iii. 1No. shower stall for female users
iv. 1No. Urinal for male users
v. Handwashing facility
vi. 500 litre tank connected to rainwater harvesting system connected to the handwashing facility for each gender
vii. 1000 litre tank connected to the piped water supply system. This tank will also be connected to the handwashing facility

The following sanitation interventions are proposed at institutions:
i. Construction of 2No. 5 stance VIP latrines for girls in Kibaale RGC
ii. Construction of 1No. 5 stance VIP latrines for girls in Kifamba RGC
iii. Construction of 2No. 5 stance VIP latrines for boys in Kibaale RGC
iv. Construction of 1No. 5 stance VIP latrines for boys in Kifamba RGC

A summary of the sanitation components is presented below.

Table 0-3: Sanitation Components

Component	Description	Unit	Kibaale - Kifamba RGCs WSS
Sanitation	**Sanitation**		
	Sanitation Facilities		
	6 stance waterborne toilet (Public Toilet)	No.	2No.
	5 stance VIP latrine (Girls)	No.	3No.
	5 stance VIP latrine (Boys)	No.	3No.
Source: Design Report, 2021			

C. Operation Phase:

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

04. Nature of Project according to National Environment Act No.5 of 2019

In reference to the National Environment Act No.5 of 2019, schedule 5 lists projects that require ESIS to be submitted to NEMA. According to Schedule 5 of the National Environment Act 2019, this project is categorised under part 1 as a **Category 4**: Utilisation of water resources and water supply, including- (b) Abstraction or utilization of ground water of **more than 1000 m³/day**. The piped water supply system will be sized based on the design demand of **2,559.44 m³/day.**

05. Project Investment Cost

The project capital investment cost is Uganda Shillings Thirty-Four Billion seven hundred ninety-seven million nine hundred eighty-four thousand seven hundred thirty shillings (Ugx 34,797,984,730).

06. Project Institutional and Management

The recommended operation and management option is to handover the management of the water supply system and public sanitation facilities to a national utility which may be South Western Umbrella of Uganda or National Water and Sewerage Corporation. Within the decentralization framework, the experience and capacity of Umbrella organization and or NWSC, applied directly to the management of the newly constructed facilities will increase the likelihood of sustainable commercial operations and management of the town systems in the next 5-10 years.

07. Scope of the ESIS

The ESIS scope focused on;

i. Presentation of baseline data on physical, biological and socio-economic conditions of the project area;
ii. Prediction and evaluation of potential environmental and social impacts of proposed project;
iii. Mitigation measures for significant impacts identified; and
iv. Environmental and Social Management Monitoring Plan (ESMMP) to ensure effective environmental and social management and monitoring of the project during execution.

08. Study methodology

Environmental conditions of the project area of influence have been collated from site investigations and literature review of the feasibility report, Social economic baseline survey report, Detailed Engineering designs and Water quality analysis reports.

09. Baseline

Table 0-4: Baseline characteristics of the project area

Aspect	Description
Physical environment	
Climate	The mean annual varies from 1,350mm to 2,125mm. Two dry seasons occur with the more pronounced one in June-July -August and September, while the other is between December and February. The district generally records around 25°C mean annual maximum temperatures. The Eastern parts record a mean annual minimum of 17.5°C while it decreases to around 15°C to the West. The Kibanda areas record mean monthly maximum temperatures ranging between 26°C and 27°C.
Ambient Air Quality	Baseline data from the project area indicates a pristine air quality environment. CO, NO, NO_2, Cl_2, ClO_2, H_2S and combustible gases were not detected. TSP levels conformed to the draft national limit of 0.3 mg/m^3. Overall comparison of TSP levels in the project area compared to national standards indicates conformity at baseline levels.
Topography	The North eastern and Western parts of Rakai District are hilly (Rakai highlands) only interrupted by two major lake depressions (Kijanebalola and Kacheera) and occasional wide flat valleys (psendoplains). The southern-eastern and north western parts of the district comprise almost flat to undulating plains topography. Therefore, Rakai District can be divided into three main topographic zones – the Lake Victoria shores, the North – Eastern and Western hills and the North – Western plains
Soils	Over 75% of Rakai soils are ferralitic representing an almost final stage of weathering with little or no mineral reserve left. Some "heavy" clay varieties have some fertility but sandy varieties are particularly poor. Other types include lithosols, alluvial and lacustrine sands and alluvial clays. Generally, lithosals and humus loams are the

	dominant upland components while the grey sandy soils derived from hill wash or river alluvium, grey clays of the valley bottoms and lacustrine sands dominate the lowland component. Lithosols are soils without horizons and thus young and stony or bare rocks
Vegetation	Rakai is endowed with a rich natural environment ranging from high forest, savannah grassland forest and man-made forest. The vegetation of Rakai District is as varied as the different ecosystems that characterize the area. It ranges from the medium altitude forests on the shores of Lake Victoria, through swamps to savannas. Three broad categories can be used to classify the vegetation of the district, namely: forests, swamps and savannas
Socioeconomic environment	
Project area administrative units	The Project Area covers 4No. Sub Counties in Rakai District, namely, Kyalulangira, Byakabanda, Kiziba and Kibanda. 7No. parishes and 75No. villages will be supplied by the piped water supply system.
Population	According to the 2014 Population and Housing Census, the total population of Rakai District was 518,002 composed of 253,054 males and 264,954 females.
Housing and settlement	Within the project area, settlement patterns are such that dense settlements are established in the trading centers. The structures within the trading centers are typically permanent structures. Outside the trading centers, the settlement patterns are spatial, consisting of permanent and semi-permanent structures. In Kifamba RGC, findings of the household survey conducted indicate that 79% of respondent households live in houses constructed with burnt bricks, 11% with blocks and 10% with mud & wattle walls. Majority of the households in the project area (86%) have cement floors, while 14% have their floors of earth. Majority of the households (95%) live in houses constructed with iron sheet roofs and 5% are grass thatched. Similarly, in Kibaale RGC, findings indicate that 71.8% of respondent households live in permanent houses, 21.3% in semi-permanent houses and 6.9% in temporary structures.
Ethnic Composition	The dominant tribe in the project area is the Baganda followed by the Banyankole. Other tribes include; Barundi, Baziba and Banyambo.
Economic Activities	Majority of people living in rural depend on subsistence farming. The economy is basically reliant on crop production and livestock production. Main food crops include finger millet, maize, beans, bananas, sorghum, sweet potatoes, Irish potatoes, cassava and groundnuts. Coffee is the major cash crop in the district Findings of the household survey indicate that a significant size of the household heads in Kibaale are engaged in subsistence farming (45.1%), 22.7% are informal traders, 10% commercial farmers and 5.8% boda boda operators. The situation o not any different in Kifamba RGC, where subsistence farming accounts for majority of respondent households (38.7%), followed by commercial farming (10.4%), 10.1% boda boda operators and 9.4% are informal traders
Existing water supply situation and practises	There are a few options for obtaining water in Kibaale and Kifamba. These include Boreholes, Traditional wells, streams and vendors. The sources are used in differing magnitudes and at different times of the year. **i. Primary Water Source in Dry and Rainy Seasons** **Kibaale:** 38.2% in the rain season and 53.2% in the dry season fetch water from a river. 9.9% in the rain season and 17.6% in the dry season fetch from boreholes and 10.7% in the rain season and 10.8% in the dry season fetch from a shallow well **Kifamba:** 41.3% in the rain season and 40.8% in the dry season fetch water from a traditional well, 28.9% in the rain season and 37.7% in the dry season fetch from

	boreholes and some from a pond/stream (28.4% in the rain season and 28.4% in the dry season). **ii. Availability of drinking water and method of treatment** **Kibaale:** 93.3% treated drinking water and 87.8% HHs revealed to be boiling their drinking water. **Kifamba:** 96% reported treating drinking water compared to 4% who reported drinking untreated water. Of those who treat, 95.3% report treating their water by boiling, 3.1% boil and filter the water while 0.8% filter the water. **iii. Water vending in the project area** **Kibaale:** 44.4% buy water from the water venders. 83.4% of the water venders use bicycles to take water to the intended users. According to 35.3% of the respondents, there are between 5-10 venders, 22.8% mentioned that there are between than 10-20 venders and 21.3% mentioned that there are more than 20 venders in the RGC. **Kifamba:** 39% reported they buy water from vendors especially in the dry season. Water vendors charge between 1,000/= to 2,000/= per 20litre jerry can of water.
Existing sanitation facilities and practises	**i. Latrine facilities** **Kibaale:** 48.2% of the households use a traditional pit latrine, 32% a VIP line, 11% an unlined VIP and 1.4% use an ecosan. 75.6% rate their pit latrines as in a good state, 19.8% in a poor state while 4.5% reported their pit latrines as filled up. **Kifamba:** 99% of the households use private pit latrines and 1% use public pit latrines. 54.9% rate their pit latrines as fair, 34.9% as very satisfactory while 10.1% aren't satisfied at all about their pit latrines. **ii. Waste disposal facilities** **Kibaale:** 33.3% reported drying and burning their rubbish, 14.2% pouring it in the open, 32.5% disposed it off at a central collection point while 4.9% disposed it off in the plantation. **Kifamba:** 26% reported drying and burning their rubbish, 46% reported pouring it in a pit within the compound, 4% disposed it off at a central collection point while 23% disposed it off in the open.
Energy sources	**Kibaale:** 40.8% households were using Solar power as their major source of lighting and 4.2% use electricity. 50.5% use firewood and 52.2% use charcoal as their energy source for cooking. **Kifamba:** 8% households were using paraffin as their major source of lighting and 11% use candles. 86 (22%) of the households in the RGC were using electricity as their source of lighting, 235(59%) households were using solar power. For cooking, 72% of the households use firewood and 26% use charcoal.
Health	Kifamba RGC relies on 2 health centres, the facilities have a total number of 39 beds. The diseases commonly treated in the health facilities include; Typhoid, Malaria, STDS, HIV, TB, Skin and eye infections, diarrhoea, Respiratory tract infections, sexually transmitted diseases. In Kibaale RGC, the health institutions comprised of 3No. government institutions and 1No private institutions. The government institutions comprised of 1No. Health Center II (Kisomole HC II) and 2No. Health Center III (Kyalulangira HC III and Kiyonza HC III). The private institution was located in Kibaale Community and was at a level of Health Center III. **i. Household morbidity**

	Kibaale: 30.8% of the respondents had at least one person with sickness requiring treatment in the specified period. 38% of the sick people were female and 47% male **Kifamba:** 15% of the respondents had at least one person with sickness requiring treatment in the specified period. 56% of the sick people were female and 44% male **ii. Health facilities** Kibaale: 45% households prefer to get treatment from a health facility as compared to 30% that preferred to access treatment from the hospitals Kifamba: 44% households prefer to get treatment from a public health facility as compared to 56% that preferred to access treatment from the private health facilities.
Communication	The most listened to radio stations in both Kibaale and Kifamba RGCs include; CBS, Buddu FM, Karo and Star, among others.

0.10. Stakeholder Consultations

A record of stakeholder consulted is presented in Table ES 1, their views and sections in this ESIS, where concerns, recommendations were incorporated (taken into account).

Table 0-5: List of relevant stakeholders & Summary of Views

Category	Stakeholder	Date
National Level institutions	Ministry of Water and Environment	
Rakai District Local Government	Deputy Chief Administration Officer (DCAO) District Water Officer (DWO) District Health Inspector District Health Officer District Environment Officer District Community Development Officer (DCDO)	13.12.2021
Kifamba Sub County	Subcounty officials (LC III, CDO, SAS), Parish Chief, Councilors, LC1s	14.12.2021
Kyalulangira Sub County		14.12.2021
Byakabanda Sub County		15.12.2021

Table 0-6: Emerging issues from stakeholder consultation

Issue	Stakeholder concern(s)	Incorporation in ESIS / project
Land acquisition for project facilities	Land owners should be approached and engaged, especially where big facilities such as reservoir tanks and treatment plant will be set up. To avoid conflicts, the process should be timely before commencement of construction and transparent.	The transmission pipe network will as much as possible utilise the existing road corridor / reserves to avoid impact on property. In unavoidable circumstances shall be dealt with on a case-by-case basis-Compensation.
Employment of local community	Local labor should be prioritized both skilled and unskilled, this will help in reducing unemployment cases in the community but the contractor should equally avoid child labor.	Sub section 8.1.1
Destruction of intake Facilities by Hippopotamus	There is a concern of presence of hippopotamuses in the lake that may destroy the intake pipes and this might affect the pumping process in a long run.	The designs for the intake structures have put into consideration the potential sources of damage.

		Efforts will be done to study the Hippos way/path and try to avoid such
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 contactor should devise measures on how to reduce accidents on access roads	Section 8.2.10
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	Section 8.2.7

0.11. Potential impacts identified

Potential environmental and social impacts of the proposed project include the following;

Impact/Risk	Mitigation / Enhancement measures
	Positive impacts
Employment opportunities	- Employ locally available labour to create ownership and participation by the local communities on the project - Contractor to operate within Uganda's labour laws - Involvement of local leaders especially LC Is in recruitment - Avail equal opportunities and equal pay for men and women for the same job done - Ensure compliance with occupational safety and health requirements e.g., provision of PPE
Income to material / equipment suppliers	- To the extent possible, obtain earth materials needed for construction, for example, marram, aggregate (stones and sand) from the project affected villages. - Sign agreements with suppliers and comply with provisions - Restore material source areas after use - Ensure fair, adequate and timely remuneration of suppliers
Clean Water supply	- Sensitize communities through the Water User Committees on safe ways of collection and storage of water to avoid contamination
Improved access to water	- MWE 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.
Improved Sanitation and hygiene	- Sensitize communities through the water user committee on hygienic practises such as hand washing and personal hygiene at home
Improved health and Economic status of the community	- Users will be educated on the proper use, regular cleaning and effective maintenance of the public facilities.
	Negative impacts

Air Pollution	- Backfill trenches as soon as possible after laying pipes to avoid dust generation from the excavated heaped soils. - - Provide workers with appropriate PPE especially masks - Cover material transporting trucks with tarpaulin - Regularly service construction equipment and vehicles to control emission of gases
Noise Pollution	- Switch off machinery when not in use - Restrict noise generating activities to day time - Fit noise generating machinery with silences, if possible - Provide workers with appropriate PPE e.g., ear muffs - Site major noise sources away from community
Impact on Flora/vegetation	- Develop and implement a vegetation restoration plan - Limit vegetation clearing to only sections planned for civil works - Restore areas of temporary land take after construction - Conduct awareness creation (amongst the public and contractor's workers) focusing on vegetation conservation prior to and during construction - Sensitize workers on vegetation conservation
Risk of increased spread of COVID-19	- Provide adequate soap and water at all construction sites for workers and visitors wash to their hands frequently. - Continuously sensitize the workers on ways of preventing the spread of COVID-19. Such communication shall form part of the daily toolbox talks - 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. - Adhere to all measures and guidance issued by the Ministry of Health and presidential directives
Occupational Health and Safety (Accidents)	- Hoarding off construction sites to prevent access by unauthorized person - Recruit a qualified Health and Safety Officer to oversee OHS matters on a daily basis. - Provide adequate and appropriate personnel protective gear to the employees - Barricading with warning tapes all excavated sites/ open trenches and pits to prevent access by un authorized person - 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 - Provide first Aid kits fully equipped with the necessary materials at all working sites; and train a first aider to administer it
Management of generated waste	- Develop and implement a waste management plan to ensure that measures for handling all project-generated waste are in place - 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. - Waste will be collected, sorted and temporally stockpiled in a designated area before haulage off site
Water Source Pollution	- Keep all construction equipment in good operating condition to avoid oil or fuel leakages that might contaminate water resources. - 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.

	- All other wastes generated will be transported by the contractor or a company that has been specifically contracted to an authorized disposal area.
Impact on Public safety	- Enforce restrictions on unnecessary entry into the construction working area - Hoarding off the sites will be mandatory especially at sanitation facilities, treatment plant and reservoir areas where some major construction is expected - Conduct safety awareness campaigns in schools about the risks of students coming close to the construction site; - Safe vehicle speed limits will be instituted and enforced along access roads including site vehicle manoeuvres
Degradation of soils and Soil erosion	- Limit vegetation clearance to areas that will be required for construction of the system components to minimize land disturbance - Develop and implement a waste management plan - Store topsoil and subsoil generated during site preparation properly (away from runoff and possible contaminants) for reuse elsewhere or for backfilling and reinstatement - Cover heaps of excavated soil with tarpaulin to minimize exposure to agents of erosion such as wind and running water;

0.12. 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.

0.13. 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 – South West) together with Rakai District Environment officer, community development officer and District Water officer. The contractor will also be required to customise this ESMP and form C-ESMP.

Table 0-7: Environment and Social Management Plan matrix

Impacts	Nature of Impact	Impact indicator/ KPI	Mitigation measure/ required Actions	Deadline of completion	Performance targets	Frequency of monitoring	Implementation responsibility	Estimated Cost
Positive impacts to be enhanced for all the three (3) phases								
Employment opportunities	Positive	No. of workers employed from the project area No. of women employed in the project Average salary/ wages paid to workers in comparison with salaries for similar jobs in the area. Number of grievances recorded from project workers. Number of incidents registered on site.	Give jobs to local community without discrimination of gender Involve Local leaders such as LC1 Chairpersons in recruitment of workers to avoid employment of children and persons with criminal records Publicize available work opportunities through the commonly used and easily accessible media using the local dialect Give all workers contracts and ensure that terms of employment are clear to all parties and adhered to. Ensure a safe working environment for all workers	End of contract as signed by either the worker or the contractor.	Local workers employed. Number of female workers employed	Monthly and quarterly	Contractor	It shall depend on the cost of living and skills of a worker.
Income to material / equipment suppliers	Positive	NEMA approval in place; Extraction Agreements in place and with provisions for restoration of sites; Schedule for monitoring of extraction of establishment materials in place.	Establishment materials shall be sourced from areas/suppliers with proof of Environmental and Social Impact Assessments/ Audits compliance evidenced by available valid EIA Certificate of Approval OR Compliance Agreement with NEMA.	End of contract duration as per the MOU signed between the source of material and contractor.	Source of material that complies with both the national and international legal requirements.	Monthly and quarterly	Contractor	Contract

Impacts	Nature of Impact	Impact indicator/ KPI	Mitigation measure/ required Actions	Deadline of completion	Performance targets	Frequency of monitoring	Implementation responsibility	Estimated Cost
			Where necessary Earth materials procurement contracts should be reviewed by competent legal practitioners under the overall supervision of MWE to avoid taking advantage of landowners where borrow pits and rock quarries are located.					
Creation of business opportunities	Positive	Evidence of payments made to land owners Number of community sensitization session on business opportunities Percentage of women employed on the project	Ensure adequate, fair, and prompt payments to local supplies Ensure equal opportunities to promote women participation Publicise available business opportunities	Throughout the project period.	All Business opportunities within the project corridor.	monthly	Contractor	N/A
Improved access to water	Positive	Improved socio-economic conditions in the area	Operation and maintenance records Changes in socio-economic conditions in the area	Throughout the project period	Clean water to all people supplied	Weekly and Monthly	Contractor	As per the adopted tariff
Clean water supply	Positive	Functionality reports of the system Provision of safe water Reports of sensitization workshops Formation of Water supply and Sanitation board Presence of women in key position of the Water and Sanitation board	Provision of water and sanitation services to the population without discrimination at affordable rates On-time billing and keeping users up to date on the status and functionality of the various project facilities. Construct yard taps within a radius of 500 m as recommended in the water supply design manual. Sensitize the community on the management of the water supply and sanitation system.	Through out	Uninterrupted supply of clean water supply.	Weekly and monthly	Contractor	Contract

Impacts	Nature of Impact	Impact indicator/ KPI	Mitigation measure/ required Actions	Deadline of completion	Performance targets	Frequency of monitoring	Implementation responsibility	Estimated Cost
			If a Community Based Management System will be adopted for the scheme management, presence of women in the Water Supply and Sanitation Board is highly recommended.					
Improved sanitation and hygiene	Positive	Sanitation improvement reports Sensitization workshops	Conduct sensitization and awareness campaigns to improve sanitation aimed at driving adoption of improved water borne toilet systems at their homes.	Though out	All people to access improved sanitation services	Quarterly	Contractor and MWE	UGX 40,000,000
Infrastructure improvement	Positive	No. of infrastructure constructed and improved	A steady maintenance system for the infrastructure. Skilled labour to maintain the infrastructure.	Throughout	Functional infrastructure system.	Weekly, and daily	Contractor, MWE and Operator	Contract
Establishment phase								
Risk of increased spread of COVID-19	Negative	No. of hand washing facilities provided No. of workers' sensitization meetings held on COVID19 prevention No. of workers issued with masks Presence and evidence of use of a temperature gun on site	Provide adequate soap and water at the site to ensure workers and visitors wash their hands frequently. Continuously sensitize the workers on ways of preventing the spread of COVID-19. Such communication shall form part of the daily tool box talks Provide washable masks to all workers and visitors and enforce wearing of the same at all times while at the worksites Screen all workers and visitors for signs of COVID-19 such as	Throughout	Zero cases of COVID-19;	Weekly	Contractor	UGX 10,000,000

Impacts	Nature of Impact	Impact indicator/ KPI	Mitigation measure/ required Actions	Deadline of completion	Performance targets	Frequency of monitoring	Implementation responsibility	Estimated Cost
			temperature before they access any work site. Adhere to all measures and guidance issued by the Ministry of Health and presidential directives					
Impact on Surface Waters	Negative	Evidence of management of waste water from sanitary facilities. Evidence of proper management of project waste Possession of spill kits to for cleaning up spillage No. of workers sensitizations conducted	Regularly maintain vehicles and equipment to avoid fuel leakages Prohibit washing of project vehicles and equipment in water courses Ensure proper management of generated waste In case of spillage of oil/lubricants, spilled product should be localized / cleaned Conduct regular training and sensitization of workers on pollution prevention	Throughout	Reduced or minimized wastes generation. Reduced or zero complaints from nearby households	Monthly Quarterly	Contractor	UGX 15,000,000
Air Pollution	Negative	Record of complaints from neighbors; Air quality records(such as PM2.5, PM10, CO2, CO, O2, H2S, and CH4) Visual observation of diffusing dust in air. Evidence of sprinkling of water along the access roads Presence of a Dust Management Plan and logistics plan Number of dust-related complaints.	Cover trucks with tarpaulin to reduce the risk of fugitive dust emissions Limit vegetation clearing to the demarcated boundaries of the site Sprinkle water along the access roads Sensitize drivers with emphasis on the need to stick to designated routes and speed limits. Use well-maintained vehicles and machines	Throughout	Air quality levels below the national and international standards.	Monthly	Contractor	Contract

Impacts	Nature of Impact	Impact indicator/ KPI	Mitigation measure/ required Actions	Deadline of completion	Performance targets	Frequency of monitoring	Implementation responsibility	Estimated Cost
		Evidence of covered material haulage trucks	Shut down equipment when not in use to minimize idle time; Regularly service the equipment and vehicles to optimum working conditions to minimize potential emissions					
Noise Pollution	Negative	Records of complaints from neighbors; Record of noise measurements	Limit marram extraction activities to daytime Regularly care for and maintain vehicles and equipment Provide protective equipment to workers Erect humps along the access road especially near the school; to reduce speed of material haulage trucks which may generate noise	Throughout	Noise levels below the national and international standards; No record of complaints from community	Monthly	Contractor	Contract
Vegetation loss	Negative	Bare land left; Number of removed trees; Extent of restoration works. Coverage of replanted vegetation or trees	Limit vegetation clearance to the demarcated boundary of the site Store top soil from site clearing on the site to be later used for restoration Restore the site after extraction of the required quantity of Use well-maintained vehicles and machines Shut down equipment when not in use to minimize idle time;	Throughout	Reviginate entire non-constructed area. Achieve at least same number of trees before excavation	Monthly	Contractor	Contract

Impacts	Nature of Impact	Impact indicator/ KPI	Mitigation measure/ required Actions	Deadline of completion	Performance targets	Frequency of monitoring	Implementation responsibility	Estimated Cost
			Regularly service the equipment and vehicles to optimum working conditions					
Occupational Health and Safety	Negative	First Aid Kits and PPEs procured and being used; OSH training program prepared and training reports in place; OHS provisions integrated in works Method Statements; NO SMOKING signs posted in no smoking zones in the project.	Contractor to have in place, an OHS Management Plan; Have in place, a First Aid kits in strategic work locations in the project; Design and conduct OSH trainings for project workforce; Provide for OHS in all Method Statements for works; Provision of workers with appropriate PPEs and enforce its effective usage; Provision of warning road signage at appropriate locations in the project area; Install "no smoking" signage in high fire risks installations such as fuel storage and outlets, public and communal areas. safe establishment plant, equipment and work methods safe handling, storage, transport and disposal of materials in a way that avoids risk to workers provision of protective gear hiring a full time qualified "Accident prevention officer" or safety officer conducting safety awareness among all workers and routine/daily toolbox meetings at all work fronts, led by section heads/ safety champions and supervised by the Environmental, Health and Safety Officers on	Throughout	Zero fatal accidents. Reduced incident occurrence.	Monthly	Contractor	UGX 8,000,000

Impacts	Nature of Impact	Impact indicator/ KPI	Mitigation measure/ required Actions	Deadline of completion	Performance targets	Frequency of monitoring	Implementation responsibility	Estimated Cost
			both the Contractor's and Supervision Consultant's teams. Control harmful insects/ vectors (including mosquitoes and houseflies) in this case tsetse flies shall be the major focus. reporting accidents to supervising engineer in a timely manner and police including maintaining an accident and incident log; Severe Accidents (fatalities) and Serious Accidents shall be reported to the RE immediately and to MWE within 12 hours within 24 hours of occurrence. control contagious diseases (e.g. Cholera) through proper sanitation and awareness control occupational hazards related to: physical hazards (noise, vibrations, high temperature) chemical hazards mechanical hazards (moving equipment) electrical/ explosion hazards ergonomic injuries (poor working postures, heavy loads, etc) poor sanitation in workplace or living environment of workers					
Poor management of generated waste	Negative	Presence of domestic wastes on site Records of complaints from the nearby households Record of wastes generated	Provision of appropriate coded waste bins at site; Segregation of waste generated; Provide mobile toilets; Training of workers and community on good waste management practices;	Throughout	Reduced or minimized wastes generation All wastes disposed-off in gazetted area Reduced or	Monthly	Contractor	UGX 4,000,000

Impacts	Nature of Impact	Impact indicator/ KPI	Mitigation measure/ required Actions	Deadline of completion	Performance targets	Frequency of monitoring	Implementation responsibility	Estimated Cost
			A licensed waste handler will be contracted to provide services		zero complaints from nearby households			
Insecurity and increased crime	Negative	Number of reported crimes to police. Number of criminals reported to police. Number of items stolen.	Having well trained security guards Having a security management plan. Fence around the site.	Though out.	Reduced crime rates within the area.	Monthly	Contractor	Contract
Impact on Public safety	Negative	Restoration plans for all borrow pits and rock quarries shall be produced and approved before commencement of operations Establishment safety signage shall be installed at all establishment sites A nominated service provider shall be hired	The contractor shall install access to properties; Restoration plans for all borrow pits shall be produced and approved before commencement of operations. Speed control structures shall be installed at such areas and towns. Establishment safety signage shall be installed at all establishment sites Installed culverts shall be properly backfilled, levelled and compacted to enable all community resident easy access including the disabled. A nominated service provider shall be hired to undertake community sensitizations and engagement on their health and safety during road establishment works, working closely with the traffic police and community leaders and District Officials as and when necessary. Maintain high visibility signage at all work sites All workers shall be required to wear high visibility vests	Throughout	Reduced disruption on access routes. Reduced incident occurrences.	Monthly	Contractor	UGX 6,500,000

Impacts	Nature of Impact	Impact indicator/ KPI	Mitigation measure/ required Actions	Deadline of completion	Performance targets	Frequency of monitoring	Implementation responsibility	Estimated Cost
			Community shall be involved in securing road safety signage. Establish a Grievance Redress Committee to receive and handle complaints from Public.					
Increase in Gender inequalities including Gender Based Violence and infringement on the rights of women and girls at the work	Negative	Record of complaints related to GBV, SEA and VAC Record of sensitization of workers and community	Sensitize all workers on Code of Conduct; Collaborate with local leadership to establish zero tolerance policies on GBV/SEA/SH; Provide code of conduct to workers and enforce it; Train all workers on laws against defilement and other sexual offences; Conduct gender sensitization and mainstreaming into the site works; Work closely with GBV and VAC Service Providers to effectively implement related activities; Deploy women as flag persons, and safety officers; Use gender-sensitive language like: "Go Slow, Work in Progress" instead of "Go Slow, Men at Work"; Conduct gender mainstreaming to create an enabling work-environment for women	Throughout	Reduced cases on the code of conduct. Reduced complaints.	Monthly	Contractor	UGX 20,000,000
Impact on Utilities	Negative	Number of utility lines within the project corridor. Number of utility lines to be disrupted.	Undertake a baseline survey with utility owners. Formulate a plan of rehabilitating a utility line in case it tis destroyed. Inform community members 3 days before a utility line is to be disrupted.	Throughout	Reduced disruption by utility lines destroyed.	Monthly	Contractor	UGX 10,000,000

Impacts	Nature of Impact	Impact indicator/ KPI	Mitigation measure/ required Actions	Deadline of completion	Performance targets	Frequency of monitoring	Implementation responsibility	Estimated Cost
Temporary loss of access to homes	Negative	Number of access routes along the project corridor. Number of access routes that can be diverted. Number of reinstated access routes.	Create diversion routes in collaboration with the community members. Install safety signs at disrupted and closed access routes.	Throughout	Reduced disruption due to affected accesses to homes	Monthly	Contractor	UGX 10,000,000
Operational phase								
Risk of increased spread of COVID-19	Negative	No. of hand washing facilities provided No. of workers' sensitization meetings held on COVID19 prevention No. of workers issued with masks Presence and evidence of use of a temperature gun on site	Provide adequate soap and water at the site to ensure workers and visitors wash their hands frequently. Continuously sensitize the workers on ways of preventing the spread of COVID-19. Such communication shall form part of the daily tool box talks Provide washable masks to all workers and visitors and enforce wearing of the same at all times while at the worksites Screen all workers and visitors for signs of COVID-19 such as temperature before they access any work site. Adhere to all measures and guidance issued by the Ministry of Health and presidential directives	Throughout	Zero cases of COVID-19;	Weekly	Operator	UGX 2,000,000
Noise Pollution	Negative	Records of complaints from neighbors; Record of noise measurements	Limit all operations to day-time hours; Regularly service equipment for efficiency Provision of PPEs to all workers	Throughout	Noise levels below the national standards; No record of complaints from community	Monthly	Operator	UGX 1,000,000

Impacts	Nature of Impact	Impact indicator/ KPI	Mitigation measure/ required Actions	Deadline of completion	Performance targets	Frequency of monitoring	Implementation responsibility	Estimated Cost
Occupational Health and Safety	Negative	First Aid Kits and PPEs procured and being used; OSH training program prepared and training reports in place; OHS provisions integrated in works Method Statements; NO SMOKING signs posted in no smoking zones in the project.	Have in place, a First Aid kits in strategic work locations in the project; Design and conduct OSH trainings for project workforce; Provide for OHS in all Method Statements for works; Provision of workers with appropriate PPEs and enforce its effective usage; Install "no smoking" signage in high fire risks installations such as fuel storage and outlets, public and communal areas. safe establishment plant, equipment and work methods safe handling, storage, transport and disposal of materials in a way that avoids risk to workers provision of protective gear conducting safety awareness among all workers and routine/daily toolbox meetings at all work fronts, led by section heads/ safety champions and supervised by the Environmental, Health and Safety Officers on both the Contractor's and Supervision Consultant's teams. Control harmful insects/ vectors (including mosquitoes and houseflies) in this case tsetse flies shall be the major focus. Maintaining an accident and incident log; Severe Accidents (fatalities) and Serious Accidents shall be reported to the plant manager immediately.	Throughout	Zero fatal accidents. Reduced incident occurrence.	Monthly	Operator	UGX 4,000,000

Impacts	Nature of Impact	Impact indicator/ KPI	Mitigation measure/ required Actions	Deadline of completion	Performance targets	Frequency of monitoring	Implementation responsibility	Estimated Cost
			control contagious diseases (e.g., Cholera) through proper sanitation and awareness control occupational hazards related to: physical hazards (noise, vibrations, high temperature) chemical hazards mechanical hazards (moving equipment) electrical/ explosion hazards ergonomic injuries (poor working postures, heavy loads, etc.) poor sanitation in workplace or living environment of workers					
Poor management of generated waste	Negative	Presence of domestic wastes on site	Provision of appropriate coded waste bins at site; Segregation of waste generated; Provide a sanitary facility for works. Training of workers and on good waste management practices; A licensed waste handler will be contracted to provide services	Throughout	Reduced or minimized wastes generation All wastes disposed-off in gazetted area Reduced or zero complaints from nearby households	Monthly	Operator	UGX 4,000,000
Insecurity and increased crime	Negative	Number of reported crimes to police. Number of criminals reported to police. Number of items stolen.	Having well trained security guards Having a security management plan.	Throughout.	Reduced crime rates within the area.	Weekly	Operator	N/A
Increase in Gender inequalities including Gender Based Violence and infringement on the rights of	Negative	Record of complaints related to GBV, SEA and VAC Record of sensitization of workers and community	Sensitize all workers on Code of Conduct; Collaborate with local leadership to establish zero tolerance policies on GBV/SEA/SH; Provide code of conduct to workers and enforce it; Train all workers on laws	Throughout	Zero GBV, SEA & VAC cases Increased awareness rising on GBV, SEA &VAC	Monthly	Operator	UGX 5,000,000

Impacts	Nature of Impact	Impact indicator/ KPI	Mitigation measure/ required Actions	Deadline of completion	Performance targets	Frequency of monitoring	Implementation responsibility	Estimated Cost
women and girls at the work			against defilement and other sexual offences; Conduct gender sensitization and mainstreaming into the site works; Work closely with GBV and VAC Service Providers to effectively implement related activities; Deploy women as flag persons, and safety officers; Use gender-sensitive language like: "Go Slow, Work in Progress" instead of "Go Slow, Men at Work"; Conduct gender mainstreaming to create an enabling work-environment for women.					
Decommissioning phase								
Air Pollution	Negative	Record of complaints from neighbors; Air quality records Visual observation of diffusing dust in air	Wet the access road to suppress dust generated; Provision of PPEs to workers Install speed limit of 20km/hour along the access	Throughout	Air quality levels below the national;	Monthly	Contractor	
Noise Pollution	Negative	Records of complaints from neighbors; Record of noise measurements	Limit all operations to day-time hours; Regularly service equipment for efficiency Provision of PPEs to all workers	Throughout	Noise levels below the national standards; No record of complaints from community	Quarterly	Contractor	UGX 3,000,000
Occupational Health and Safety	Negative	First Aid Kits and PPEs procured and being used; OSH training program prepared and training reports in place; OHS provisions integrated in works Method Statements; NO SMOKING signs posted in no smoking zones in the project.	Have in place, a First Aid kits in strategic work locations in the project; Design and conduct OSH trainings for project workforce; Provide for OHS in all Method Statements for works; Provision of workers with appropriate PPEs and enforce its effective usage;	Throughout	Zero fatal accidents. Reduced incident occurrence.	Quarterly	Contractor	UGX 5,000,000

Impacts	Nature of Impact	Impact indicator/ KPI	Mitigation measure/ required Actions	Deadline of completion	Performance targets	Frequency of monitoring	Implementation responsibility	Estimated Cost
			Install "no smoking" signage in high fire risks installations such as fuel storage and outlets, public and communal areas. safe establishment plant, equipment and work methods safe handling, storage, transport and disposal of materials in a way that avoids risk to workers provision of protective gear hiring a full time qualified "Accident prevention officer" or safety officer conducting safety awareness among all workers and routine/daily toolbox meetings at all work fronts, led by section heads/ safety champions and supervised by the Environmental, Health and Safety Officers on both the Contractor's and Supervision Consultant's teams. Control harmful insects/ vectors (including mosquitoes and houseflies) in this case tsetse flies shall be the major focus. Maintaining an accident and incident log; Severe Accidents (fatalities) and Serious Accidents shall be reported to the plant manager immediately. control contagious diseases (e.g. Cholera) through proper sanitation and awareness control occupational hazards related to: physical hazards (noise, vibrations, high temperature) chemical hazards					

Impacts	Nature of Impact	Impact indicator/ KPI	Mitigation measure/ required Actions	Deadline of completion	Performance targets	Frequency of monitoring	Implementation responsibility	Estimated Cost
			mechanical hazards (moving equipment) electrical/ explosion hazards ergonomic injuries (poor working postures, heavy loads, etc.) poor sanitation in workplace or living environment of workers					
Poor management of generated waste	Negative	Presence of domestic wastes on site Records of complaints from the nearby households Record of wastes generated	Provision of appropriate coded waste bins at site; Segregation of waste generated; Provide a sanitary facility for works. Training of workers and on good waste management practices; A licensed waste handler will be contracted to provide services	Throughout	Reduced or minimized wastes generation All wastes disposed-off in gazetted area Reduced or zero complaints from nearby households	Quarterly	Contractor	UGX 4,000,000
Spread of invasive species	Negative	Record of invasive species identified	Manually remove and appropriately destroy identified alien species before flowering to prevent the spread of its seeds.	Throughout	No introduction of invasive species	Monthly	Contractor	N/A

Independent local empowered and accessible Grievance Redress Mechanism (GRM) at the project level;

The Project-Affected-People in rural areas and small-town settlements and any other stakeholders will submit comments or complaints at any time by using the project's Grievance Redress Mechanism (GRM). The overall objectives of the GRM are to:

1. Provide a transparent process for timely identification and resolution of issues affecting the project and people, including issues related to specifics in program components.
2. Strengthen accountability to beneficiaries, including project affected people. The GRM will be accessible to all external project stakeholders, including affected people, community members in rural areas and small towns, civil society, media, and other interested parties.

Grievances may emerge from directed and indirect activities related to civil work activities. Local communities have existing traditional and cultural grievance redress mechanisms, and in addition, there are the Water and sanitation Committees. When Grievances cannot be managed at Community Level, there is a District Grievance Management Committee. The initial effort to resolve grievances to the complainant's satisfaction will be undertaken by those structures. If any grievance cannot be resolved at that level, it shall be allowed to go the court of law.

Grievance Resolution Information about the GRM will be publicized as part of the initial program consultations and disclosure in all the participating agencies. Brochures will be distributed during consultations and public meetings, and posters will be displayed in public places such as in government offices, project implementation unit offices, notice boards available to strategic stakeholders, etc

The overall grievance resolution framework will include six steps described below. The six steps demonstrate a typical grievances resolution process.

• **Step 1: Uptake.** Project stakeholders will be able to provide feedback and report complaints through several channels such as filling up grievance forms, reporting grievances to implementing agencies, submitting grievance via email address made available by the implementing units and via the implementing institutions' websites collection boxes stipulated for the grievance uptake.

• **Step 2: Sorting and processing.** Each unit / department of the implementing institutions will conduct a prompt sorting and processing of all grievances. The processing will involve the internal escalation process to specific desks to review, resolve and respond to grievances raised.

• **Step 3: Acknowledgement and follow-up.** Within seven (7) days after the date a complaint is submitted, the responsible person within the unit will communicate with the complainant and provide information on the likely course of action and the anticipated timeframe for resolution of the complaint. The information provided to complainant would also include, if required, the likely procedure if complaints had to be escalated outside the unit and the estimated timeline for each stage.

• **Step 4: Verification, investigation and action.** This step involves gathering information about the grievance to determine the facts surrounding the issue and verifying the complaint's validity, and then developing a proposed resolution. It is expected that many or most grievances would be resolved at this stage. All activities taken during this and the other steps will be fully documented, and any resolution logged in the register.

• **Step 5: Monitoring and evaluation.** Monitoring refers to the process of tracking grievances and assessing the progression toward resolution. Each implementing agency would develop and maintaining a grievance register and maintain records of all steps taken to resolve grievances or otherwise respond to feedback and questions.

• **Step 6: Providing Feedback.** This step involves informing those who have raised complaints, concerns or grievances the resolutions to the issues they have raised.

Whenever possible, complainants should be informed of the proposed resolution in person, which gives them the opportunity ask follow-up questions which could be answered on the spot for total resolve. If the complainant is not satisfied with the resolution, he or she will be informed of further options.

The Sociologists shall update the grievance register which shall be the collection of all grievances raised across GRM State One and GRM Stage Two levels. The social specialists shall meet quarterly to review the grievance registers and update the grievance register which shall be the collection of all grievances raised during project implementation

The grievance register should have the following.

1. Individual reference number
2. Name of the person submitting the complaint, question, or other feedback, address and/or contact information (unless the complaint has been submitted anonymously)
3. Details of the complaint, feedback, or question/her location and details of his /her complaint.
4. Date of the complaint.
5. Name of person assigned to deal with the complaint (acknowledge to the complainant, investigate, propose resolutions, etc.)
6. Details of proposed resolution, including person(s) who will be responsible for authorizing and implementing any corrective actions that are part of the proposed resolution.
7. Date when proposed resolution was communicated to the complainant (unless anonymous).
8. Date when the complainant acknowledged, in writing if possible, being informed of the proposed resolution.
9. Details of whether the complainant was satisfied with the resolution, and whether the complaint can be closed out
10. If necessary, details of escalation procedure

11. Date when the resolution is implemented (if any).

0.13. Roles and Responsibilities in the ESMP Implementation

Ministry of Water and Environment will coordinate with NEMA on ensuring that environmental and social issues are addressed effectively throughout the lifecycle of the Project. Implementation of the different environmental issues is done through the relevant government institutions (Lead Agencies) within whose mandate the respective issues lie. The role of NEMA is to coordinate the input by all the different lead agencies and ensure compliance with the National Environmental Policy and Law. The monitoring team/ institutions shall be required to report on a quarterly basis. The reporting matrices shall include mong others accident and incidents, compliance with ESMPs, challenges and how to address the challenges

Implementation of the ESMP will involve multiple institutions at all levels as detailed out below in **Table 0-8 below**

Table 0-8: Roles and responsibilities within the Project Implementation Unit

Ministries and Departments	Roles and responsibilities
The Ministry of Water and Environment (MWE)	The ministry of Water and Environment (MWE) has the overall mission: to promote and ensure the rational and sustainable utilization, development and effective management of water and environment resources for socio-economic development of the country. The ministry has three directorates; Directorate of Water Resources Management (DWRM, Directorate of Water Development (DWD) and Directorate of Environmental Affairs (DEA). MWE shall take lead on implementation of the project and shall ensure all recommendations contained in the mitigation plan are implemented
Ministry of Local Government-MoLG	The ministry of is mandated to carry out a number of responsibilities in the Local Government Act as follows; to inspect, monitor, and where necessary offer technical advice/assistance, support supervision and training to all Local Governments, to coordinate and advise Local Governments for purposes of harmonization and advocacy, to act a Liaison/Linkage Ministry with respect to other Central Government Ministries and Departments, Parastatals, Private Sector, Regional and International Organizations, and to research, analyze, develop and formulate national policies on all taxes, fees, levies, rates for Local Governments; Rakai DLG falls under this Ministry and will be supervised and supported by MoLG
STATUTORY AGENCIES	
National Environment Management Authority (NEMA)	NEMA retains its mandatory role of coordination, supervision and monitoring environmental issues. As for the implementation of the ESIA process, NEMA's role will involve coordinating the review of the ESIAs of the planned interventions with relevant line agencies. Other lead agencies that would participate in the review are the Ministry of Local Government. Specifically, the Environmental Monitoring and Compliance Department of NEMA is responsible for the review and approval of ESIAs, post-implementation audits and monitoring of approved projects. Although project sponsors have a responsibility for monitoring their own activities, NEMA carries out its own monitoring largely through District Environmental Officers and environmental inspectors at NEMA's head office/ Lead Agencies.
DIRECTORATE	
Directorate of Environmental Affairs (DEA)	The DEA is responsible for environmental policy, regulation, coordination, inspection, supervision and monitoring of the environment and natural resources as well as the restoration of degraded ecosystems and mitigating and adapting to climate change.

Directorate of Water Development (DWD)	The DWD is responsible for providing overall technical oversight for the planning, implementation and supervision of the delivery of urban and rural water and sanitation services across the country, including water for production. DWD is responsible for regulation of provision of water supply and sanitation and the provision of capacity development and other support services to Local Governments, Management Authority and other service providers.
Directorate of Water Resources Management (DWRM)	The DWRM is responsible for developing and maintaining national water laws, policies and regulations; managing, monitoring and regulation of water resources through issuing water use, abstraction and wastewater discharge permits; Integrated Water Resources Management (IWRM) activities; coordinating Uganda's participation in joint management of trans boundary waters resources and peaceful cooperation with Nile Basin riparian countries.
DISTRICT	
District Environmental Officer (DEO)	The functions of the District Environment Officer is amongst others, advice the district Environment committee on all matters relating to the environment amongst others.
District Environmental Committees	The functions of the District Environment Committees include: to act as a forum for community members to discuss and recommend environmental policies and bye laws to the District Council and advice the District Technical Planning Committee, the District Council and NEMA on environmental management issues in the district.
NGOs	The NGOs working in the sector are coordinated at the national level through UWASNET, Uganda Water and Sanitation NGO Network an umbrella organization, which has been largely funded by sector development partners through MWE
Water Management at District Level	They receive funding from the center in the form of a conditional grant and can also mobilize additional local resources for water and sanitation programs. Local Governments, in consultation with MWE appoint and manage Management Authority for urban piped water schemes that are outside the jurisdiction of NWSC.
COMMUNITY	
Beneficiary Communities	The Communities are responsible for demanding, planning, contributing contribution towards land, and supporting operation and maintenance of the piped water supply and sanitation facilities. A Water and Sanitation Committee (WSC) should ideally be established for each Rural Growth Center or Town Council or Water Supply Area. Being the primary beneficiaries of the project, the community will be made to participate fully in all aspects of the program including project identification, preparation, implementation, operation and maintenance.

0.14. Costed Environment and Social Management and Monitoring Plan

Since the banks policy states that the total cost of the ESMMP is (3%-5%) before 5% contingency and 18% VAT of the project cost so in this particular project the total cost of the ESMMP is UGX 345,400,000 (Uganda Shillings Three Hundred Forty Five Million Four Hundred Thousand Only)

Table 0-9: Summary of Implementation Cost of the ESMMP

Item No.	Description	Unit	Estimated Quantity	Rate (UGX)	Amount (UGX)	Amount [1](USD)
1	Environmental action plan, decommissioning plans and reporting	L.S.	1	10,000,000	10,000,000	2,632
2 (a)	Provide Consultant Environmental Manager	Month	7	1,000,000	7,000,000	1,842
2 (b)	Provide Consultant Social Manager	Month	5	1,000,000	5,000,000	1,316
2 (c)	Provide qualified Environmentalist for the contractor	Month	7	700,000	4,900,000	1,289
3	HIV/AIDS and STD prevention and counselling and COVID 19 Prevention					
3 (a)	Provide, maintain and operate STD and HIV/AIDS clinic or make alternative arrangements with existing local clinic	Lump sum	1	2,900,000	2,900,000	763
3 (b)	Maintenance of sexual health and first aid clinic	Month	7	800,000	5,600,000	1,474
3 (c)	COVID 19 interventions and Standard Operating Procedures	paid monthly	7	500,000	3,500,000	921
4	Safety Clothing and Equipment's					
4 (a)	Provision of safety clothing and equipment for the workforce. (Ushs 200,000 to be paid for each of the 80 people per year)	Person-Years	80	200,000	16,000,000	4,211
5	Institutional coordination and support during construction and monitoring i.e., Local NGO's, Local Government and lead Agencies Meetings	Lumpsum	1	2,000,000	2,000,000	526
6	Source protection measures					
6 (a)	Planting and establishing	Lumpsum	1	30,000,000	30,000,000	7,895
7 (a)	Reinstatements	Lumpsum	1	10,000,000	10,000,000	2,632
7 (b)	Sand pits	Lumpsum	1	2,000,000	2,000,000	526
7 ©	Quarry site	Lumpsum	1	4,500,000	4,500,000	1,184
8 (a)	Environmental Social Audit	Lumpsum	1	80,000,000	80,000,000	21,053
8 (b)	Waste management	Lumpsum	1	12,000,000	12,000,000	3,158
8 (c)	Stakeholder Engagements, Training & Awareness and Dissemination	Lumpsum	1	100,000,000	100,000,000	26,316

[1] Exchange rate of 1USD = UGX 3,800 was adopted

Item No.	Description	Unit	Estimated Quantity	Rate (UGX)	Amount (UGX)	Amount [1](USD)
8 (d)	Information Products and Publicity	Lumpsum	1	50,000,000	50,000,000	13,158
Total					**345,400,000**	**90,895**

0.15. 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.

1. INTRODUCTION

1.1 Background

The Government of Uganda, with support from Development Partners, established the Water and Sanitation Development Facility (WSDF) programme as a service delivery and funding mechanism to focus on provision of water supply and sanitation to small towns and rural growth centres in the country.
The WSDF concept has been developed as a vehicle to actualize the Urban Water Supply and Sewerage (UWSS) sub-sector key strategy, among others, "Effective funding mechanism for small towns' investments". This is linked to the Small Towns Water Supply and Sanitation (STWSS) component which is inadequately funded under the Joint Water Supply and Sanitation Programme Support (JWSSPS) in the sector.

The Water and Sanitation Development Facility – South West (WSDF-SW) commenced operations in July 2006, covering Twenty-eight (28) districts: Kabale, Kisoro, Rukungiri, Kanungu, Ibanda, Ntungamo, Bushenyi, Mbarara, Kiruhura, Isingiro, Kamwenge, Kabarole, Kasese, Sembabule, Rakai, Lyantonde, Kyenjojo, Kyegegwa, Buhweju, Rubirizi, Mitooma, Ntoroko, Bundibugyo, Sheema, Bunyangabu, Rukiga, Kyotera, and Rubanda.

WSDF-SWB received applications for water services from various towns and RGCs within the region of operation and these were scores and ranked and 50No. towns were identified for implementation in the next funding cycle which is expected to run from 2019 to 2024.
Ministry of Water and Environment, through the WSDF-SW, engaged services of competent Consultants to conduct feasibility studies and detailed engineering designs of selected town water supply systems in the South Western and Mid – Western regions of Uganda.

Eng. Otwane Dan Etiange was awarded a contract by Water and Sanitation Development Facility – South West to carry out Feasibility Studies and Detailed Design for Kibaale RGC Water Supply and Sanitation Systems (Contract No. MWE/WSDF-SWB/CONS/20-21/00001) and Feasibility Study and Detailed Design for Rwemikoma RGC, Nkungu RGC, Buremba Town Council and Kifamba RGC Water Supply and Sanitation Systems (Contract No. MWE/WSDF-SWB/CONS/18-19/00006/2). Due to the proximity of the RGCs of Kibaale and Kifamba, the detailed design of the pipe water systems have a common surface water source, lake Kijjanebalola.

Consequently, Eng. Otwane Dan Etiange engaged a team of environmental experts to undertake and environmental and social impact assessment for the proposed piped water supply and sanitation systems.

1.2 Water and Sanitation Development Facility – South West Project Objectives

The purpose of the WSDF-SW is to support the development of water supply and sanitation in small towns and rural growth centers through a decentralized and demand driven financing mechanism in central Uganda districts. The WSDF-SW provides technical and financial support to help districts and Town Councils to develop, rehabilitate and expand water supply services and sanitation in the small towns and rural growth centres, following a demand-based approach under the framework of Uganda's water and sanitation policies and relevant sector strategies.

The specific objectives of the WSDF – South West, therefore, are:

i. To improve 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
    - promotion of sanitation facilities
ii. To improve general health conditions through the reduction of water borne diseases in the targeted STs(Small Towns) and RGCs.
iii. To empower communities in the targeted RGCs through the nature of the operations of the WSDF (decentralized, participatory, bottom-up approach.)

iv. To ensure cross-cutting issues of Gender, Environment, Good governance and HIV/AIDS are adequately addressed in project implementation.

The core activities funded by the Water and Sanitation Development Facility include water supply and sanitation infrastructure development (new investment, rehabilitation, and major extensions), software and sanitation promotion programmes in small towns and rural growth centres.

1.3 Project Location

The project towns of Kibaale RGC and Kifamba RGC are located in Rakai District.

Rakai District is bordered by the districts of Lwengo and Lyantonde to the North, Kiruhura to the North West, Isingiro to the West, The Republic of Tanzania to the South and Kyotera to the East. The project location map for Rakai Project Area is shown in **Figure 1-1.**

Kibaale RGC is a rural growth centre located in Rakai District. The RGC is accessed by a gravel road approximately 13km South West from Rakai town. Kibaale town is earmarked to be upgraded to a Town Council. Kibaale Town Council comprises of the 20No. villages in Kalungi parish in Kyalulangira Sub County. The Kibaale RGC Project Area covers 4No. Sub County in Rakai District, namely, Kyalulagira, Byakabanda, Kiziba and Kibanda. 7No. parishes and 75No. villages will be supplied by the piped water supply system. The location map for Kibaale RGC is shown in **Figure 1-2.**

Kifamba RGC is a rural growth centre located in Kifamba Sub County of Rakai District. The RGC is accessed by a gravel road approximately 16km from Rakai town. The Kifamba RGC Project Area covers 1No. Sub County in Rakai District, namely, Kifamba. All the four parishes in Kifamba Sub County will be supplied by the piped water supply system. The location map for Kifamba RGC is shown in **Figure 1-3.**

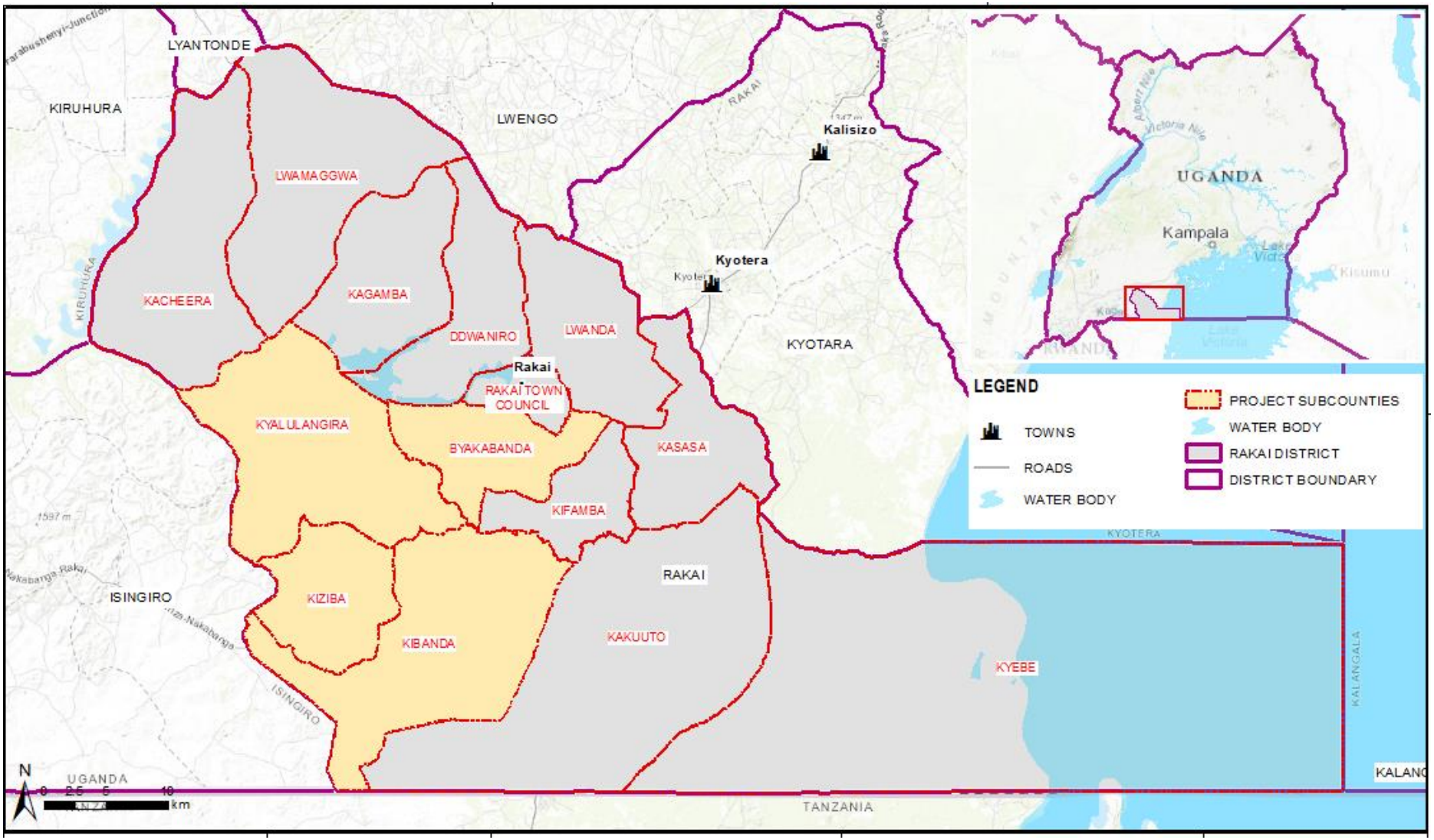


Figure 1-1: Map of Rakai showing the Project Areas

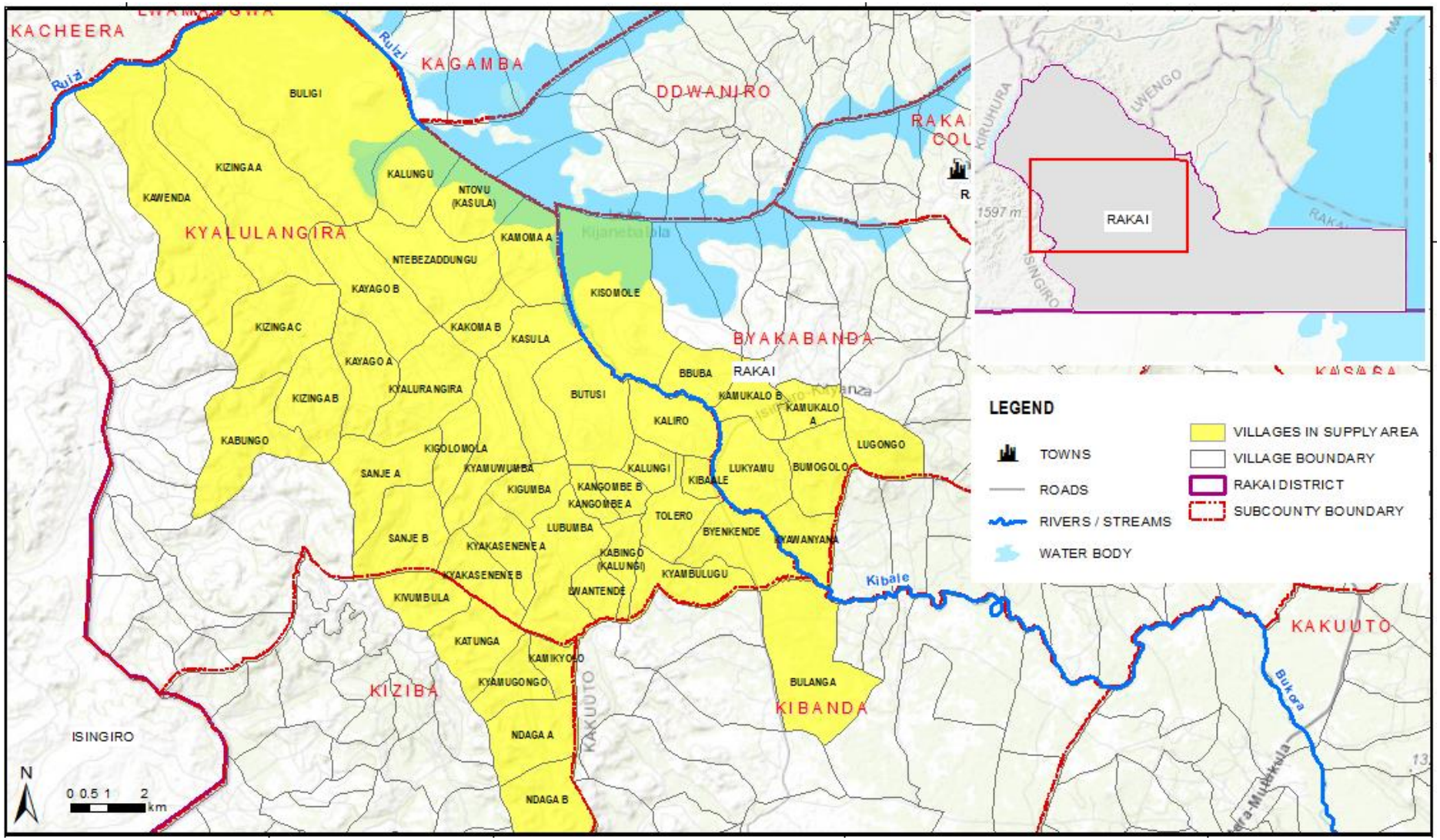


Figure 1-2: Map of Kibaale RGC Project Area

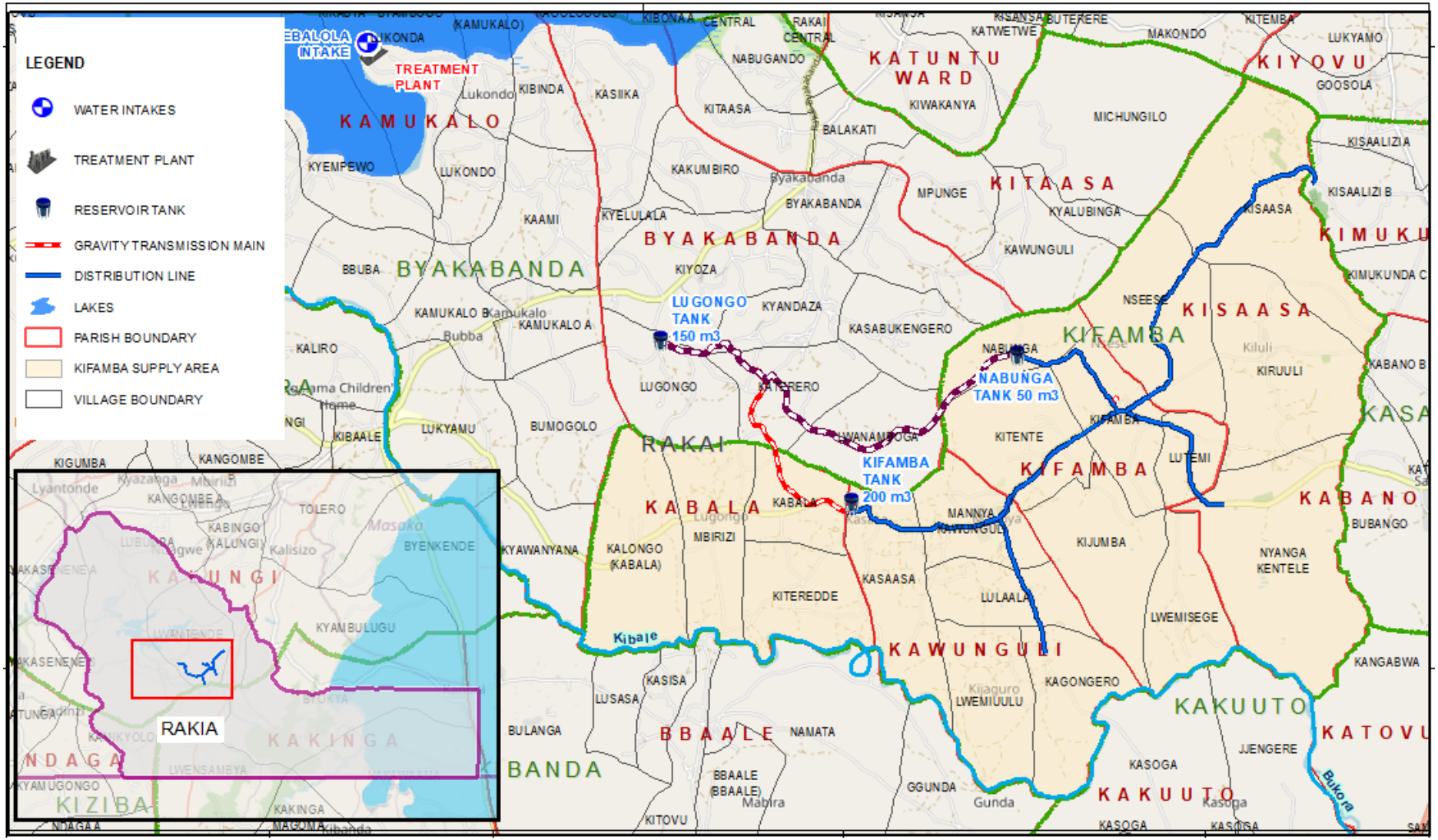


Figure 1-3: Map of Kifamba RGC Project Area

1.4 Project's Environmental Category

According to Schedule 5 of the National Environment Act No.5 of 2019, this project is categorised under part 1 as a **Category 4**: Utilisation of water resources and water supply, including- (b) Abstraction or utilization of ground water of **than 1000 m^3/day**.

Notwithstanding the fact that schedule 4 under part 2, Section 3: necessitates in subsections

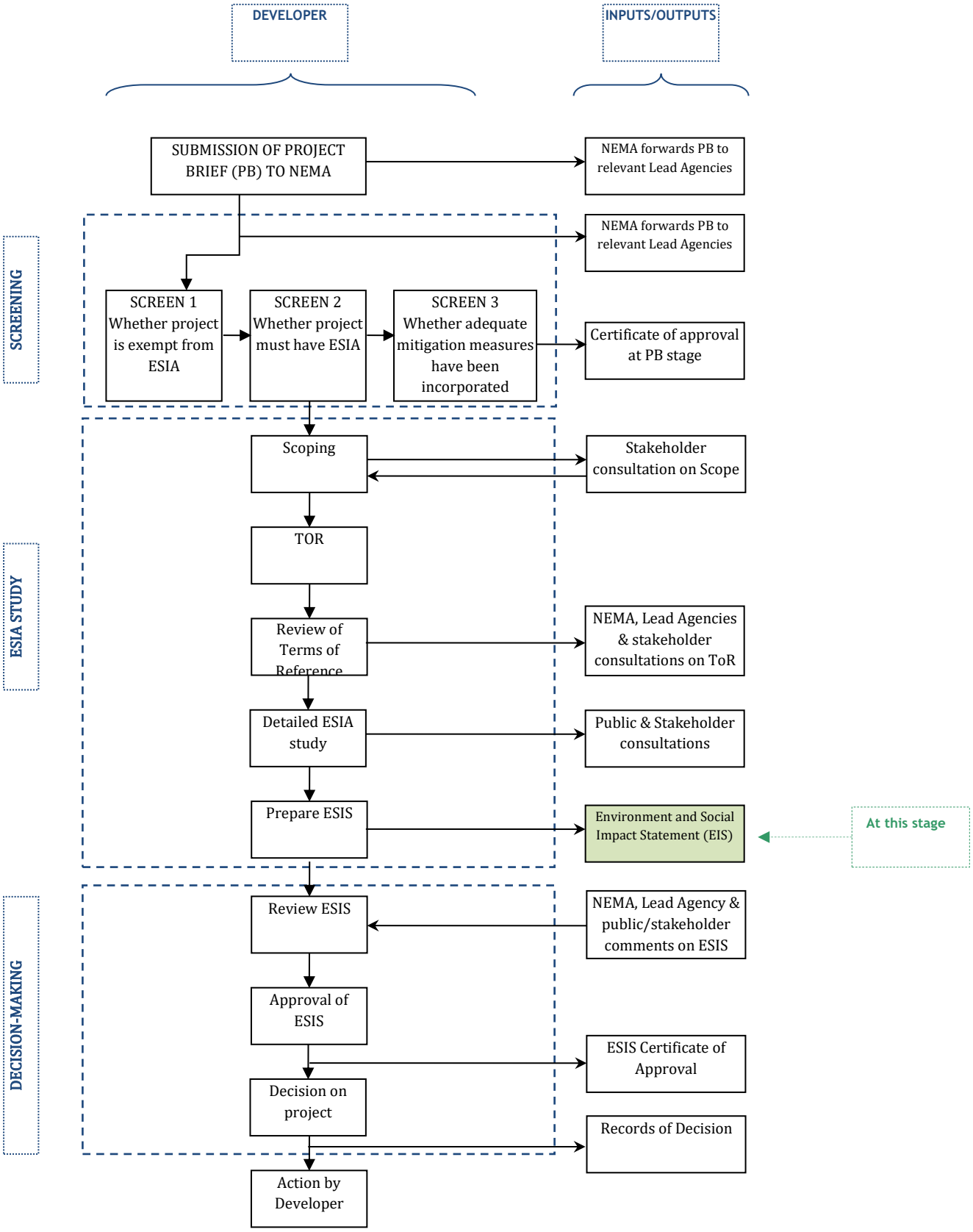
a) Construction of community water points;
b) Extension of piped water in town councils and;
c) Support facilities to (a) to (c), the need for an ESIA.

According to the EIA Guidelines for the water resources related projects (MWE, 2011) it is necessary that to avoid excessive abstraction or pollution of the available ground water resources, an assessment be carried out for all water use projects that are likely to impact on such groundwater resources. These include rural and small towns' water supply projects, examples of which include: (i) Borehole drilling and hand augured shallow wells.

The piped water supply system will be sized based on the design demand of **2,559.44 m^3**/day and so, according to the National Environmental Act No.5 of 2019, necessitates that an Environmental and Social Impact Assessment is conducted.

The process for ESIA in Uganda is described in the flow diagram in **Figure 1-4.** This ESIS was therefore prepared in accordance with the requirements stipulated in the Environmental Impact Assessment Regulations, 2020, Fifth Schedule of the National Environment Act, 2019 and Environmental Impact Assessment guidelines for water resources related projects in Uganda (MWE 2011). The ESIS analysed the potential environmental impacts of the project and proposed mitigation measures and monitoring programs to ensure that environmental impacts are avoided or kept to minimum. The mitigation measures and monitoring programs were compiled into an Environmental and Social Management and Monitoring Plan (ESMMP) that form part of the ESIS.

According to Uganda's ESIA process, the study has been accomplished through the various levels shown below;



**Source: Appendix C (ESIA Process in Uganda) of ESIA Reference Manual, NEMA, June 2002)*

Figure 1-4: ESIA process in Uganda

1.5 ESIA Report Structure

This ESIS has been complied in conformity to national ESIA requirements of the National Environment Management Authority (NEMA) and Environmental Impact Assessment guidelines for water resources related projects in Uganda (MWE 2011) and benchmarked against international best-practice standards. It has therefore been presented into the following sections as shown in the **Table 1-1** below.

Table 1-1: ESIS structure

No	Contents Headings	Explanatory Note
NTS	Non-Technical Executive Summary	Provides a summary of the ESIS in a non-technical manner for the purposes of disclosure to the wider public.
1.	Introduction	This chapter introduces the project details, location and justification, objective and scope of the environmental study, ESIA requirement and the ESIS structure
2.	Project Description	This chapter provides a concise description of the project and its geographic, ecological, social and temporal context. In terms of site description, evolution of the scheme design, key components of the system, details of the construction process and operation and the changes in land use resulting from the project activities.
3.	Policy, Legal and Administrative Framework	This chapter discusses the policy, legal and institutional framework within which the environmental and social study has been conducted. National regulations are discussed along with relevant international agreements and conventions to which Uganda is a party.
4.	Applied Methodology	This chapter discusses the methodology that was applied in determining the environmental and social baseline and public consultation.
5.	Baseline Data	This chapter has summarised the available baseline data on physical, biological and socio-economic resources within the project area.
6.	Public Consultation and Disclosure	This chapter presents the consulted stakeholders; their views and concerns and development of measures to address them.
7.	Impacts and Mitigation Measures	This section summarised the identified positive and negative impacts of the development, recommendation of appropriate mitigation measures for all significant negative environmental impacts predicted and enhancement of positive impacts.
8.	Analysis of Alternatives	An analysis of alternatives, including a comparison of feasible alternatives to the proposed project site, technology, design, and operation in terms their capital and recurrent costs; their suitability under local conditions; and their institutional, training, and monitoring requirements.
9.	Environmental and Social Management and Monitoring Plan (ESMMP)	An Environmental and Social Management and Monitoring Plan (ESMMP) for addressing negative impacts and assessing effectiveness of mitigation measures, scheduling monitoring frequency and assigning responsibility.

1.6 Project Investment Cost

The project capital investment cost is Uganda Shillings Thirty-Four Billion seven hundred ninety-seven million nine hundred eighty-four thousand seven hundred thirty shillings (USHs 34,797,984,730).

2. PROJECT DESCRIPTION

2.1 Project location and access

Kibaale and Kifamba RGCs are located in Rakai District. Rakai District is located in Central Uganda and is bordered by the districts of Lwengo and Lyantonde to the North, Kiruhura to the North West, Isingiro to the West, The Republic of Tanzania to the South and Kyotera to the East.

Kibaale RGC is accessed by a gravel road approximately 13km South West from Rakai town. Kibaale town is earmarked to be upgraded to a Town Council. Kibaale Town Council will comprise of the 20No. villages in Kalungi parish in Kyalulangira Sub County.

Kifamba RGC is a rural growth centre located in Kifamba Sub County of Rakai District. The RGC is accessed by a gravel road approximately 16km from Rakai town.

2.2 Population to be served

The population to be served by the piped water supply system is presented in **Table 2-1**.

Table 2-1: Project area population served

Project Area	**Served Population**					
	2020	**2025**	**2030**	**2035**	**2040**	**2045**
Kibaale	21,343	23,635	26,170	28,978	32,093	35,538
Kifamba	10,131	11,219	12,420	13,754	15,231	16,866
Total	**31,474**	**34,854**	**38,590**	**42,732**	**47,324**	**52,403**
Source: Design Report, 2021						

The maximum day demand for the piped water supply system is shown in **Table 2-2.**

Table 2-2: Maximum Day Demand

Project Area	**Maximum Day Demand (m^3/day)**					
	2020	**2025**	**2030**	**2035**	**2040**	**2045**
Kibaale	984.21	1,107.57	1,246.48	1,403.03	1,579.74	1,772.75
Kifamba	443.45	497.46	558.01	626.19	702.78	786.69
Total	**1,427.66**	**1,605.03**	**1,804.50**	**2,029.21**	**2,282.52**	**2,559.44**
Source: Design Report, 2021						

The Maximum Day Demand in the Ultimate Year is 2,559.44m^3/day.

2.3 Existing Water Supply Situation

2.3.1 Kibaale RGC Project Area

The Project Area does not have a piped water supply system. The population relies on point water sources and surface water sources such as River Kibaale, streams and dams.

Point Water Sources

The population relies on boreholes fitted with hand pumps.

Borehole fitted with a handpump in Kagombe Village, Kibaale TC

Shallow well fitted with a handpump in Kyalulangira Village, Kyalulangira Sub-County

Figure 2-1: Point Water Sources

Surface Water Sources

The population relies on river Kibaale, streams and dams as a water source for both domestic use and livestock watering.

Lake Kijjanebalola in Kamoma A village, Kyalilangira Sub-County

River Kibaale in Kibaale village, Kibaale TC

Dam in Kyakasenene village, Kibaale TC

Stream in Sanje A village, Kyalulangira Sub-County

Figure 2-2: Surface Water Sources

Rainwater Harvesting

Rainwater harvesting is primarily done at institutions. A few households carry out rainwater harvesting.

Figure 2-3: Rainwater Harvesting at Institutions in Kyakasenene village, Kibaale TC

2.3.2 Kifamba RGC Project Area

The Project Area does not have a piped water supply system. The population relies on point water sources and surface water sources such as dams.

Point Water Sources

The population relies on boreholes fitted with hand pumps.

Surface Water Sources

The population relies on dams as a water source for both domestic use and livestock watering.

Rainwater Harvesting

Rainwater harvesting is primarily done at institutions. A few households carry out rainwater harvesting.

Figure 2-4: Borehole fitted with Handpump in Kifamba Village, Kifamba Sub - County

Figure 2-5: Dam in Manya Kawunguli village, Kifamba Sub - County

Figure 2-6: Rainwater Harvesting at Nsese Primary School, Nsese Village, Kifamba Sub - County

2.4 Existing Sanitation Situation

2.4.1 Kibaale RGC Project Area

Kibaale RGC currently has no central piped sewerage facilities. The population is mainly served by onsite sanitation mainly comprised of pit latrines. There are public toilets at institutions and offices. The solid waste generated in the project area is mainly domestic and is biodegradable. Solid waste management is done at household level.

Unlined Pit Latrine at Kyalulangira Sub – County Offices

Unlined pit latrine at school in Tolero Village, Kibaale TC

Lined Pit Latrines at Education Institutions in Kibaale TC

Figure 2-7: Sanitation Facilities in Kibaale TC

2.4.2 Kifamba RGC Project Area

The RGC currently has no central piped sewerage facilities. The population is mainly served by onsite sanitation mainly comprised of pit latrines. There are public toilets at institutions and offices. The solid waste generated in the project area is mainly domestic and is biodegradable. Solid waste management is done at household level.

Figure 2-8: Sanitation Facility in Manya Kiwunguli village - Kifamba Sub - County

2.5 Technical description of the proposed Water supply system

The proposed water source for the piped water supply systems is Lake Kijjanebalola. The selected option for the Kifamba RGC piped water supply system is extension from Lugongo reservoir. This option is based on the assumption that the Greater Rakai water and sanitation project will be contructed by the Ministry of Water and Environment under separate funding. The tapoff point under this study is the Lugongo reservoir tank. It is proposed extension of water from the proposed Lugongo reservoir tank by gravity to the proposed Kifamba Storage Reservoir. In addition, a booster station would be installed at the Lugongo reservoir tank site to supply water to the proposed Nabunga reservoir tank.

The Detailed Design of Kibaale RGC and Kifamba RGC piped water supply systems will rely on one water source, Lake Kijjanebalola, shared water treatment plant, command reservoir and independent distribution networks

2.5.1 Water Supply System Configuration

The System Configuration has been designed as follows:

i. Raw Water Abstraction from Lake Kijjanebarola in Kibaale RGC, Rakai District.
ii. Raw Water Pumping Main to the adjacent Water Treatment Plant. The Water Treatment Plant is located in Kiina in Lukondo village, Kamukalo parish, Byakabanda sub county.
iii. Combined Treated Water Pumping Main from the WTP to the Lugongo Command Reservoir; containing water for both Kibaale and Kifamba Towns.
iv. Dedicated Gravity Transmission Main from the Lugongo Command Reservoir to the Kifamba Reservoir and Kibaale Reservoir.
v. Separate Distribution Networks from the reservoirs to the respective Towns.

The water system will be designed for 2,687.4m^3/day (134.4m^3/hr at 20 hours pumping regime; includes 5% WTP use).

Table 2-3: Summary of Water System Capacity

Description	**Quantity** (m^3/d)	**Operation** (hr)	**Quantity** (m^3/hr)	
Maximum Day Demand- Kifamba Town	786.7	20.0	39.3	20 Hours operation
Maximum Day Demand- Kibaale Town	1,772.7	20.0	88.6	20 Hours operation
Combined Maximum Day Demand	**2,559.4**	**20.0**	**128.0**	**20 Hours operation**
Combined Water Treatment Plant use	128.0	20.0	6.4	5% of Maximum Day Demand
Capacity of Raw Water Intake and Water Treatment Plant	**2,687.4**	**20.0**	**134.4**	**Amount to be abstracted**
Capacity of Raw Water Transmission Main	2,687.4	20.0	134.4	Combined Towns Flow
Capacity of Backwash Water Pumping Main	204.0	6.0	34.0	8 hours pumping
Capacity of common Treated Water Transmission Main	**2,559.4**	**20.0**	**128.0**	**Amount to be distributed**

Source: Design Report, 2021

The system configuration is shown in **Figure 2-9** whereas the transmission system layout is shown in **Figure 2-10**.

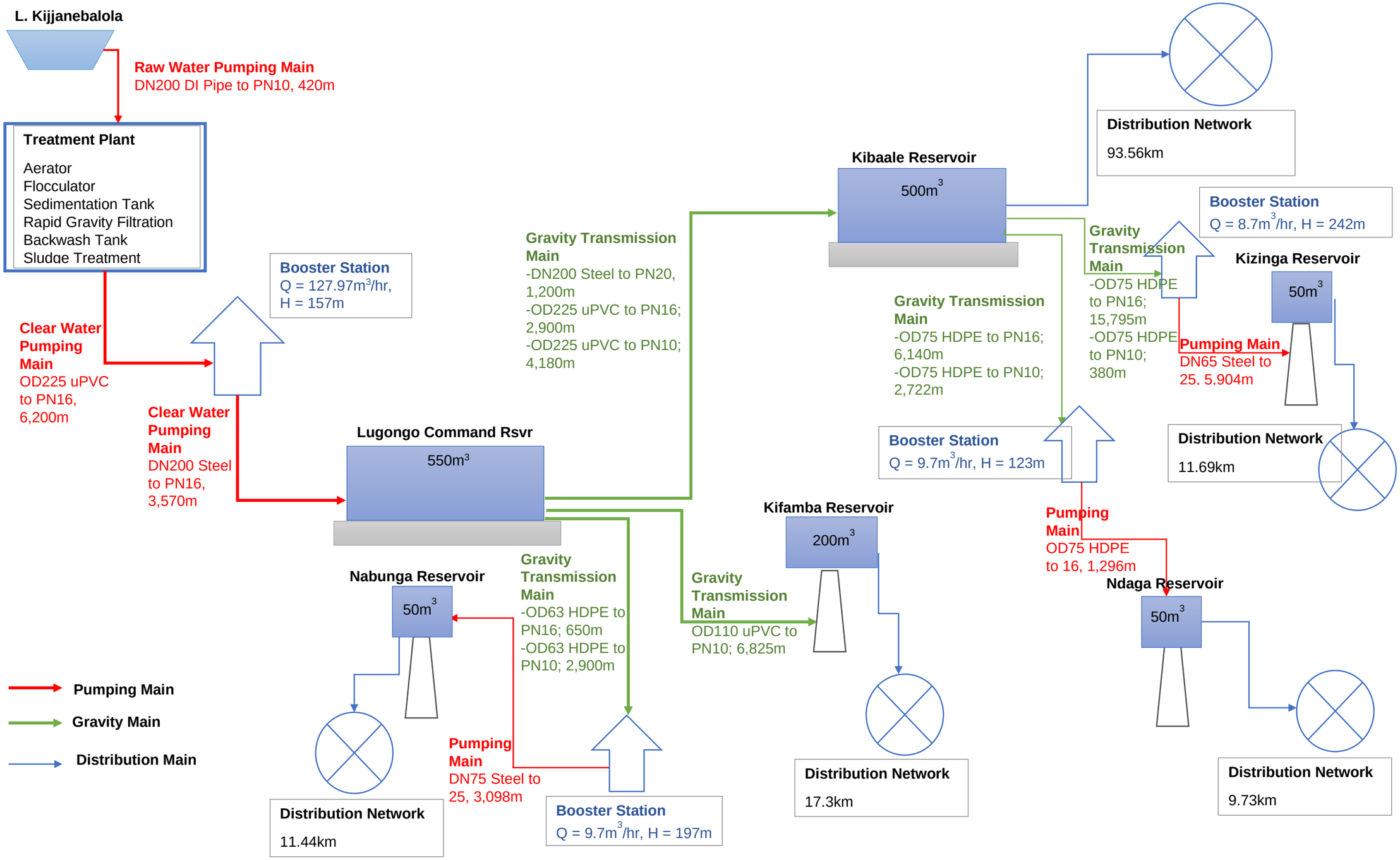


Figure 2-9: Water Supply System Configuration

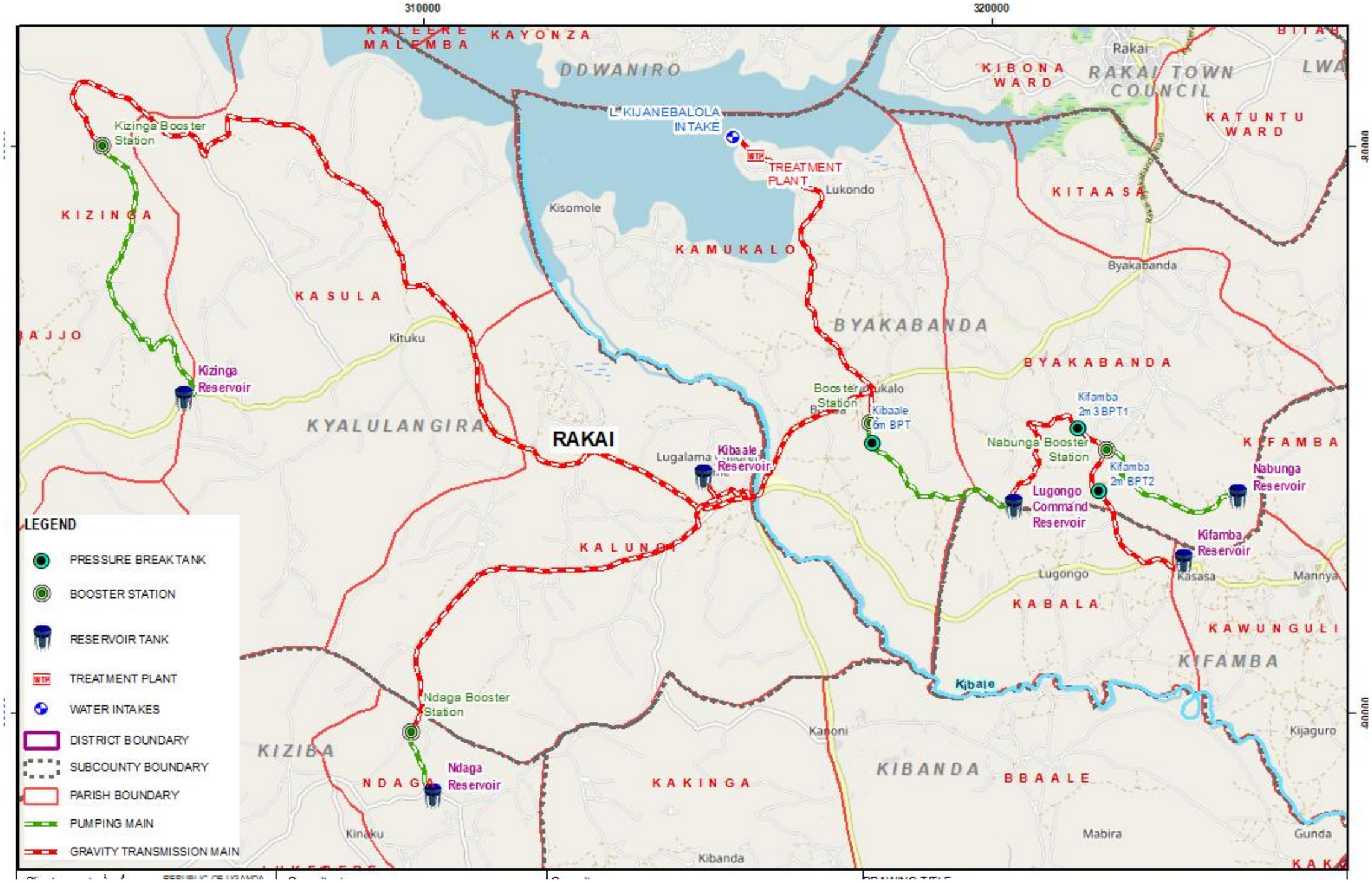


Figure 2-10: Transmission System Layout

2.5.2 Water Treatment Process Design

Conventional water treatment process was determined to be sufficient for the Lake Kijjanebarola raw water and will therefore include:

i. Raw Water Abstraction, Coarse and Fine Screening at the Intake.
ii. Aeration at the entrance of the WTP.
iii. Coagulation- to dissolve the colloidal particles using a coagulant.
iv. Flocculation- to aggregate the destabilized particles into flocs.
v. Clarification- to remove the flocs by settlement.
vi. Rapid Sand Filtration- to remove the remaining suspended solids.
vii. Filter backwash facilities comprising air and water.
viii. Final Chlorination- to disinfect the water.
ix. Filter Wash water treatment.
x. Sludge treatment.
xi. In addition, provision has been made for emergency Pre-Chlorination so as to protect the water treatment process from micro-organisms / microbial (biofilm) growth which tend to settle in the water treatment structures especially on the filter media increasing filter head loss thus frequent backwashing.

The Water Treatment Plant is located in Kiina in Lukondo village, Kamukalo parish, Byakabanda sub county on subcounty land. Boundary coordinates of the proposed site are presented in **Table 2-4**

Table 2-4: Boundary coordinates of the proposed site for the water treatment plant

Point	Easting	Northing	Elevation
A	315855	9919767	1259
B	315766	9919720	1252
C	315736	9919816	1252
D	315858	9919865	1248

2.5.3 Storage reservoirs

Command Reservoir

The command reservoir will be located in Lugongo, Byakabanda parish, Byakabanda Sub County. The required storage capacity of the command reservoir has been computed as 20% of the maximum day demand for the project areas.

The proposed storage capacity of the command reservoir is 550m^3. It is recommended to erect a pressed steel tank with square 1.22m panels measuring 12.2m long, 12.2m wide, and 3.66m high. The command reservoir will be erected on 1.5m high reinforced concrete dwarf walls.

The boundary coordinates of the proposed site are presented in **Table 2-5**.

Table 2-5: Boundary coordinates of the proposed site for the command reservoir

Point	Easting	Northing	Elevation
A	320347	9913817	1473
B	320328	9913770	1473
C	320287	9913799	1467
D	320307	9913842	1471

Storage reservoirs

A. Kibaale RGC supply area

Due to the topography within the Kibaale RGC supply area, 3No. storage reservoirs will be established;

i. Kibaale Storage Reservoir. This reservoir will provide storage for 84% of the Project Area. In addition, this reservoir will act as a balancing reservoir for supply to the reservoir tanks for Ndaga and Kizinga. It will be located Tolero village, Kalungi parish, Kyalulangira Sub County.

ii. Ndaga Storage Reservoir. This reservoir will provide storage for 9% of the Project Area (Ndaga parish, Kyakasenene villages in Kalungi parish). It is located in Kyamugongo village, Ndaga parish in Kiziba Sub County.

iii. Kizinga Storage Reservoir. This reservoir will provide storage for 7% of the Project Area (Kizinga parish). It is located in Kizinga B village, Kizinga parish in Kyalulangira Sub County.

B. Kifamba RGC Supply Area

Due to the topography within the Kifamba RGC supply area, 2No. storage reservoirs will be established;

i. Kifamba Storage Reservoir. This reservoir will provide storage for 80% of the Project Area. It will be located Kasaasa village, Kawunguli parish, Kifamba Sub County.

ii. Nabunga Storage Reservoir. This reservoir will provide storage for 20% of the Project Area (Nabunga village in Kifamba parish and Kisaasa parish). It will be located Kasaasa village, Kawunguli parish, Kifamba Sub County.

The boundary coordinates of the proposed sites for the storage reservoir are presented in Table 2-6

Table 2-6: Boundary coordinates of the proposed sites for storage reservoir tanks

S/N	Structure	Village	Easting	Northing	Elevation
1.	Nabunga reservoir tank	Nabunga	325426	9914648	1467
			325443	9914658	1468
			325451	9914640	1467
			325437	9914632	1465
2.	Nabunga booster tank	Katerero	322290	9914522	1393
			322301	9914509	1393
			322287	9914501	1392
			322278	9914513	1392
3.	Kifamba reservoir tank	Kasaasa	323407	9912763	1270
			323435	9912752	1268
			323421	9912733	1263
			323394	9912743	1262
4.	Kibaale reservoir tank	Kibaale	314937	9914172	1367
			314907	9914160	1362
			314935	9914202	1365
			314908	9914189	1370
5.	Booster Tank to Kibaale	Bumogolo	317928	9914782	1398
			317935	9914775	1400
			317925	9914769	1398
			317928	9919776	1398
6.	Kamukalo booster	Kamukalo	317848	9915123	1364
7.	Kiziba reservoir tank	Kiziba	310362	9908716	1426

2.5.4 Distribution Network

The distribution networks for the project areas will be gravity fed from the respective Storage Reservoir tanks.

The summary of the distribution networks for Kibaale RGC is shown in **Table 2-7** below. The distribution networks have Break Pressure Tanks as follows:

i. Kibaale Distribution Network: 1No. 5m³ BPT located in Tolero village, Kalungi parish, Kyalulangira sub county
ii. Ndaga Distribution Network: 1No. 1m³ BPT located in Katunga village, Ndaga parish, Kiziba sub county
iii. Kizinga Distribution Network: 1No. 1m³ BPT located in Kizinga B village, Kizinga parish, Kyalulangira sub county

Table 2-7: Kibaale RGC Distribution Networks

Pipe Details	**Length (m)**		
	Kibaale	**Ndaga**	**Kizinga**
OD 225 uPVC PN10	805		
OD 160 uPVC PN10	11,040		
OD 110 uPVC PN16	4,300		
OD 110 uPVC PN10	3,792		
OD 90 HDPE PN16	305		
OD 90 HDPE PN10	7,705	125	1,708
OD 75 HDPE PN16	4,380		
OD 75 HDPE PN10	16,210	3,173	2,750
OD 63 HDPE PN16	5,632		
OD 63 HDPE PN10	10,135	2,655	2,827
OD 50 HDPE PN16	5,283		
OD 50 HDPE PN10	23,973	3,800	4,403
Total	**93,561**	**9,753**	**11,688**
Source: Design Report, 2021			

The summary of the distribution networks for Kifamba RGC is shown in **Table 2-8** below. The Nabunga distribution network has 2No. Break Pressure Tanks of 1m3 capacity located in Kifamba village, Kifamba parish, Kifamba Sub County.

Table 2-8: Kifamba RGC Distribution Networks

Pipe Details	**Length (m)**	
	Kifamba	**Nabunga**
OD 225 uPVC PN16		
OD 225 uPVC PN10		
OD 160 uPVC PN16		
OD 160 uPVC PN10	2,895	
OD 110 uPVC PN16		
OD 110 uPVC PN10	1,873	2,274
OD 90 HDPE PN16		
OD 90 HDPE PN10	2,711	6,373
OD 75 HDPE PN16		
OD 75 HDPE PN10	1,987	
OD 63 HDPE PN16		2,796
OD 63 HDPE PN10	3,355	
OD 50 HDPE PN16		
OD 50 HDPE PN10	4,485	0
Total	**17,304**	**11,443**
Source: Design Report, 2021		

The layout of the distribution networks are shown in **Figure 2-11** and **Figure 2-12**.

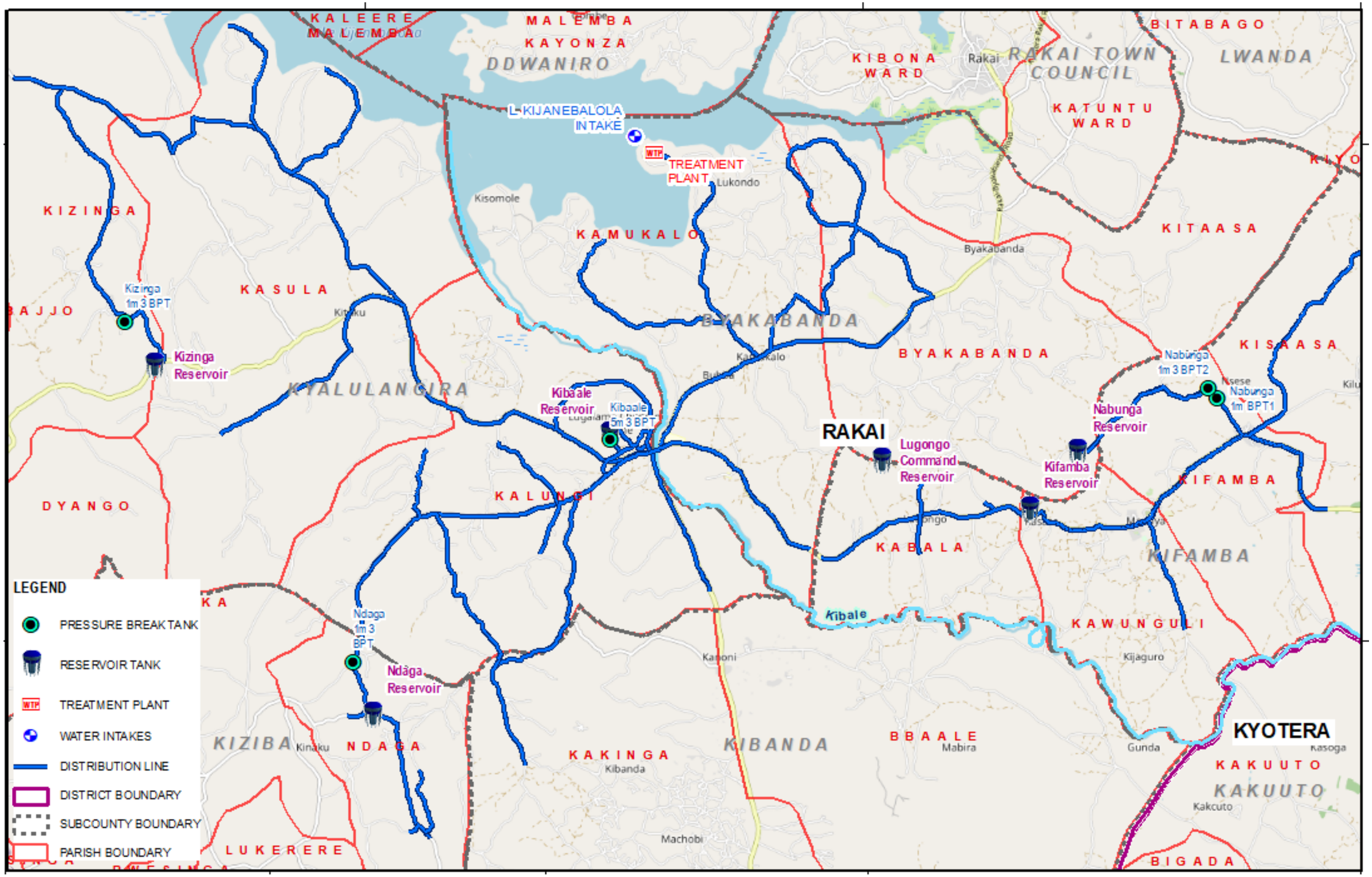


Figure 2-11: Distribution Networks for Kibaale RGC Project Area

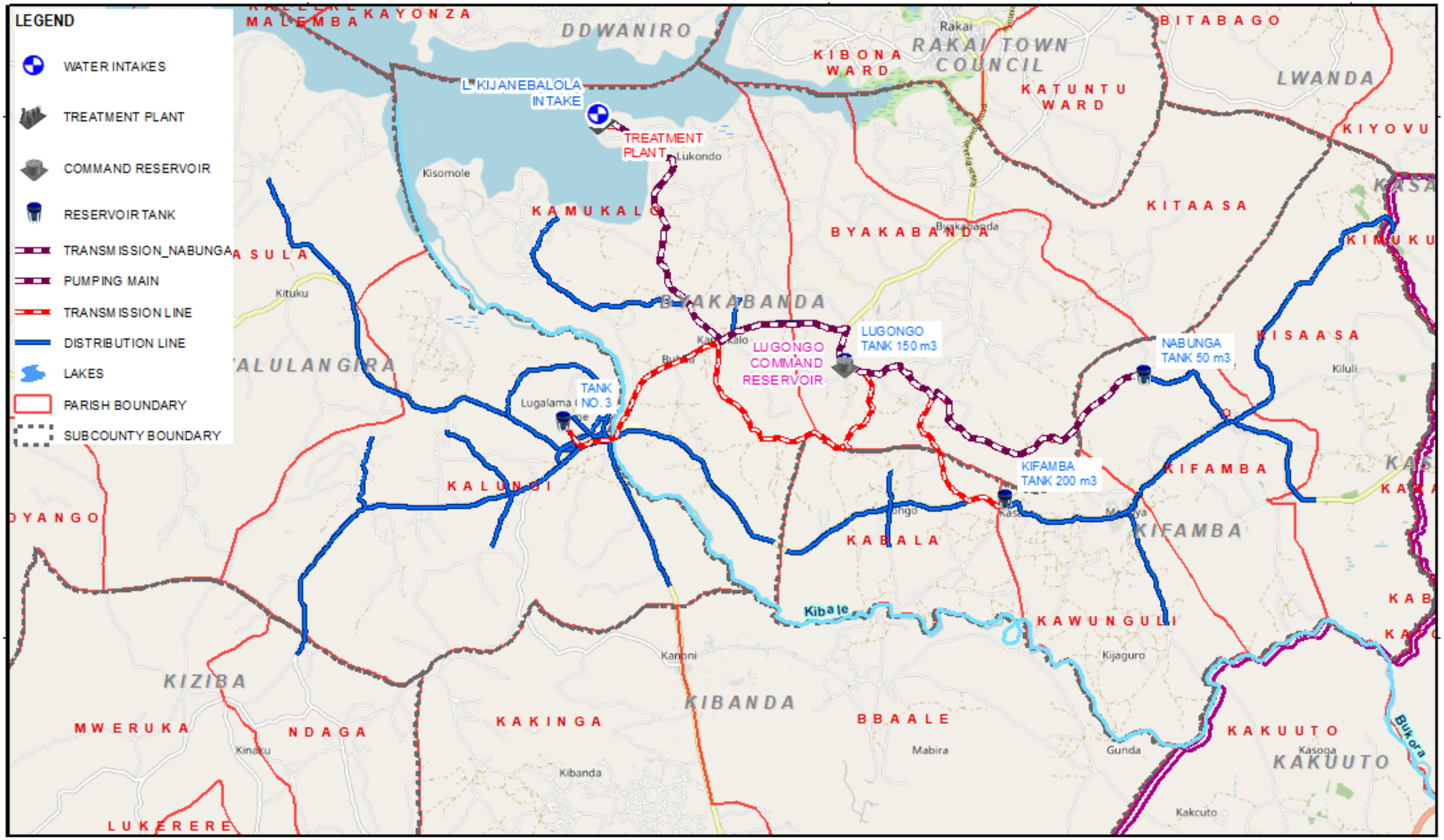


Figure 2-12: Distribution Networks for Kifamba RGC Project Area

2.5.5 Network Intensification

There are some parts of the proposed water supply areas where the trunk mains are adequate but the mains are too far away for the customers to be able to connect at reasonable cost. As a measure to increase the densification of the distribution networks as a drive to increase the customer base, and allow a neater layout of the service connection pipes, some pipe work intensification will be required.

The intensification lines will be demand-driven, and installed where there are adequate applications for connections. Estimated quantities for this item have thus been included in the bills of quantities to cater for this. The location of the service pipes will not be known until applications for connections are received. At this stage, only an estimate of the sizes, quantities and costs can be given.

For Kibaale RGC Project Area, the start-up number of connections is estimated as 1,200No. Service Connections and 24No public stand posts in the project area. 62Km of pipe work have been provided for intensification

For Kifamba RGC Project Area, the start-up number of connections is estimated as 400No. Service Connections and 10No public stand posts in the project area. 21Km of pipe work have been provided for intensification

It is also assumed that the connection materials will be supplied by the project on the payment of the connection fees.

The summary of the intensification network is shown in **Table 2-9**.

Table 2-9: Intensification Network for RGCs

Connections / Length	Intensification Network Lengths (m)				
	Kibaale			Kifamba	
	Kibaale	Ndaga	Kizinga	Kifamba	Nabunga
Service Connections	1,000	100	100	300	100
Public Stand Posts	20	2	2	8	2
OD 40 HDPE PN10	10,000	1,000	1,000	3,000	1,000
OD 32 HDPE PN10	15,000	2,000	2,000	5,000	2,000
OD 25 HDPE PN10	25,000	3,000	3,000	7,000	3,000

Source: Design report, 2021

2.5.6 Summary of water supply system components

The water supply system components are summarized in **Table 2-10.**

Table 2-10: Water Supply System Components

Component	Description	Unit	Kibaale - Kifamba RGCs WSS
System Details	**Population Served**		
	Population Served - Kibaale RGC (2045)	nr	35,538
	Population Served - Kifamba RGC (2045)	nr	16,866
	Population Served - Kibaale + Kifamba RGC (2045)	nr	52,403
	Water Demand		
	Water Demand - Kibaale RGC (2045)	m^3/day	1,772.75
	Water Demand - Kifamba RGC (2045)	m^3/day	786.69
	Water Demand - Kibaale + Kifamba RGC (2045)	m^3/day	2,559
	Raw Water Main		

Component	Description	Unit	Kibaale - Kifamba RGCs WSS
Head Works	**Intake Structure**	No.	1No.
	Raw Water Pumping Main		
	DN200 DI PN10	m	420
	Raw Water Pumps		
	Head 32m, Flow 67.2m^3/hr	H, Q	3No. (2No. Duty, 1No. Standby)
	Water Treatment Plant		
	Capacity (2045)	m^3/day	2,559.44
	Aerator	No.	1No. 3No. Cascade Weir Steps
	Rapid Mixing Chamber	No.	1No. 2.45m length x 1.2m width x 1.1m depth
	Flocculators	No.	2No. 9.6m length x 1.3m width x 2.5m depth
	Sedimentation Tanks	No.	2No. 16.0m length x 4.0m width x 5.5m depth
	Rapid Gravity Sand Filters	No.	3No. Filters 4.8m length x 3.1m width x 1.2m depth
	Clear Water / Contact Tank	No.	102.6m^3 Effective Volume 6.0m length x 8.0m width x 4.85m depth
	Sludge Drying Channels	No.	2No. 24.5m length x 3.0m width x 1.65m depth
	Sludge Drier	No.	10.5m length x 7.0m width x 4.0m depth
	Chemical House	No.	2No. Coagulant Dosing Tanks (4.05m^3) 3No. Chlorine Dosing Tanks (2.16m^3) Storage Space 31.8m^2
	Pump House	No.	1No. (70.7m^2 area)
	Workshop, Laboratory and Office	No.	1No. (108m^2 area)
	Staff Houses	No.	4No. (35m^2 area)
	Clear Water Pumps		
	Head 155m, Flow 126.83m^3/hr	H, Q	2No. (1No. Duty, 1No. Standby)
	Backwash Pumps		
	Head 25m, Flow 34.0m^3/hr	H, Q	2No. (1No. Duty, 1No. Standby)
	Backwash Tank		
	200m^3 Steel tank on 18m tower	No.	1No.
	Air Blowers	Q	700m^3/hr
	Power Supply		
	500kVA Transformer	No.	1No.
	500kVA Standby Generator	No.	1No.
	Power Extension	km	10.0
	Booster Station		
	130m^3/hr Reinforced Concrete Sump	No.	1No.
	Booster Station Pumps		
	Head 156m, Flow 126.83m^3/hr	H, Q	2No. (1No. Duty, 1No. Standby)

Component	Description	Unit	Kibaale - Kifamba RGCs WSS
	Power Supply		
	200kVA Transformer	No.	1No.
	200kVA Standby Generator	No.	1No.
	Power Extension	km	0.6
	Clear Water Pumping Mains		
	DN200 Steel PN16	m	3,570
	OD225 uPVC PN16	m	6,200
	Command Reservoir		
	550m³ Steel Tank on 1.5m dwarf walls	No.	1No.
Kibaale	**Kibaale RGC Supply Area**		
	Clear Water Gravity Mains (m)		**8,280**
	DN200 Steel PN20	m	1,200
	OD225 uPVC PN16	m	2,900
	OD225 uPVC PN10	m	4,180
	OD75 HDPE PN16	m	21,935
	OD75 HDPE PN10	m	3,102
	Clear Water Pumping Mains (m)	m	2,900
	DN65 Steel PN25	m	5,904
	OD75 HDPE PN16	m	1,296
	Booster Station		
	40m³/hr Reinforced Concrete Sump	No.	2No.
	Booster Station Pumps		
	Head 117m, Flow 7.7m³/hr	H, Q	2No. (1No. Duty, 1No. Standby)
	Head 219m, Flow 3.5m³/hr	H, Q	3No. (2No. Duty, 1No. Standby)
	Power Supply		
	50kVA Transformer	No.	1No.
	25kVA Transformer	No.	1No.
	280wP Solar Panels	No.	108No.
	Power Extension	km	9.5
	Break Pressure Tanks (Transmission Lines)		
	6m³ Reinforced Concrete Tank	No.	1No.
	Break Pressure Tanks (Distribution Lines)		
	5m³ Reinforced Concrete Tank	No.	1No.
	1m³ Reinforced Concrete Tank	No.	2No.
	Storage Tanks		
	500m³ Steel Tank on 1.5m dwarf walls	No.	1No.
	50m³ Steel Tank on 10m tower	No.	2No.
	Distribution Network + Network Intensification		
	Distribution Network (m)		**115,002**
	OD 225 uPVC PN10	m	805
	OD 160 uPVC PN10	m	11,040
	OD 110 uPVC PN16	m	4,300
	OD 110 uPVC PN10	m	3,792
	OD 90 HDPE PN16	m	305
	OD 90 HDPE PN10	m	9,538
	OD 75 HDPE PN16	m	4,380
	OD 75 HDPE PN10	m	22,133
	OD 63 HDPE PN16	m	5,632
	OD 63 HDPE PN10	m	15,617
	OD 50 HDPE PN16	m	5,283
	OD 50 HDPE PN10	m	32,177
	Network Intensification		**62,000**
	OD 40 HDPE PN10	m	12,000

Component	Description	Unit	Kibaale - Kifamba RGCs WSS
	OD 32 HDPE PN10	m	19,000
	OD 25 HDPE PN10	m	31,000
	Service Connections	No.	1,200
	Public Stand Posts	No.	24
	Kifamba RGC Supply Area		
	Clear Water Gravity Mains (m)		**6,825**
	OD110 uPVC PN10	m	6,825
	OD63 HDPE PN16	m	650
	OD63 HDPE PN10	m	2,900
	Clear Water Pumping Mains (m)	m	
	DN65 Steel PN25	m	3,098
	Booster Station		
	40m³/hr Reinforced Concrete Sump	No.	1No.
	Booster Station Pumps		
	Head 183m, Flow 7.7m³/hr	H, Q	2No. (1No. Duty, 1No. Standby)
	Power Supply		
	50kVA Transformer	No.	1No.
	280wP Solar Panels	No.	58No.
	Power Extension	km	0.1
	Break Pressure Tanks (Transmission Lines)		
	2m³ Reinforced Concrete Tank	No.	2No.
	Break Pressure Tanks (Distribution Lines)		
	1m³ Reinforced Concrete Tank	No.	2No.
	Storage Tanks		
Kifamba	200m³ Steel Tank on 15m tower	No.	1No.
	50m³ Steel Tank on 10m tower	No.	1No.
	Distribution Network + Network Intensification		
	Distribution Network (m)		**28,747**
	OD 160 uPVC PN10	m	2,895
	OD 110 uPVC PN16	m	0
	OD 110 uPVC PN10	m	4,147
	OD 90 HDPE PN16	m	0
	OD 90 HDPE PN10	m	9,083
	OD 75 HDPE PN16	m	0
	OD 75 HDPE PN10	m	1,987
	OD 63 HDPE PN16	m	2,796
	OD 63 HDPE PN10	m	3,355
	OD 50 HDPE PN16	m	0
	OD 50 HDPE PN10	m	4,485
	Network Intensification		**21,000**
	OD 40 HDPE PN10	m	4,000
	OD 32 HDPE PN10	m	7,000
	OD 25 HDPE PN10	m	10,000
	Service Connections	No.	400
	Public Stand Posts	No.	10
Source: Design report, 2021			

2.6 Technical description of the proposed Sanitation Interventions

The proposed sanitation facilities for public spaces are 1No. 6 stance waterborne toilet for Kibaale RGC and Kifamba RGC. The location of the proposed sanitation facilities will be agreed upon with the local authorities.

The sanitation facilities will have the following features:

i. 3No. stances for female users inclusive of 1No. stance for the physically disabled
ii. 3No. stances for male users inclusive of 1No. stance for the physically disabled
iii. 1No. shower stall for female users
iv. 1No. Urinal for male users
v. Handwashing facility
vi. 500 litre tank connected to rainwater harvesting system connected to the handwashing facility for each gender
vii. 1000 litre tank connected to the piped water supply system. This tank will also be connected to the handwashing facility

The following sanitation interventions are proposed at institutions:

i. Construction of 2No. 5 stance VIP latrines for girls in Kibaale RGC
ii. Construction of 1No. 5 stance VIP latrines for girls in Kifamba RGC
iii. Construction of 2No. 5 stance VIP latrines for boys in Kibaale RGC
iv. Construction of 1No. 5 stance VIP latrines for boys in Kifamba RGC

A summary of the sanitation components is presented below.

Table 2-11: Sanitation Components

Component	Description	Unit	Kibaale - Kifamba RGCs WSS
Sanitation	**Sanitation**		
	Sanitation Facilities		
	6 stance waterborne toilet (Public Toilet)	No.	2No.
	5 stance VIP latrine (Girls)	No.	3No.
	5 stance VIP latrine (Boys)	No.	3No.
Source: Design Report, 2021			

The proposed sanitation intervention, focussing Government aided schools, include:

I. Construction of 1No. 5 stance VIP latrine for boys at:

- St Andrews Mbirizi CoU Primary School
- Lwemisege Primary School
- St Nicholas Manya Primary School

II. Construction of 1No. 5 stance VIP latrine for girls at:

- St Andrews Mbirizi CoU Primary School
- Kifamba Comprehensive Secondary School (2No. Facilities)
- Kifamba Primary School
- Lwemisege Primary School
- St Nicholas Manya Primary School

2.7 Construction Phase

2.7.1 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.

The Developer will put in place, a traffic management plan and work with the traffic police to guide and control traffic during construction works across public areas. Project drivers shall be required to sign specific code of conduct for Machine Operators, requiring among others observance of speed limits and ensuring regular servicing and maintenance of vehicles. The project shall ensure installation of safety signage, speed control structures, and sensitization of the public on safety measures by a nominated service provider.

2.7.2 Construction inputs and equipment

The water supply and sanitation system will be constructed using common construction materials and construction procedures that are not expected to compromise the safety of the neighboring communities as well as the general environment. The following inputs will be required for construction:

i) Raw construction materials e.g., sand, cement, natural building stone blocks, gravel, Water)
ii) Paints, solvents, etc.
iii) Steel structure members
iv) A construction labour force (of both skilled and unskilled workers).
v) Pipes; GI, Ductile Iron or Steel, uPVC, PE, HDPE, among others

2.7.3 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.

2.7.4 Concrete and Reinforcement Works

These will include casting of reinforced concrete for; the foundation (Concreted slabs). Most of the building materials for completion including cement, concrete blocks and slabs, sand, iron bars, timber trusses will be obtained from the local market. Care will be taken to use prescribed tensile strength of iron bars and cast-iron beams and appropriate ratios of concrete to ensure that load bearing beams and columns will not be subjected to shearing or bending/breaking under pressure.

2.8 Operations Phase

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.

2.8.1 Institution and Management Arrangements

The recommended operation and management option is to handover the management of the water supply system and public sanitation facilities a national utility which may be South Western Umbrella of Uganda or National Water and Sewerage Corporation. Within the decentralization framework, the experience and capacity of Umbrella organization and or NWSC, applied directly to the management of the newly constructed facilities will increase the likelihood of sustainable commercial operations and management of the town systems in the next 5-10 years.

2.9 Project Waste

2.9.1 Project waste streams

Due to the concurrent nature of the activities and the similarities between the waste streams, the impacts associated with these two phases of the work have been considered together in this section.

Table 2-12: Project waste streams

No	Waste Stream	Specific	Category	Codes*	Phase
1	Concrete waste	Broken concrete	Non-hazardous	B2040	Construction
2	Cement waste	Cement covers	Non-hazardous	B2030	Construction
3	Organic	Food, frying oils	Non-hazardous	B3065	Both
4	Medical waste	First Aid used material, Face masks	Hazardous	Y1, Y3	Construction
5	Oily Waste	Oil - Used Lube Oil	Hazardous	A4060	Construction
6		Oily Rags/Absorbent Materials	Hazardous	A4060	Construction
7		Contaminated soil		A4060	Construction
8	Paper & Cardboard		Non-hazardous	B3020	Operation
9	Tyres & Rubber		Non-hazardous	B3040	Construction
10	Wood	Untreated, including bush	Non-hazardous	B3050	Construction
11	Chemicals	Water Treatment Chemicals	Hazardous	Y4	Construction
12	Electrical Equipment	Light Bulbs	Non-hazardous	B2020	Operation
13		Conductor Wires/ Cables	Non-hazardous	B1115	Both
14	Sludge		Hazardous	Y46	Operation
15	Sanitary waste		Non-hazardous	Y46	Both
16	Plastic (contaminated)		Hazardous	Y48	Construction
17	Plastic (clean)		Non-hazardous	B3011	Both
18	Plastic	Polyethylene (plastic carrier bags)	Hazardous	A3210	Both
19	Paint and varnishes		Non-hazardous	B4010	Both
20	Used clothes	Worn out PPE	Non-hazardous	B3030	Construction
21	Scrap metal	Pipe cuttings	Non-hazardous	B1010	Both

* Schedule 3 of National Environment (Waste Management) Regulations S.I. No. 49 of 2020

2.9.2 Project waste Legal compliance

The Project intends to comply with the National Environment (Waste Management) Regulations S.I. No. 49 of 2020 as presented in table below

Table 2-13: Project waste management legal compliance

Legal Framework Applicable citation	Action/ Task
Section 11(5): The person who generates hazardous waste and a waste handler shall ensure that the waste management system and waste management plans developed under this regulation are documented, implemented, regularly updated and made available to the Authority and other relevant lead agencies upon request	Drafting of Waste Management Plan (WMP)
Section 47. A person who generates hazardous waste, not being a person referred to under regulation 26(1), shall (a) provide for proper storage of the waste in accordance with regulations 54 and 55;	Demarcating Templary waste storage area
Section 10(C): put in place measures for segregation of the waste to ensure that the hazardous waste is identified, separated and managed differently from the non-hazardous waste	Waste separation monitoring at site
Section 37(1): A person shall not import, export, manufacture, use or re-use plastic carrier bags or plastic products made of polymers of ethene (polythene) and propylene (polypropylene) except in accordance with section 76(1) of the Act 39(3) Every person has a duty to separate plastic waste from other waste.	

Legal Framework Applicable citation	Action/ Task
Section 47(c) ensure that the waste is managed by a waste handler authorised to manage that waste if the person generating the waste is not licensed to handle the waste;	Contracting NEMA registered Waste Handler
Section 73(1): A waste handler shall maintain an up-to-date database of the quantities and characteristics of the waste disposed in the landfill.	Filing of waste Transfer Notes
Section 8(2): The waste streams identified under sub regulation (1) shall be quantified, characterised and documented to determine the best waste management options.	All waste records to be Organized, populated, updated periodically
Section 47(b) maintain sufficient information on the source, content and properties of the waste to ensure that the waste is managed in a responsible manner;	
Section 53(1): For the purpose of traceability and proper documentation of the hazardous waste, a person who generates hazardous waste and a waste handler shall each complete a waste manifest for each consignment of hazardous waste in the format set out in Schedule 10 to these Regulations.	
Section 53(4): A person who generates hazardous waste and a waste handler shall keep records of the waste stored under this regulation.	
Section 100(5): The records and documents generated under this regulation shall be kept for a minimum of ten years.	

2.9.3 Project proposed waste management

The proposed management routes for Project wastes have been determined based on the principles of the waste management hierarchy (Avoid, Reduce, Reuse, Recycle, Recover, Dispose), and in consideration of the available existing facilities in Uganda and Best Available Techniques (BAT). Waste will be stored in a manner that prevents the commingling or contact between incompatible wastes, hazardous and non-hazardous, and allows for inspection between containers to monitor leaks or spills. Regular visual inspection of all waste storage collection and storage areas for evidence of accidental releases and to verify that wastes are properly labelled and stored will be conducted

Table 2-14: Proposed project waste Management

Waste Category	Measures proposed to be implemented
Non-hazardous	- Recycling non-hazardous wastes (such as uncontaminated wood, metal, - plastic, paper) where suitable facilities can be identified. - Reuse of topsoil and subsoil from site clearance or trenching works. Soil could be used for restoration - Instituting procurement measures that recognize opportunities to return usable materials such as cut pipes and which prevents the over ordering of materials; - Instituting good housekeeping and operating practices - Procurement procedures with strict guidelines to ensure packaging is minimized and recyclable wherever possible - Utilize services of Rakai District Natural Resource Department in disposal approval for general waste such as food waste.
Hazardous	- Minimizing hazardous waste generation by implementing stringent waste segregation to prevent the commingling of non-hazardous and hazardous waste to be managed - Substituting raw materials or inputs with less hazardous or toxic materials or with those where processing generates lower waste volume - Clearly identifying and demarcating waste storage areas - Applying for a waste management license - Having an MoU with a NEMA licensed waste handler

2.10 Land acquisition for the project

2.10.1 Project components

The project shall require land for establishment of facilities such as the water treatment plant and reservoirs. A Memorandum of Understanding between Water and Sanitation development Facility- SW of the Directorate of Water Development, Ministry of Water and Environment in partnership with Rakai District Local Government AND Kifamba Water and Sanitation Committee (WSC) on behalf of the community in partnership with Kifamba Sub county.

In this MOU, the community agreed to, among others;

- Clause 8 of page 5 under PART III -RESPONSIBILITIES, Subsection A: "The Community agrees to Provide all the land for infrastructural development in the dimensions and locations provided at the time of design presentation to stakeholders. All land provided SHALL NOT have any conditionalities attached and should be free of any conflict".
- Subsection B: Clause 4"Resolve any land wrangles and any other conflicts that may arise that are related to the intervention being put in place".

The transmission and distribution network will as much as possible utilize the roads right of way to minimize impact on property.

The signed MOU has been attached to this report under Appendix II.

2.1.1 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;

i. A camp to accommodate the project employees and provide offices for the management and administrative staff
ii. 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. Or contractor may as well rent from the many available trading centres for his office or accommodation requirements.

3. POLICY, LEGAL, REGULATORY AND INSTITUTIONAL FRAMEWORK

This chapter presents a review of the relevant policies, laws, regulations and guidelines in Uganda and their implications to the implementation of the proposed water supply and sanitation project. Key institutions and their roles in the successful implementation of the project have also been discussed.

3.1 National Policy Framework

3.1.1 The National Environment Management Policy, 1994

This policy aims to promote sustainable economic and social development mindful of the needs of future generations and EIA is one of the vital tools it considers necessary to ensure environmental quality and resource productivity on long-term basis. It calls for;

i. Integration of environmental concerns into development policies plans and projects at national, district and local levels, with full participation of the people;
ii. Conservation, preservation and restoration of ecosystems and maintenance of ecological processes and life support systems, especially conservation of national biological diversity;
iii. Raising of public awareness to understand and appreciate linkages between environment and development; and ensure individual and community participation in environmental improvement activities.
iv. Enhancement of the health and quality of life of all people in Uganda and promote long-term, sustainable socio-economic development through sound environmental and natural resource management and use;
v. Optimization of resource use and achievement of a sustainable level of resource consumption

Relevance: 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 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.

3.1.2 National Water Policy, 1999

The National Water Policy promotes a new integrated approach to manage the water resources in ways that are sustainable and most beneficial to the people of Uganda. The goal of this policy is to provide guidance on development and management of the water resources of Uganda in an integrated and sustainable manner, so as to secure and provide water of adequate quantity and quality for all social and economic needs, with full participation of all stakeholders and mindful of the needs of future generations. The policy aims to:

i. Promote rational use of water;
ii. Control pollution and promote safe storage, treatment and disposal of waste, which could pollute water and impact public health; and
iii. Promotion of awareness of water management and development issues and capacity building

Relevance: Lake Kijjanebalola 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.

3.1.3 Environment Health Policy – 2005

The Environmental Health Policy concentrates on the importance of environmental sanitation which includes: safe management of human waste and associated personal hygiene; the safe collection, storage, and use of drinking water; solid

Relevance: The Environmental Health policy will guide implementation of public health and hygiene intervention measures on the

waste management; drainage; and protection against disease vectors (MOH 2005). Environmental health practices include: safe disposal of human waste, hand washing, adequate water quantity for personal hygiene and protecting water quality, all influence the morbidity and mortality of diarrheal diseases.

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 improving people's standards of living.

3.1.4 National Gender Policy, 2007

The Uganda National Gender Policy was first developed in 1997 and revised in 2007 as a confirmation that the Ugandan government is committed to take actions that will bring about more equal gender relations. The overall goal of this policy is to achieve gender equality and women's empowerment as an integral part of Uganda's socio-economic development. Its main purpose is to establish a clear framework for identification, implementation and coordination of interventions designed to achieve gender equality and women's empowerment in Uganda. The policy is a guide to all stakeholders in planning, resource allocation, implementation and monitoring and evaluation of programmes with a gender perspective. The main Objectives of this policy include;

i. To reduce gender inequalities so that all women and men, girls and boys, are able to move out of poverty and to achieve improved and sustainable livelihoods;
ii. To increase knowledge and understanding of human rights among women and men so that they can identify violations, demand, access, seek redress and enjoy their rights;
iii. To strengthen women's presence and capacities in decision making for their meaningful participation in administrative and political processes;
iv. To address gender inequalities and ensure inclusion of gender analysis in macro-economic policy formulation, implementation, monitoring and evaluation

Relevance: The gender policy recommends integration of gender issues in national policies and projects. This Project will require labour during construction, and operation and maintenance phases. During construction phase, to the extent possible, equal employment opportunity shall be available for women.

3.1.5 National Equal Opportunities Policy, 2006

The National Equal Opportunities Policy provides a framework for re-dressing imbalances, which exist against marginalized groups while promoting equality and fairness for all, with a goal of. Providing avenues where individuals and groups' potentials are put to maximum use by availing equal opportunities and affirmative action.

Relevance: Water supply and sanitation system construction comes along with a lot of opportunities including employment and service provision. The project will avail equal opportunities and affirmative action.

3.1.6 National Youth Policy, 2001

The goal is to provide an appropriate framework for enabling youth to develop social, economic, cultural and political skills so as to enhance their participation in the overall development process and improve their quality of life. The objectives of the policy are;

i. To initiate, strengthen and streamline all programmes and services targeting the youth.
ii. To promote social and economic empowerment of the youth.
iii. To build capacity and provide relevant training and information to the stakeholders.
iv. To promote growth in the development of the youth through actions that protect empower and prepare them for adulthood.

Relevance: water and sanitation system construction project should include all youth in all phases of the project execution, including construction and operations. Priority for employment should be given to youth from the project area.

v. To provide psycho-social support and other services to youth in conflict situations, difficult circumstances and to the disadvantaged groups.
vi. To increase youth involvement in decision--making, leadership, community based and other development programmes.
vii. To mobilise resources for youth programmes and projects at all levels.

3.1.7 National Child Labour Policy, 2007

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 working children enjoy their right to childhood, education, dignity and the full development of their potential.

Relevance: 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 recruitment to ensure underage children are not employed in project works. The Contractor shall ensure potential workers produce a form of identification showing they are of legal age to work; 18 years and above

3.1.8 National Policy on Disability, 2006

The vision of the policy is a society where people with disabilities (PWDs) fully participate in all spheres of development. The mission is to provide a framework to the empowerment of PWDs in the development process.

Relevance: The project shall ensure participation of representatives of PWDs in the implementation, phase. During recruitment of workers, PWDs should not be discriminated against.

3.1.9 Occupational Health and Safety Policy

This policy seeks to:
i. Provide and maintain a healthy working environment;
ii. Institutionalize OHS in the water-sector policies, programs and plans; and
iii. 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.

Relevance: 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 labourers, 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.

3.1.10 HIV/ AIDS Policy, 1992

Current effort to combat HIV/AIDS is characterized by a policy of openness by Government and this has, to a large extent, been emulated by civil society, political and social institutions, and workplaces. HIV/AIDS is recognized by Ministry of Health as a considerable risk in construction of infrastructure projects and it (together with the Ministry of Gender, Labour and Social Development) encourages employers to develop in-house HIV/AIDS policies, provide awareness and prevention measures to workers and avoid discriminating against workers living with or affected by HIV/AIDS.

To ensure HIV/AIDS is addressed in the workplace, the policy encourages employee awareness and education on HIV/AIDS. To protect the infected and affected persons from discrimination, employers are required to keep personal medical records confidential. Employees living with, or affected by, HIV and AIDS, and those who have any related concerns, are encouraged to contact any confidant within the organization to discuss their concerns and obtain information. It is anticipated that during the construction phase, there may be an influx of people into the project area possibly resulting into sexual fraternisation and a risk of HIV/AIDS spread. The policy also guides about HIV/AIDS management including awareness and provision of condoms in workplaces.

Relevance: 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.

3.1.11 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.

Relevance: 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.

3.2 National Legislative Framework

3.2.1 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*

Relevance: The implementation of this Project will be conducted in a manner that will

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 government enforces this through the lead agencies like NEMA which in turn mandates for a 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.*

incorporate the appropriate safeguards for environmental and social issues.

3.2.2 National Environment Act, No.5 of 2019

The specific legislation that deals with Environmental and Social Impact Assessments (ESIA) in Uganda is the revised National Environment Act No.5 of 2019 from NEA-Cap 153, 1995. The National Environment Management Authority (NEMA) was created under the NEA, 1995 and mandated with the responsibility to oversee, coordinate and supervise environmental management activities in Uganda. Schedule 5 of the National Environment Act No.5 of 2019, this project is categorised under part 1 as a **Category 4**: Utilisation of water resources and water supply, including- (b) Abstraction or utilization of ground water of **more than 1000 m³/day.** The Act provides for various strategies and tools for environment management, which also include EIA for projects likely to have significant impacts on the environment.

Relevance: the system will be sized based on the design demand of 2,559.44 m³/day hence the need for ESIS. This study is therefore in line with the provisions of this law.

3.2.3 The Local Governments Act Cap 243

The Local Government Act provides for decentralised governance and devolution of central government functions, powers and services to local governments that have their own political and administrative structures. Districts have powers to oversee implementation of development activities under supervision of their relevant departments such as environment, lands and water resources. According to Section 9 of the Local Government Act, a local government is the highest political and administrative authority in its area of jurisdiction and will exercise both legislative and executive powers in accordance with the constitution. *Rakai District (Environment and Water offices) bears the key responsibilities for environmental monitoring during the construction phase of the proposed project*. The same Act Provides for the system of local governments to enforce environmental law; which includes among others, physical planning, environmental protection (forests and wetlands, streams etc) and ensuring proper sanitation.

Relevance: The local government of Rakai District and Kyalulangira and Kifamba Sub counties as well as the newly formed Kibaale town council together with the project are local councils will continuously be engaged at all stages of project planning and implementation.

3.2.4 Employment Act, 2006

The Employment Act is the governing legal statutory instrument for the recruitment, contracting, deployment, remuneration, management and compensation of workers. The Act is based on the provisions of Article 40 of the Constitution of Uganda. The Act mandates Labour Officers to regularly inspect working conditions of workers to ascertain that the rights of workers and basic provisions are provided and workers' welfare

Relevance: This Project will require workers during construction, operation and maintenance phases. Among the 15 principles which apply to MWE's ESS Policy is Gender Equality and Women's Empowerment. This requires that projects and programmes implemented or supported by the Ministry be designed and implemented in such a way that both women and men have equal opportunities to participate in the project; therefore, the construction contractor will involve local leaders in

attended to. The Act also provides for the freedom of association of workers permitting workers to join labour organizations. Section 32 addresses the issue of child labour and states that children under the age of twelve years shall not be employed in any business, undertaking or workplace (32(1)). Subsection 32(2) provides restrictions under which a child under the age of fourteen (14) years may be employed; including for light work under the supervision of an adult aged over eighteen (18) years and the work shall not interfere with the child's education.

recruitment process to ensure full and fair participation of local communities and screening out of lawbreakers. This in turn will promote utilization of locally available labour, to the extent possible, depending on the level of skills required visa vie what is available. In addition, the working conditions and workers' welfare, including child labour will be governed by the provisions of this Act. Rakai District labour officers will also be involved in ensuring compliance with the provisions of the Employment Act for this project.

3.2.5 Water Act, Cap 152

The objective of the Water Act is to enable equitable and sustainable management, use, and protection of water resources of Uganda through supervision and coordination of public and private activities that may impact water quantity and quality. Section 18 requires that before constructing or operation of any water works, a person should obtain a permit from Directorate of Water Resources Management (DWRM). Construction is herein defined to include alteration, improvement, maintenance and repair of water systems. The Act also aims to control pollution of water resources (Sections 28 and 31). Section 6 (c) implies that it is prohibited to cause or allow any waste to come into contact, whether directly or indirectly, with any water, other than under the provisions of the Water Act.

Relevance: The proposed project not only aims at improving/increasing water coverage in the subcounty but also to protect the existing water sources in the district. Therefore, it was imperative that a baseline water quality test be conducted at the proposed Lake water source to ascertain the quality of water (Appendix IV) proposed to be supplied to the community against the National water standards.

3.2.6 The Physical Planning Act, 2010

The Physical Planning Act, 2010 replaced the Town and Country Planning Act, Cap 246 which was enacted in 1951 and revised in 1964 but is now inconsistent with contemporary government system in Uganda. The 1951 Act is enacted to regulate and operate in a centralised system of governance where physical planning was carried out at national level through the Town and Country Planning Board. Implementation of the Act was supervised by local governments, especially the urban local governments. Uganda has since gone through many social, political and economic changes. For example, promulgation of the 1995 Constitution established a decentralised system of governance which divulged powers and functions including physical planning, finance and execution of projects from the central government to local governments. This therefore created a need to enact a physical planning legislation which is consistent with this Constitutional requirement. The Physical Planning Act, 2011 establishes district and urban physical planning committees, provides for making and approval of physical development plans and applications for development.

Section 37 of The Physical Planning Act, 2011 requires an EIA permit for developments before they are implemented, stating: "Where a development application related to matters that require an environmental impact assessment, the approving authority may grant preliminary approval subject to the applicant obtaining an EIA certificate in accordance with the National Environment Act".

Relevance: This Project is located within Rakai District; hence must conform to planning requirements prescribed by the district planning committee and the water office. The Act is applicable to the piped Water supply and sanitation system project and provides for the approval of the project and associated infrastructure prior to development.

3.2.7 Occupational Safety and Health Act, 2006

The Occupational Safety and Health Act, Section 13, puts the responsibility of protection of the worker and the general environment to the employer and he or she must take all measures to protect the worker and the general public from the dangerous aspects of his or her undertaking. In section 18, he or she also has the responsibility of monitoring the environment under the influence of his or her undertaking. It also pleas in section 14 (1) that the contractor with more than 20 workers should; Prepare, and as often as may be appropriate, revise a written statement of policy with respect to the safety and health of employees while at work. Section 19 (2) skeletons that it is the duty of contractor to ensure that personal protective equipment provided under subsection (1) is used whenever it is required. Occupation Safety and Health Act also requires that the project construction area should be registered under section 41 (1).

Relevance: The Act requires the contractor to ensure that workers always have a safe working environment and that their health is not at risk because of the working environment. The contractor therefore is obliged to provide employers with washing facilities, First Aid, facilities for meals and safe access to workplaces. In onus for creation of a safe working environment and reduced health risk during construction phase, and will be required to formulate an Environmental, Social, Health, and Safety (ESHS) plan.

3.2.8 Public Health Act Cap 281

The Public Health Act consolidates the law with respect to public health and puts a duty on urban and local authorities for matters pertaining to public health. Section 7 of this Act provides local authorities with administrative powers to take all lawful, necessary and reasonably practicable measures for preventing the occurrence of, or for dealing with any outbreak or prevalence of, any infectious, communicable or preventable disease, to safeguard and promote the public health.

The Act also specifies about nuisances or conditions liable to be injurious/dangerous to health caused by persons or to persons on premises/ land they occupy or are in charge of. These nuisances include among others, vehicles in a state harmful to health, a dwelling or part of dwelling which is in a state that is dirty or harbors vermin or is damp and is likely to be harmful to health or is liable to favour the spread of any infectious disease, any pit, drain, septic tank, garbage receptacle, manure heap, dung pit so foul or offensively situated and likely to be injurious to health, any noxious matter or waste water flowing or discharged from any premises, wherever situated into any public street, gutter, gulley, swamp or watercourse that is not approved for reception of the discharge.

Relevance: The Act calls for health insurance, provision of adequate sanitary facilities, proper solid and liquid waste management, and provision of first aid services in all work places, an HIV/AIDS prevention and control plan as part of mitigation measures. It will be imperative for the contractor, in response to the COVID-19 outbreak, to prepare a Contagious Disease Preparedness and Response Plan.

3.2.9 The Children's Act, Cap 59

The Children's Act was enacted; to reform and consolidate the law relating to children; to provide for the care, protection and maintenance of children; to provide for local authority support for children; to establish a family and children court; to make provision for children charged with offences and for other connected purposes. In particular, Section 8 of this Act provides that no child will be employed or engaged in any activity that may be harmful to his or her health, education or mental, physical or moral development.

Relevance: The project will require workers during construction phases and there will not be any employment or engagement of children as per restrictions of the Employment Act to ensure that risks to children are either eliminated or reduced to as low as reasonably practicable as prescribed under the Children's Act, cap 59. In addition, the contractor will confirm age of potential local labourers prior to hiring through National Identity Card, birth certificate or confirming with Local Authority.

3.2.10 NSSF Act, Cap 222

The National Social Security Fund is a mandatory pure defined contribution provident fund which pays lump sums at retirement. The contribution rate to NSSF is 15% shared at 5% and 10% between the employee and employer respectively. The scheme was created by the National Social Security Fund Act (Cap 222) Laws of Uganda and its core objective is to protect formal employees against uncertainties of social and economic life.

Relevance: All permanent employees on the project should be subject to NSSF registration and the contractor shall ensure timely remittance of his/her contribution. their contributions remitted to NSSF in a timely manner

3.2.11 The Historical and Monuments Act, Cap 46

This Act provides for the preservation and protection of historical monuments and objects of archaeological pale-ontological ethnographical and traditional interests.

Relevance: During construction phase, any objects, material or infrastructure that may be identified during the trench excavation process as falling under the category of 'archaeological pale-ontological ethnographical and traditional interests' will be documented by the contractor and Rakai district and Department of Museums and monuments notified.

3.3 National Regulatory Framework

3.3.1 Environmental Impact Assessment Regulations, 2020

The regulations require a detailed study to determine possible environmental impacts and mitigation measures. The guidelines require that the EIA process should be participatory engaging the general public and stakeholders in consultations or to inform them and obtain their views about the proposed development during the EIA.

Relevance: This Environmental and social study was conducted with the guidance of these regulations. During this study, various stakeholders have been informed of the project concept, and widely consulted for their views on the proposed construction and establishment of the project. The views of all stakeholders and public consulted are presented in subsequent chapters of this report.

3.3.2 National Environment (Waste Management) Regulations, S.I. No. 49 of 2020

These Regulations apply to: All categories of hazardous and non-hazardous waste; Storage and disposal of hazardous waste and its movement into and out of Uganda. The regulations, which will relate to overall waste management (promote and minimise waste generation) during the construction phase, by: Eliminating use of toxic raw materials; Reducing toxic emissions and wastes; Recovering and reuse of waste wherever possible.

Relevance: These Regulations will apply during construction, operation, and maintenance phases of the Project. Each of the phases is expected to generate various types and volume of waste, the management of which should conform to these regulations.

3.3.3 National Environment (Noise Standards & Control) Regulations, 2003

Section 7 of these regulations requires that no person shall emit noise in excess of permissible noise levels, unless permitted by a licence issued under these Regulations. Section 8 imparts responsibility onto noise generators to use the best practicable means to ensure that noise does not exceed permissible noise

Relevance: These regulations are relevant to the Project as the construction activities may generate noise. This regulation explicitly makes the proponent responsible for

levels. Part IV of the First Schedules states the maximum permissible noise levels at construction sites as 75 dBA and 60 dBA for commercial and residential areas respectively.	ensuring that noise levels are kept within acceptable limits during the project implementation.

3.3.4 National Environment (Audit) Regulations, 2020

These regulations require that an environmental audit is undertaken to ensure compliance by the developer with the regulations, conditions in permits and licenses and any other applicable law, environment management systems and the environmental management and monitoring plan of the developer.	**Relevance:** This Regulation is relevant to the project as it keeps the operations of the project in-check with regards to the approval conditions stipulated in the approval certificate issued. The system construction contractor should develop an Environmental Management System, as a contractual obligation and a basis for regular environmental audits. Furthermore, Rakai district together with the supporting partner (Embassy of Iceland) shall ensure that a comprehensive audit is undertaken for the project.

3.4 Institutional Framework

3.4.1 National Environment Management Authority (NEMA)

The National Environmental Act provides for establishment of NEMA as the principal agency responsible for coordination, monitoring and supervision of environmental conservation activities. NEMA is under the Ministry of Water and Environment but has a cross-sectorial mandate to oversee the conduct of EIA through issuance of EIA guidelines, regulations and registration of practitioners. It reviews and approves environmental impact statements (EIS) in consultation with any relevant lead agencies. NEMA works with District Environment Offices and Local Environment Committees at local government level, which undertake inspection, monitoring and compliance enforcement on its behalf.	**Relevance:** NEMA is the agency responsible for making public the findings of this ESIS as well as approving and making recommendations to address any environmental and social impacts because of the project implementation.

3.4.2 Ministry of Water and Environment

The Ministry of Water and Environment (MWE) is the lead agency for the provision and management of water supply and sanitation services in Uganda. The Ministry has the responsibility for setting national policies and standards, managing and regulating water resources and determining priorities for water development and management. It also monitors and evaluates sector development programmes to keep track of their performance, efficiency and effectiveness in service delivery. MWE has three directorates**:** Directorate of Water Resources Management (DWRM), Directorate of Water Development (DWD) and the Directorate of Environmental Affairs (DEA). **Water and Sanitation Development Facility – South West** The purpose of the WSDF-SW is to support the development of water supply and sanitation in small towns and rural growth centers through a decentralized and demand driven financing mechanism in central Uganda districts. The WSDF-SW provides technical and financial support to help districts and Town Councils to develop, rehabilitate and expand water supply services and sanitation in the small towns and rural growth centres, following a demand-based approach under the framework of Uganda's water and sanitation policies and relevant sector strategies.	**Relevance:** The project requires a Surface water abstraction permit (to pump water from Lake Kijjanebalola for the system). DWRM will ensure that all possible measures are taken to minimize the risk of water pollution, as a result of the Project, to levels that are as low as reasonably practicable. Rakai district falls within the jurisdiction of Water and Sanitation Development Facility – South West and this facility will be fundamental in

The Directorate of Water Resources Management (DWRM) is responsible for developing and maintaining national water laws, policies and regulations; managing, monitoring and regulation of water resources through issuing water use, abstraction and wastewater discharge permits; Integrated Water Resources Management (IWRM) activities; coordinating Uganda's participation in joint management of transboundary waters resources and peaceful cooperation with Nile Basin riparian countries. The directorate comprises three departments namely Water Resources Monitoring and Assessments, Water Resources Regulation and Water Quality Management.

offering technical and financial support to help districts to ensure the system is not only constructed well but also operated and maintained well to achieve the project objectives.

3.4.3 Ministry of Gender, Labour and Social Development (MGLSD)

MGLSD is the leading and coordinating agency for the Social Development Sector. In collaboration with other stakeholders, MGLSD is responsible for occupational safety, labour relations, community empowerment, protection and promotion of the rights and obligations of the specified vulnerable groups for social protection and gender responsive development.

Relevance: The Department of Occupational, Health and Safety (OHS) in the Ministry will be consulted as a Stakeholder to give guidance on the OHS aspects of this Project during this study.

3.4.4 Rakai District Local Government

The proposed WSS is located in Rakai district and so district authorities will be vital in the implementation of the project by mobilising political goodwill and sensitizing communities. District Environmental Officers (DEO) and District Community Development Officers will play pivotal role during environmental and social safeguards monitoring associated with system construction, operation and maintenance.

3.4.5 Acquisition of Requisite Permits for the Project

Implementation of the project will require the necessary permits **(Table 3-1)** in line with Uganda laws.

Table 3-1: Permits to be acquired for Project Implementation

Permit	Acquiring Agency	Responsible Agency	Legal Framework	Reason for Permit
Project NEMA approval certificate	Ministry of water and environment	NEMA	National Environment Management Act, 2019	Environmental and Social Impact Assessment for the Project
Surface Water abstraction permit	MWE	MWE-DWRM	Water Act	The Surface water abstraction from L. Kijanabalola for project should be equitable and sustainable

3.4.6 Roles and Responsibilities in Water Supply Provision

Institutions	Roles and Responsibilities in Water Service Provision
Water Policy Committee (WPC)	**The Water Policy Committee (WPC)** advises the Ministry of Water and Environment to develop integrated sustainable water management policies. WPC is comprised of representatives from several ministries, National Water and Sewerage Corporation (NWSC) and National Environmental Management Authority (NEMA).
Ministry of Water and Environment (MWE)	**The Ministry of Water and Environment (MWE)** has the overall responsibility for setting national policies, standards, and priorities for the development of water provision services.
Directorate of Water Development (DWD)	**The Directorate of Water Development (DWD)** is responsible for: • Managing, coordinating and regulating water supplies and sanitation activities (rural and urban areas) • Providing support to Local Governments to develop capacity guide the utilization of grants. • Constructing and rehabilitating piped water schemes in small towns and rural growth centres
Rural Water Supply and Sanitation Department (RWSSD)	**The Rural Water Supply and Sanitation Department (RWSSD)** builds programs to develop staff capacity for water provision and monitoring in rural areas. RWSSD collaborates with the Technical Support Units who are operating in the districts.
Urban Water Supply and Sanitation Department (UWSSD)	**The Urban Water Supply and Sewerage Department (UWSD)** oversees and supports water supply and sanitation service delivery in areas outside the National Water and Sewerage Corporation's mandate. The Department has two regional deconcentrated units: Umbrella Authorities and Water and Sanitation Development Facilities.
Water and Sanitation Development Facility (WSDF)	**The Water and Sanitation Development Facilities (WSDFs)** funds new water supply, sanitation schemes and major rehabilitations project in Small Towns and Rural Growth Centres. After completion, WSDF schemes are handed over to NWSC, local authorities or Umbrella Authorities for operation and maintenance.
Water Utility and Regulation Department (WURD)	**The Water Utility and Regulation Department (WURD)** is responsible for setting, monitoring and enforcing water service standards for the National Water and Sewerage Corporation as well as reviewing private operators' business plans, approving new tariff proposals.
Umbrella Authorities (UA)	**Umbrella Authorities (UA)** are regional structures of the MWE officially designated (since 2017) as water authorities responsible for the management of piped systems not covered by NWSC. Prior to 2017, these organizations were called Umbrellas of Water and Sanitation and were responsible for O&M backup support. As of 2018, 259 schemes had been gazetted to the UAs for direct management.
Technical Support Units (TSU)	**Technical Support Units (TSU)** are the links between the MWE and Local Government. They are relatively influential at the district level. They were established under MWE in Uganda's 9 regions to build capacity at the district level following the decentralization of rural water supply and sanitation. They provide capacity building, monitoring and technical back-up support skills to local governments, especially in the utilization of the DWSCG.
National Water and Sewerage Corporation (NWSC)	**The National Water and Sewerage Corporation (NWSC)** is a parastatal corporation responsible for the delivery of water supply and sewerage services in urban centres. NWSC is gazetted service areas (jurisdiction) which are expanding to small urban centres. From 20 service areas in 2011, NWSC managed 236 areas in 2018.
Private Operator (PO)	**Private Operators** manage small piped systems under a management contract with the Sub-County. With the designation of the Umbrella Authorities as service providers, POs are being phased out.
Sub-county Water Supply and Sewage Board (SCWSSB)	**The Sub-County Water Supply and Sewage Board (SCWSSB)** no longer manage (directly, or more commonly, through POs) small piped system but conserve an oversight role. They are seen as an important link between the community and the service provider (the Umbrella or NWSC).
Water User Committees (WUC)	The community, through the Community-Based Management System (CBMS), is entrusted to take care of the management of rural point sources through **Water User Committees (WUC).**
Hand Pump Mechanics Association (HPMA)	**The Hand Pump Mechanics Association (HPMA)** is a district-level actor with members from the sub-counties who provide maintenance services to waters in rural areas. Private hand pump mechanics and scheme attendants also operate independently of the Association..
Uganda Water and Sanitation NGO network (UWASNET)	**Non-governmental Organizations (NGOs)** and **Community-based Organizations (CBOs)** support the provision of water and sanitation services (construction of facilities, community mobilization, training of communities and local governments, hygiene promotion), as well as advocacy and lobbying.
Ministry of Local Government (MoLG)	**The Ministry of Local Government (MoLG)** is responsible for providing administrative support and technical advice to local governments in developing district water plans. The Ministry of Finance dictates the allocation formulas which outline how District Water and Sanitation Conditional Grants can be spent in the district. The District Water Office, with support from Ministry for Water and Environment through the Technical and Support Units, develops work plans and budgets. The District Council can recommend changes to workplans and makes the final approvals.
Local Governments (districts, towns, sub-counties)	**The local Governments (districts, towns, sub-counties)** are responsible for the provision and management of water and sanitation services in rural and urban areas outside the jurisdiction of NWSC, in liaison with District Water Office and the Umbrella Authorities.
District Water Office (DWO)	**The District Water Office (DWO)** is the central institution coordinating district water and sanitation services. The DWO elaborates the district water plans through the District Water and Sanitation Conditional Grants. DWO has an oversight and architect role of water management in the district. They do not directly manage specific operations such as maintenance or infrastructure development.

Source: Acquaya Institute: Institutional Framework Brief; December 2019

3.5 **African Development Bank Group Environmental and Social Assessment Procedures**

The Bank's existing Environmental and Social Assessment Procedures (approved in 2001) have been revised (2015) to reflect the updated information, upgraded processes and cutting-edge knowledge embodied in the Integrated Safeguards System (ISS). It also addresses the limitations of the existing Environmental and Social Assessment Procedures (ESAP) and provides a strong procedural basis for the operationalization of the Integrated Safeguards Systems. It details the specific procedures that the Bank and its borrowers or clients should follow to ensure that Bank operations meet the requirements of the operational safeguards (OSs) at each stage of the Bank's project cycle.
Some of the important steps to this process include:
Step 3.1a: For Category 1 and 2 projects, the Sector Departments shall notify the borrower of the project Category and specify the ESA studies that are required for that project Category.
Step 3.2a: Prepare the TOR for the Strategic Environmental and Social Assessment (SESA) / Environmental and Social Impact Assessment (ESIA) and ESMP (and where applicable a Full Resettlement Action Plan (FRAP) / Abbreviated Resettlement Action Plan (ARAP). To achieve this, the borrower may request technical assistance from the Sector Departments. Affected communities (including vulnerable groups) and other stakeholders shall be meaningfully consulted about the TOR for the SESA / ESIA and ESMP (and where applicable the FRAP / ARAP). For Category 2 projects, the borrower shall prepare the TOR for the ESMP/ESMF (and where applicable an ARAP). To achieve this, the borrower may request technical assistance from the Sector Departments

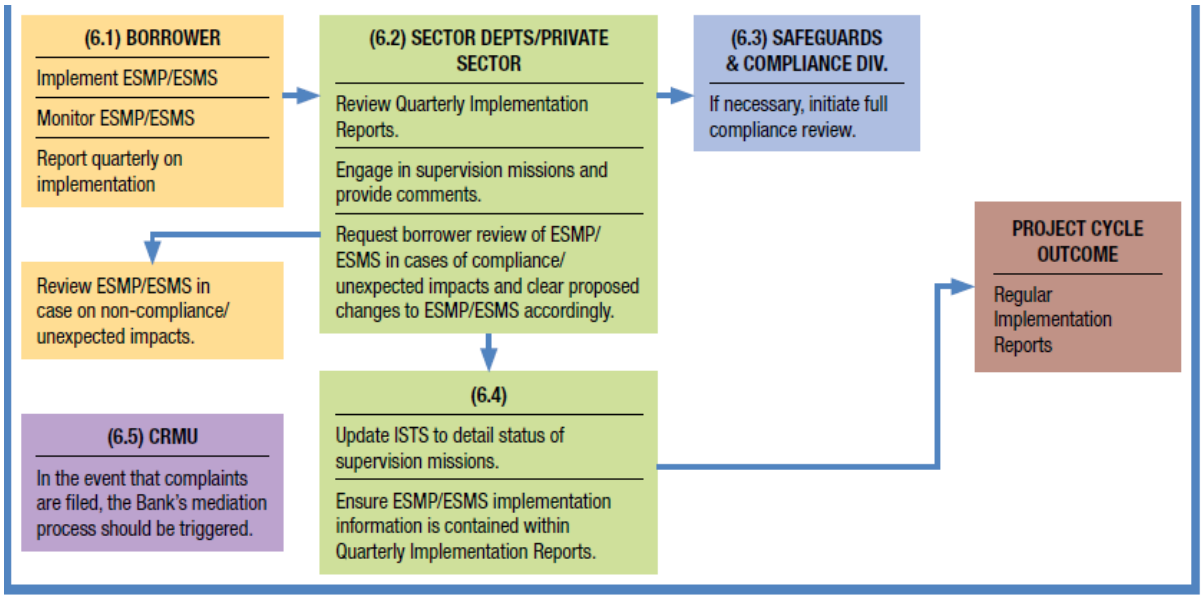
Step 3.3a: For Category 1 projects, the Sector Departments shall review the TOR for the SESA / ESIA and ESMP (and where applicable the FRAP / ARAP) 3. For Category 2 projects, the Sector Departments shall review the TOR for the ESMP/ESMF (and where applicable the ARAP).

Step 3.4a: For Category 1 projects, the borrower shall begin to prepare the SESA / ESIA and ESMP (and where applicable the FRAP / ARAP) and should engage independent environmental and social specialists to carry out the SESA / ESIA and ESMP (and where applicable the FRAP / ARAP) work. The borrower may request project preparation financing assistance from the Bank in order to engage the necessary specialists. The assessment work must be completed in accordance with the Bank's OSs, the agreed-upon TOR and country regulations and guidelines.

Affected communities (including vulnerable groups) and other stakeholders shall be meaningfully consulted during the preparation of the SESA / ESIA and ESMP (and where applicable the FRAP / ARAP). The borrower shall follow and monitor the SESA / ESIA and ESMP (and where applicable the FRAP / ARAP) progress closely, particularly when consultants are involved. For Category 2 projects, the borrower shall begin to prepare the ESMP (and where applicable the ARAP). As in the case of the SESA / ESIA process, the borrower should engage independent environmental and social specialists to carry out the ESMP (and where applicable the ARAP) work, may request project preparation financing assistance and shall follow and monitor the ESMP/ESMF (and where applicable the ARAP) progress closely. Again, in line with the SESA / ESIA process, the assessment work must be completed in accordance with the Bank's OSs, the agreed-upon TOR and country regulations and guidelines. Affected communities (including vulnerable groups) and other stakeholders shall be meaningfully consulted during the preparation of the ESMP/ESMF and (where applicable the ARAP).

Responsibility: Borrower (supported by Sector Departments, where applicable).
Output: (a) Initial work to prepare draft SESA / draft ESIA and draft ESMP (and where applicable draft FRAP / ARAP) for Category 1 projects; (b) initial work to prepare draft ESMP (and where applicable draft ARAP) for Category 2 projects.

Responsibilities of Borrowers, Sector Departments / Private Sector Department and Safeguards



The borrower is responsible for the implementation of the ESMP / ESMS and shall diligently monitor it by: i) ensuring that the indicators identified in the project implementation documents are respected; ii) ensuring compliance with the Bank's ISS; iii) ensuring adherence to the environmental and social covenants of the financing agreement. The borrower shall then report to the Sector Departments / Private Sector Department on the implementation of the ESMP / ESMS, as part of the Quarterly Implementation Reports that it submits to the Bank. These reports shall clearly identify the results achieved in implementing the ESMP and key management and monitoring tasks.

The project therefore is within Category 1 projects, the Ministry of Water and Environment engaged independent environmental and social specialists to carry out an ESIA study. A Resettlement Action Plan is not necessary for this project.

The Bank's Integrated Safeguards Policy Statements (ISS) sets out the Bank's commitments to and responsibilities for delivering the ISS to amongst others, ensure the systematic assessment of environmental and social impacts and risks as well as implement an adaptive and proportionate approach to environmental and social management measures to be agreed with clients as a condition of project financing. The ISS are summarized as follows:

Table 3-2: African Development Bank Integrated Safeguards relevant to the project

Operational Safeguards	Objective	Relevance to the Project
OS 1: Environmental and Social Assessment	This overarching safeguard governs the process of determining a project's environmental and social category and the resulting environmental and social assessment requirements. It addresses issues of project categorisation, application and use of appropriate level of environmental assessment in line with the scale of the project. It also covers aspects of climate change vulnerability assessment; public consultation as well as grievance redresses procedures.	*Under this OS, such a water project is placed as a category 1 type and accordingly, a full and detailed ESIA has been prepared. In addition, mitigation measures in the ESIA are among the key guides on environmental and social safeguards compliance.*
OS 2: Involuntary	The safeguard retains the requirement to provide compensation at full replacement cost; reiterates	*The water project involves land uptake which is all being handled in*

Operational Safeguards	Objective	Relevance to the Project
Resettlement, Land Acquisition, Population Displacement and Compensation	the importance of a resettlement that improves standards of living, income-earning capacity, and overall means of livelihood while emphasising the need to ensure social considerations, such as gender, age, and stakes in the project outcome so as not to disenfranchise project-affected people	*line with the GoU laws on compensation which spells out provisions for compensations following Good International best practices*
OS 3: Biodiversity, Renewable Resources and Ecosystem Eervices	The overarching objective of this safeguard is to conserve biological diversity and promote the sustainable use of natural resources. The safeguard reflects the importance of biodiversity on the African continent and the value of key ecosystems to the population, emphasising the need to amongst others, respect, conserve and maintain [the] knowledge, innovations and practices of indigenous and local communities in accordance with amongst others, traditional cultural practices that are compatible with conservation or sustainable use requirements	*The project is cognizant of the need to conserve biodiversity in its settings hence, baseline terrestrial and aquatic biodiversity surveys were conducted as part of ESIA. In addition, during implementation, all measures are taken to ensure minimal loss of vegetation and where that is inevitable, there are efforts to re-plant vegetation on exposed surfaces.*
OS 4: Pollution Prevention and Control, Hazardous Materials and Resource Efficiency	This safeguard covers a range of impacts of pollution, waste, and hazardous materials for which there are agreed international conventions and comprehensive industry-specific standards that other multilateral development partners follow. It also introduces vulnerability analysis and monitoring of green-house gas emissions levels and provides a detailed analysis of the possible reduction or compensatory measures framework	*With regard to this OS, the project ensures that, it's activities that are likely to trigger pollution especially operations of the, site clearance, excavations activities are all mitigated. The developer shall monitor the Contractor to ensure use of technical and financial measures for pollution prevention and for efficient use of resources*
OS 5: Labor Conditions, Health and safety	This Safeguard establishes the Bank's requirements for workers' conditions, rights and protection from abuse or exploitation. It covers working conditions, workers' organizations, occupational health and safety, and avoidance of child or forced labor	*The workers in the project are provided with appropriate personal protective equipment (PPEs) and all the working conditions are governed by GoU labor laws which are pegged to International Labor Organization.*

3.6 **World Bank Environment and Social Safeguards**

Table 3-3: World Bank Environmental and Social Safeguards relevant to the project

Framework	Objective	Relevance to the project
ESS-1: Assessment and	ESS1 clearly shows the developer's responsibilities for assessing, managing, and monitoring environmental and social risks, and	*ESS1 enacts the Project ESIA study. This study has been conducted in conformity with this safeguard as a*

Framework	Objective	Relevance to the project
Management of Environmental and Social Risks and Impacts	impacts associated with each stage of a project, in order to achieve environmental and social out-comes consistent with the Environmental and Social Standards (ESSs) including the developers national environmental and social framework. Such assessment will inform the design of the project, and be used to identify mitigation measures and actions and to improve decision making.	*project tool for environment and social risks management.*
ESS-2: Labour and Working Conditions	ESS2 recognizes the importance of employment creation and income generation in the pursuit of poverty reduction and inclusive economic growth. It promotes safety and health at work, promotes the fair treatment, non-discrimination, and equal opportunity of project workers, protects project workers, prevents the use of all forms of forced labour and child labour, supports the principles of freedom of association and collective bargaining of project workers in a manner consistent with national law and provides project workers with accessible means to raise workplace concerns.	*During the construction phase of the project, the contractor will be required to create a conducive, safe and healthy working environment and conditions for workers by treating them fairly and equally hence enhancing the project development benefits.*
ESS-3: Resource Efficiency and Pollution Prevention and Management	ESS3 recognizes that economic activity and urbanization often generate pollution to air, water, and land, and consume finite resources that may threaten people, ecosystem services, and the environment at the local, regional, and global levels. ESS3 requires the developer to consider ambient conditions and apply technically and financially feasible resource efficiency and pollution prevention measures that are proportionate to the risks and impacts associated with the project and in accordance with the mitigation hierarchy and the Environmental Health and Safety Guidelines (EHSGs).	*During project implementation, the developer shall monitor the contractor to ensure the use of technical and financially feasible measures for pollution prevention and for efficient use of resources.*
ESS-4: Community Health and Safety	ESS4 recognizes that such project activities, equipment, and infrastructure can increase community exposure to risks and impacts. Therefore, it goes ahead to address the health, safety, and security (HSS) risks and impacts on project-affected communities and the corresponding responsibility to avoid or minimize such risks and impacts.	*ESS4 calls for Identification, Management of HSS risks related to the project.*
ESS-8: Cultural Heritage	ESS8 recognizes that cultural heritage provides continuity in tangible and intangible forms between the past, present, and future. ESS8 aims to protect cultural heritage from the adverse impacts of project activities and support its preservation.	*During the project excavations, there might be unearthing of physical cultural resources or features that need to be protected and preserved.*
ESS-10: Stakeholder Engagement and	ESS10 recognizes the importance of open and transparent engagement between the developer and project stakeholders as an essential element of good international practice. Effective stakeholder engagement throughout the project	*ESS10 guided project stakeholder identification, engagement planning, and project disclosure and reporting (ESMP).*

Framework	Objective	Relevance to the project
Information Disclosure	life cycle can improve the environmental and social sustainability of projects, enhance project acceptance, strong, constructive and responsive relationships and make a significant contribution to successful project design and implementation. It therefore requires the developer to conduct stakeholder identification and analysis; plan how the engagement with stakeholders will take place; disclosure of information; consult with stakeholders; addressing and responding to grievances; and reporting to stakeholders	

4. METHODOLOGY

4.1 ESIA scope

The ESIA study commenced with a scoping exercise which informed formulation of the Terms of Reference (TOR) for the EIA. The TORs were submitted to National Environment Management Authority for review and were approved on 27th February 2021. The approved Terms of Reference and the NEMA approval conditions (Appendix 1) guided the ESIA process.

4.2 Literature Review

Existing literature related to proposed project and its area was reviewed. The Guidelines for Environment Impact Assessment in Uganda as well as other existing national policies, guidelines, standards, and legislation were also referred to.

Additionally, a review and reference to previous studies on the project was also made. Some of the documents reviewed include;

i. Feasibility study and preliminary design report for the water supply and sanitation system in Kibaale and Kifamba RGCs in Rakai district local government (2021).
ii. Detailed design report for the water supply and sanitation system in Kibaale and Kifamba RGCs in Rakai district local government (2021)
iii. Social economic baseline survey reports
iv. Water quality analysis reports
v. Environmental Impact Assessment Guidelines for Water Resources Related Projects in Uganda
vi. Rakai District Development Plan
vii. Environment and Social Safeguards Policy - MWE

4.3 Baseline Data Collection

4.3.1 Baseline Air quality

A series of measurements, using passive samplers (an electronic light-scattering device (CEL-712 Microdust Pro) and portable electronic monitors were undertaken at selected areas identified as having relevant sensitive receptor exposure (homesteads, health facility, school) and others areas of commune like places of worship.

4.3.2 Ambient Noise

Noise measurements were taken using a Casella CEL-62X - Digital integrated sound pressure meter. Measurements of background noise levels were performed at locations across the Town Council with possible receptor exposure. All the measurements were slow and Impulse time weighted. Percentile parameters L_{AF90} (the noise level exceeded for 90% of the measurement period, A-weighted), L_{AF50}, L_{AF10} and L_{Aeq} (A-weighted, equivalent sound level - with the same Energy content as the varying acoustic signal measured) were recorded. All measurements were taken during daytime the results are presented in Section 5.1.6.

Figure 4-1: Garmin hand held GPS system

All sampling and measurement locations during the site surveys were geo-referenced using portable GPS (GARMIN eTrex Vista HCx-**Figure 4-1)** and expressed in the WGS 84 system. Locations were selected in consideration of projects components, potential receptors and also existing baseline data available as per the project site layout maps, survey reports, scoping and field surveys by different specialist teams. Maps, Google Earth satellite imagery have been used to clearly show the administrative boundaries, water sources, social profile, and site

location of the proposed area. A software known as Arcmap11 was used for analysis.

4.3.3 Water quality

Water samples were collected from Lake Kijjanebalola and the physio-chemical and bacteriological characteristics analysed in a laboratory. These samples were collected in two replicates with labelled containers, preserved and transported in a cool box with ice packs as per ISO 5667 guidelines to ensure integrity of the sampling process for analysis at laboratory. The results then informed the need for a treatment plant

4.3.4 Biological Environment

The study involved a desk review of existing data for the study area and ground truth field observations of existing biological environment (flora and fauna) in the areas surveyed. Surveys were performed across the project area to identify and characterize potentially sensitive receptors targeting vegetation.

4.3.5 Social Economic Baseline

Social conditions are important in understanding potential socio- economic impacts of the project components such as its effect on existing social services, availability of local labour and induced changes in population dynamics (in-migration, effects domestic violence, family breakups, child labour, school drops, early marriages and HIV/AIDS). Factors such as literacy levels in the local community influence how objectively a project is perceived and appreciated. Community expectations for the project benefits to improve their conditions of living and local infrastructure are more common in poor communities than wealthier ones. In addition, project sustenance in an impoverished and low-literacy community is harder since people are more likely to vandalize equipment or pilfer materials, they perceive to be very valuable, yet are of no resale value to them. The construction of the system has been proposed in an area where there is significant human settlement, and this was surveyed for socio-economic baseline conditions.

Objectives of this specific study were:

i. To assess the existing socio-economic status, gender, hygiene, and sanitation of the beneficiaries in the proposed project area.
ii. To analyze the socioeconomic impact of the proposed project on the local community.
iii. To collect the community's expectations and fears about proposed project.
iv. To build a prior trust between stakeholders of project and local community.
v. To explore the ability of communities to operate and manage piped water supply systems and public sanitation facilities.

Scope of socio-economic study: The socioeconomic situation of the project area was conducted with the help of social team supported by local council leaders during the ground truthing and social economic survey. The study also encompassed a review of information on existing socioeconomic situation, level of education, physical infrastructure condition, existing natural and human resources from the previous social economic studies conducted in the area.

Methodology for socio-economic assessment: This cross-sectional study utilized a mixed approach of both qualitative and quantitative data collection techniques. The second activity was to establish contact/ rapport with the community. Data was collected from primary and secondary sources.

A. Data Sources

Data was collected from both primary and secondary sources.

- Primary data sources included household heads or spouses, institutional heads/managers, water suppliers/vendors, and community leaders at the town council and village levels. The survey targeted institutions including all existing education facilities, health facilities/drug shops/pharmacies/clinics, industries/factories, hotels/restaurants/bars/lodges, saloons, and wholesale /retail shops. The study

focused on collecting general information related to the project especially from leaders at all levels, from the district to the local council level and institutions within the project area.

- Secondary data source included literature review

B. Sample Design and Implementation

Whereas the study targeted all the institutions in the study areas, a representative sample of households was taken. The Kreijce and Morgan Formula (1970) was used in calculating the sample size for households.

$$S = \frac{X^2 NP(1-P}{d^2(N-1) + X^2 P(1-P)}$$

Where;
S = Sample Size
N = Total Population in this case the Number of Households
X_2 is the table value of chi=square for one degree of freedom at the desired confidence level (3.841 given that X= 1.96)
P is the population proportion (assumed to be 0.5 since this would be the maximum sample size).
d is the degree of accuracy expressed as a proportion = 0.05
The adopted sample size for all the Kibaale project areas is shown in **Table 4-21** and that of Kifamba is shown in **Table 4-2** .

Table 4-1: Adopted Sample Size for Kibaale

Sub County	Household Sizes		Calculated Percentage	Adopted Percentage	Adopted Sample Size
	Total House Holds	Sample Size			
Kibanda	191	128	67%	15%	29
Byakabanda	1,286	296	23%	15%	193
Kiziba	366	188	51%	15%	55
Kyalulangira	3,841	349	9%	15%	576
Total	**5,685**				**853**

Overall, 853 households were reached during the survey signifying a 15% of households in Kibaale RGC.

Table 4-2: Adopted Sample Size for Kifamba

Village	Household Sizes		Calculated Percentage	Adopted Percentage	Adopted Sample Size
	Total Households	Sample Size			
Kifamba Subcounty	2,632	335	13%	15%	395
Total	**2,632**				**395**

Overall, 395 households were reached during the survey.

C. Sampling Procedure

A systematic two stage cluster design was employed in selecting study households. The first stage involved selecting Enumeration Areas (EAs)/villages from a list of all the EAs that made the parish in which the study town falls. The listing process of the EAs was based on the UBOS 2014 Population Census Master Sampling Frame and updated with guidance from the town leaders.

In the second stage, a fixed number of households were sampled using systematic sampling from a complete listing of households, which was updated prior to the survey.
At the household, the head or spouse was the primary unit of response. All institutions in the parish in which the town falls were targeted.

D. Data Collection Techniques

The study utilized both primary and secondary data and for primary data a mixed approach of both qualitative and quantitative primary data collection techniques was used. Among the techniques utilized include: -

- Literature review: among the documents reviewed included Kiruhura and Rakai District Development Plans, National and Local Government Statistical Abstracts, among others;
- Face to face interviews with household heads or spouses, institutional heads/managers. Household and Institutional structured questionnaires accommodated on mobile phones were used at household and institutions respectively;
- In-depth interviews with water vendors/suppliers and local community leaders;
- Focus Group Discussions (FGDs) with members in study towns. One FGD was held per town (core business area). The target compositions of the FGDs in each town include male and household heads, male and female persons with disabilities, local council leader;
- Observation, photography and video recording

E. Development of Data Collection Instruments

Development of the data collection tools was based on the study objectives with a focus on understanding the socio-economic and socio-demographic characteristics of the study communities, water usability, and their willingness and ability to pay for improved water sources.
The development process utilized a participatory approach involving the consulting team developing and sharing the instruments with the client. A field back meeting was held at the offices of the client to which comments and suggestions on the tools were made.

F. Study Variables

The key areas of assessment include and the rationale for their inclusion: -

- Socio-demographic characteristics such as population, gender, household size, education, etc. of the target communities which will be used in the design of the systems and production of educational materials;
- Socio-economic characteristics such as occupation and income, expenditures, home ownership, assets and tenure which can provide indications of the population's ability to sustain the system and therefore the opportunities for private/house-connections;
- Water use patterns such as quantities, sources, problems and costs which indicate the type of improvements that can be made with respect to the households' apparent ability to pay;
- Sanitation facilities and corresponding use such as type, condition, problems and cost, all of which indicate the type of improvements that can be made with respect to the household's apparent ability to pay;
- Other priorities (land use and social set up), which indicate how important this project is and therefore the likelihood of responsiveness to private connections

G. Survey Management and Quality Assurance

A three days training was conducted for the Research Team about the study to ensure quality work. The first two days were in-door classroom while the third day involved a pre-test. Areas discussed in the classroom set-up included among others the objectives of the study, the study methodology, ethics for the study, use of mobile phones in data collection etc.

The third day involved a pre-test which among others; a) oriented the research assistants to mobile phone data collection; b) provided an opportunity to reflect on how the respondents were understanding and perceiving the questions, observing that the content was translated from English; c) provided an insight on the likely challenges in undertaking the assignment. The exercise provided a great learning opportunity for the research assistants.

The Field Research team comprised of one field team coordinator, 2 field supervisors, and 8 enumerators to collect household level data and 1 Research Assistants to collect institutional level data. Two days were spent in the town undertaking fieldwork. The survey team was led and guided by the local leaders to the sampled households.

H. Data Management and Analysis

Voice recorders were used to record the Focus Group Discussions of which the recordings were transcribed and synthesized by themes. On the other hand, the household and institutional questionnaires were installed on tablets using the Magpi / Episurveyor Software (Appendix V). Mobile phone data collection allowed field spot monitoring and verification of the data as compared to the manual questionnaires. Further, it also saved sometime that would otherwise have been wasted in the process of entering data using the paper questionnaire. Phones also have the potential of taking GPS coordinates for the study areas. Data was posted daily after fieldwork and this enabled daily review of work done to check for inconsistencies and errors.
Analysis of the quantitative data was done using STATA with some graphical generations done in EXCEL. Analysis was guided by the study objectives and analysis plan. Multivariate analysis techniques were employed in understanding factors explaining willingness to Pay.

I. Limitations and Challenges

Whereas the primary target respondents in the households were the primary heads, getting them especially in the morning hours was very challenging. In most cases, it was the spouses available to whom interviews were held.
Not all local leaders had lists of households nor knew the households that existed in their communities. Prior visits had to be done with the local leaders to compile them before the survey dates.
Some members of the community reported to have responded to similar previous studies which yielded nothing. Consequently, they were not readily willing to respond to this survey. However, this was addressed.
There were frequent rain interruptions. The survey team managed to sail through moderate rains with the help of umbrellas and rain coats.

4.3.6 Stakeholder Consultations

Stakeholder consultations are essential for acceptance and ownership of the proposed project. It is evident that different stakeholders will be engaged in different ways at the various stages of the project, from gathering and giving information, to consultation and dialogue. Relevant stakeholders were identified through a stakeholder analysis exercise and from the kickoff meeting with the client. As a result of the analysis, stakeholders **(Table 4-3)** were identified and consulted. Relevant project information was provided to stakeholders to understand project risks, impacts and opportunities.

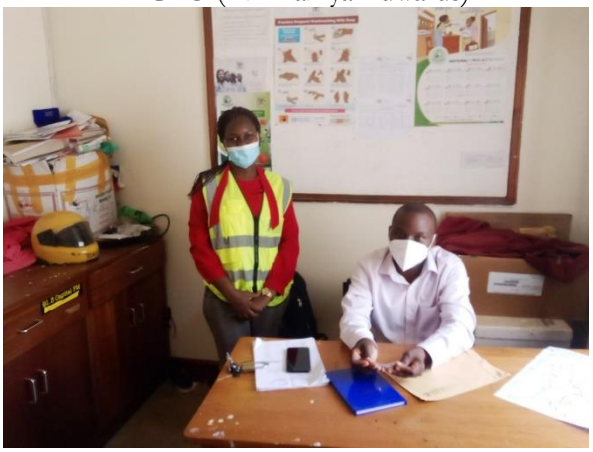
Table 4-3: Stakeholders engaged and their Interest in the proposed project

Category	Stakeholder		Date
National Level institutions	Ministry of Water and Environment	Kibaale TC WSSS	27.05.2021
		Kifamba TC WSSS	27.05.2021
Rakai District Local Government	Deputy Chief Administration Officer (DCAO) District Water Officer (DWO) District Health Inspector District Health Officer District Environment Officer District Community Development Officer (DCDO)		13.12.2021
Kifamba Sub County	Subcounty officials (LC III, CDO, SAS), Parish Chief, Councilors, LC1s		14.12.2021
Kyalulangira Sub County			14.12.2021
Byakabanda Sub County			15.12.2021

Disclosure methods: Disclosure of the proposed project activities and environmental and social information was an integral part of stakeholder consultation process. This involved providing stakeholders with complete, accurate and understandable information on the project. Meetings with stakeholders at District and sub-county level were organized to facilitate exchange of information and opinions between consultants as well as soliciting for views.

DCAO (Mr. Kamya Edwards)

District Water Officer (Mr. Muwanga Francis)



District Health Inspector (Mr. Bwire William)

District Health Officer (Dr. Sakor Moses)

District Environment Officer (Mr Kalungi Richard)

DCDO Rakai (Mr Kimbugwe Godfrey)

Kifamba Sub County

Kyalulangira Sub County

Byakabanda subcounty

Figure 4-2: Stakeholder consultation meetings

4.4 Impact Identification and Assessment

4.4.1 Impact Description

Describing a potential impact involves an appraisal of water supply and sanitation system characteristics, together with the attributes of the receiving environment. Relevant impact characteristics may include whether the impact is:

- Adverse or beneficial;
- Direct or indirect;
- Short, medium, or long-term in duration; and permanent or temporary;
- Affecting a local, regional or global scale; including trans-boundary; and
- Cumulative

Each of these characteristics was addressed for each impact. Consideration of the above gave a sense of the relative **intensity** of the impact. The **sensitivity** of the receiving environment was determined by specialists based on the baseline data collected and literature data during the study.

4.4.2 Impact Evaluation

Each impact was evaluated based on impact intensity and receptor sensitivity. Impact significance was evaluated and presented pre and post mitigation**.** The scale of intensity was defined from impact characterization on the basis of ecological-toxicological, physical-chemical and social studies and expert judgment **(Table 4-4).**

Table 4-4: Criterion of intensity scale gradation for anticipated project environmental impacts

Scale of Impact Intensity	Criterion	Score
Very low	Environmental changes are within the existing limits of natural variations	1
Low	Environmental changes exceed the existing limits of natural variations. Natural environment is completely self-recoverable.	2
Medium	Environmental changes exceed the existing limits of natural variations and results in damage to the separate environmental components. Natural environment remains self-recoverable.	3
High	Environmental changes result in significant disturbance to particular environmental components and ecosystems. Certain environmental components lose self-recovering ability.	4

Intensity was more particularly defined in terms of extent and duration **(Table 4-5).**

Table 4-5 Classification of impact evaluation

Impact Intensity Characteristic	Description
Extent	Evaluation of the area of occurrence/influence by the impact on the subject environment; whether the impact will occur on site, in a limited area (within 2 km radius of the site); locally (within 5 km radius of the site); regionally (district wide, nationally or internationally).
Persistence/Duration	Evaluation of the duration of impact on the subject environment, whether the impact is temporary (<1 year); short term (1 – 5 years); medium term (5 – 10 years); long term (>10); or permanent.

4.4.3 Impact Significance

Determination of the potential impact severity was premised on the product of the intensity of the impact and the sensitivity of the receiving environment. Matrix of impact severity involved assigning numerical or relative descriptors to the impact intensity and receptor sensitivity for each potential impact. As such, each was assigned a numerical descriptor of 1, 2, 3, or 4, determined as being equivalent to very low, low, medium or high respectively. The severity of impact was then established by the product of the two numerical descriptors, with severity described as negligible, minor, moderate or major **(Table 4-6).**

i) **Moderate-**Orange: Impacts in this region are considered tolerable but efforts must be made to reduce the impact to levels that are as low as reasonably practical.

ii) **Minor-**blue**:** Impacts in this region are considered acceptable.

iii) **Negligible-**green: Impacts in this region are almost not felt.

Table 4-6: Determination of impact significance

			Sensitivity of receptor			
			Very low	Low	Medium	High
			1	2	3	4
Intensity of impact	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 Major
	High	4	4 Minor	8 Moderate	12 Major	16 Major

The textural description of the descriptors ranging from "Very low" to "High" is presented in Table 4-7

Table 4-7: Criteria for rating impact intensity and likelihood

Criteria	Rating scales
Intensity (the expected magnitude or size of the impact)	**Very Low**- where the impact affects the environment in such a way that natural, and /or cultural and social functions and processes are negligibly affected and valued, important, sensitive or vulnerable systems or communities are negligibly affected.
	Low- where the impact affects the environment in such a way that natural, and/or cultural and social functions and processes are minimally affected and valued, important, sensitive or vulnerable systems or communities are minimally affected. No obvious changes prevail on the natural, and / or cultural/ social functions/ process because of project implementation.

Criteria	Rating scales
	Medium - where the affected environment is altered but natural, and/or cultural and social functions and processes continue albeit in a modified way, and valued, important, sensitive or vulnerable systems or communities are moderately affected.
	High - where natural and/or cultural or social functions and processes are altered to the extent that they will temporarily or permanently cease, and valued, important, sensitive or vulnerable systems or communities are substantially affected. The changes to the natural and/or cultural / social- economic processes and functions are drastic and commonly irreversible.
Probability (The likelihood of the impact occurring)	**None** – where the impact will not materialize
	Low – where the possibility of the Impact materializing is very low (<20%)
	Medium – where there is a good possibility (30%-60% chance) that the impact will occur.
	High– where it is most likely (60% -100% chance) that the impact will occur.

4.5 Environmental and Social Management and Monitoring Plan (ESMMP)

An ESMMP was developed to guide implementation of the proposed mitigation measures in an effective manner to ensure sustainability of the project development throughout its life. The ESMMP summarizes the planned mitigation measures against the anticipated environmental impacts and the responsibility for its implementation and supervision including monitoring.

5. ENVIRONMENTAL BASELINE

5.1 PHYSICAL ENVIRONMENTAL BASELINE

5.1.1 Rakai District

5.1.2 Location

Rakai District is bordered by the districts of Lwengo and Lyantonde to the North, Kiruhura to the North West, Isingiro to the West, The Republic of Tanzania to the South and Kyotera to the East. The Project areas are in 2 sub counties, namely, Kyalulangira and Kifamba sub counties.

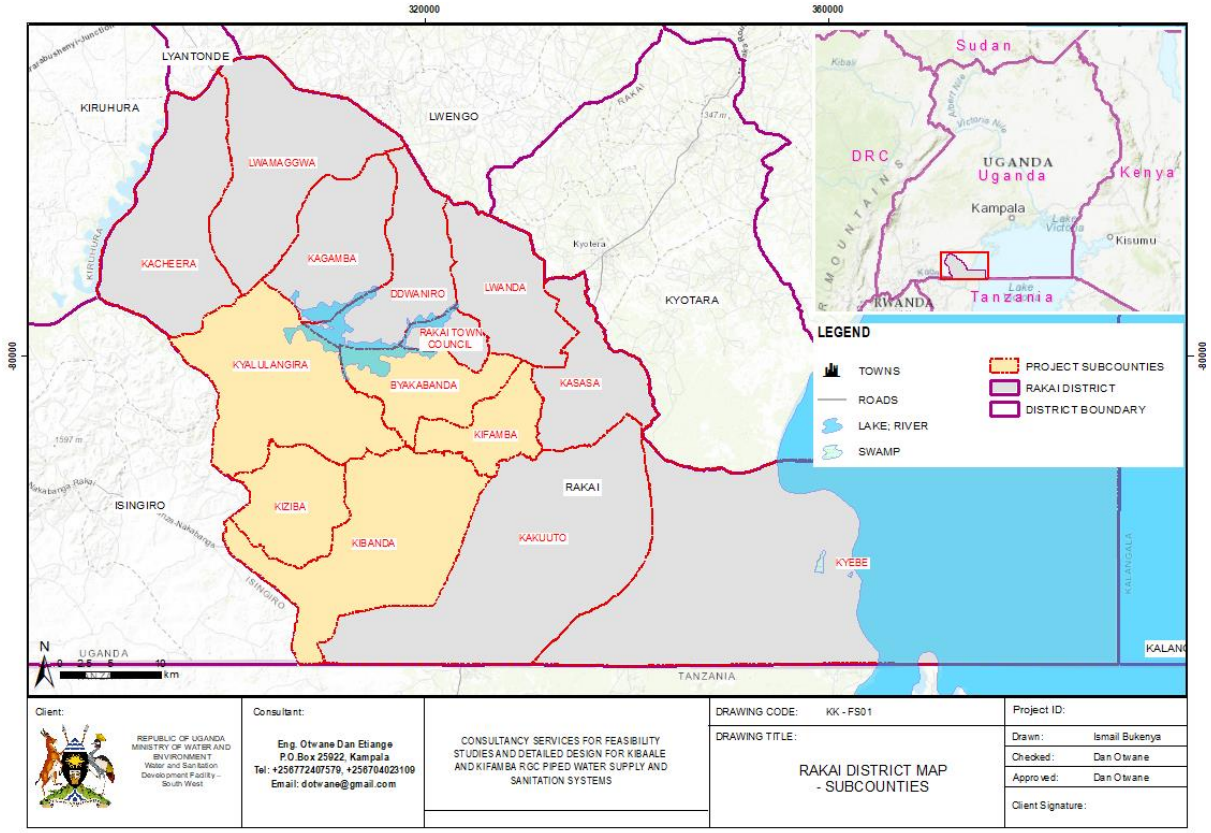


Figure 5-1: Map of Uganda Showing Rakai District

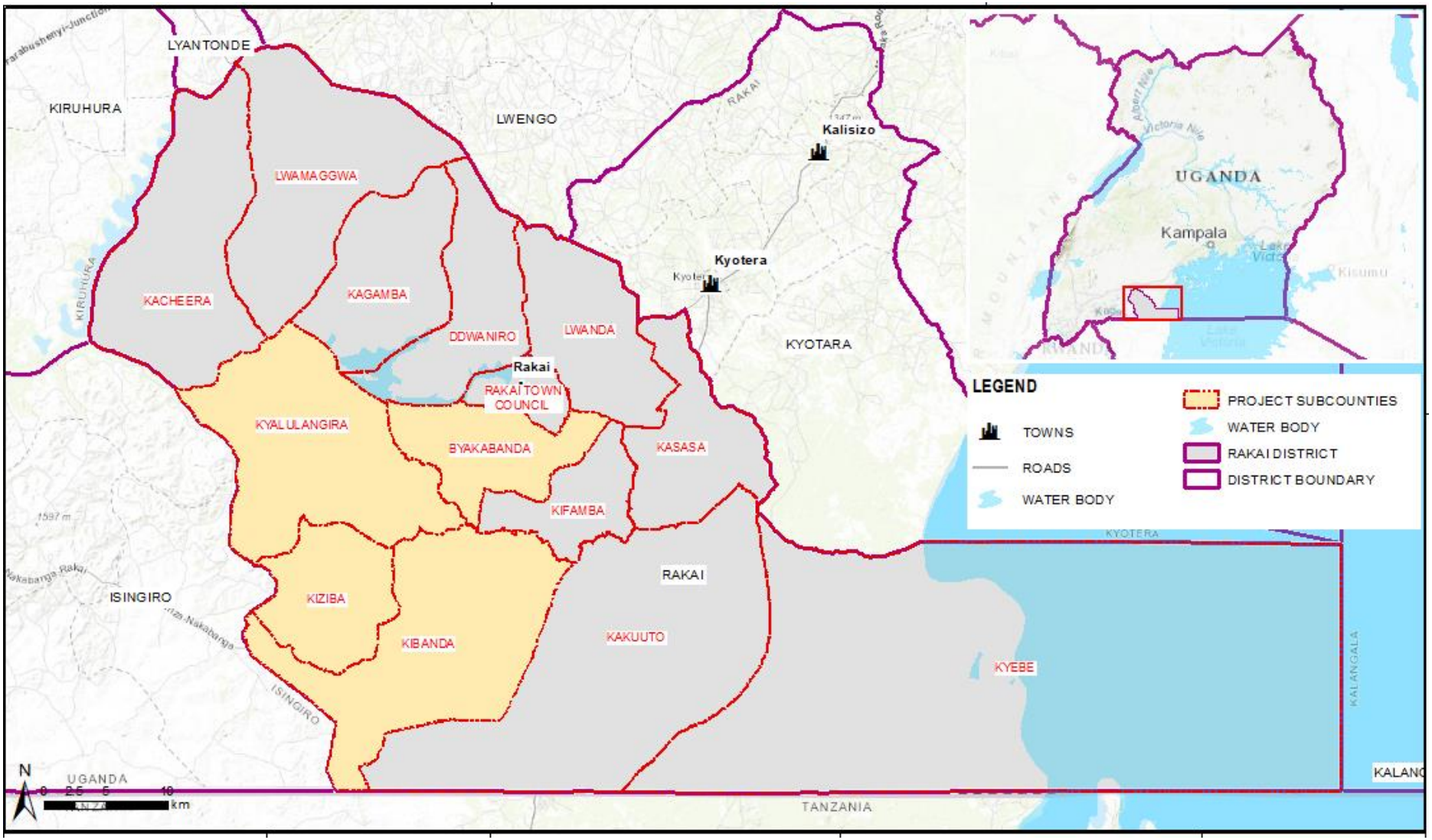


Figure 5-2: Map of Rakai District showing the project areas

5.1.3 Topography

The North eastern and Western parts of Rakai District are hilly (Rakai highlands) only interrupted by two major lake depressions (Kijanebalola and Kacheera) and occasional wide flat valleys (psendoplains). The southern-eastern and north western parts of the district comprise almost flat to undulating plains topography. Therefore, Rakai District can be divided into three main topographic zones – the Lake Victoria shores, the North – Eastern and Western hills and the North – Western plains.

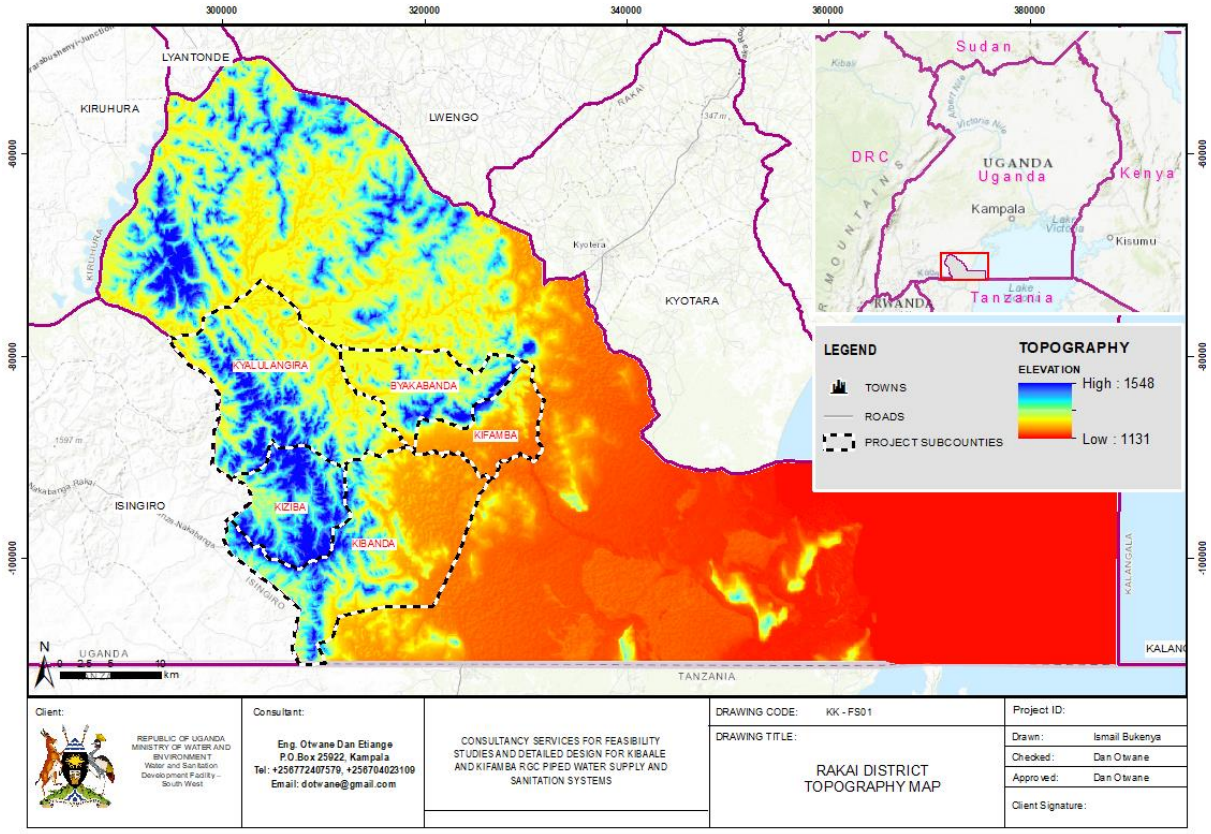


Figure 5-3: Topography map of Rakai District

5.1.4 Climate

The Southern and Eastern parts of Rakai, which include Kyebe, Kabira and Kasaali Sub-Counties display fair distributions of rainfall throughout the year. There is a relatively dry season around January and February, and another in June, July and August. However, these dry periods are occasionally mitigated by a few light falls. A principal peak is due around March-April and May, whereas the minor peak is around October and November. The mean annual varies from 1,350mm to 2,125mm. Two dry seasons occur with the more pronounced one in June-July -August and September, while the other is between December and February.

The district generally records around 25°C mean annual maximum temperatures. The Eastern parts record a mean annual minimum of 17.5°C while it decreases to around 15°C to the West. The Kibanda areas record mean monthly maximum temperatures ranging between 26°C and 27°C. These are very insignificant variations and hence indicate that there are generally high temperatures within the district throughout the year. Relative humidity ranges between 80-90% in the morning and decreases to between 61% and 66% in the afternoons during the months of January and May. From June to August, the morning recordings decrease to around 77% and so, are the afternoon recordings that decrease to around 56% and 57%. The implication is that though the morning recordings are always within reasonable limits to induce rainfall, they normally reduce unfavorably in the afternoons resulting in poor chances of getting rainfall. However,

it should be noted that relative humidity is so variable with time and thus liable to change any time in relation to other climatic conditions.

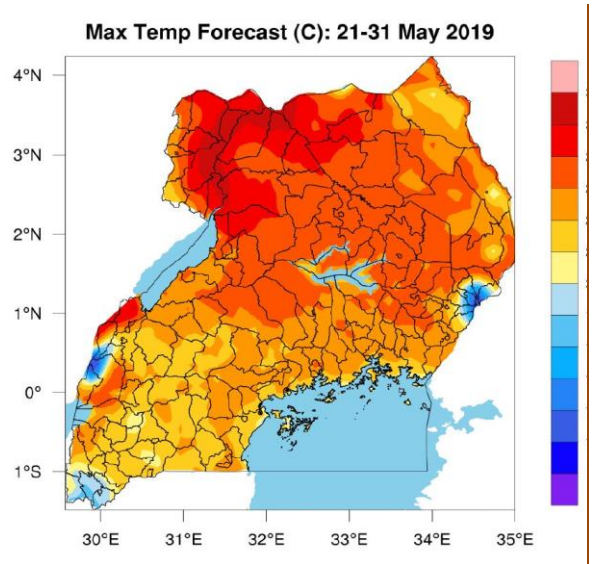


Figure 5-4: Uganda Temperature Map

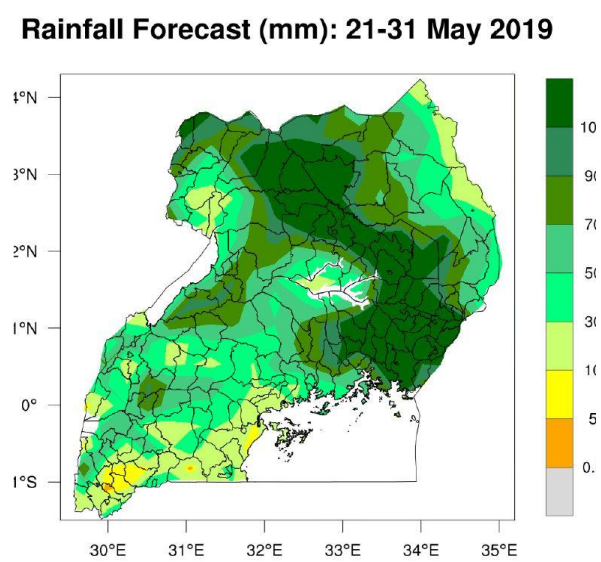


Figure 5-5: Uganda Rainfall Map

Source: Uganda National Meteorological Authority (http://www.unma.go.ug/)- May 2019

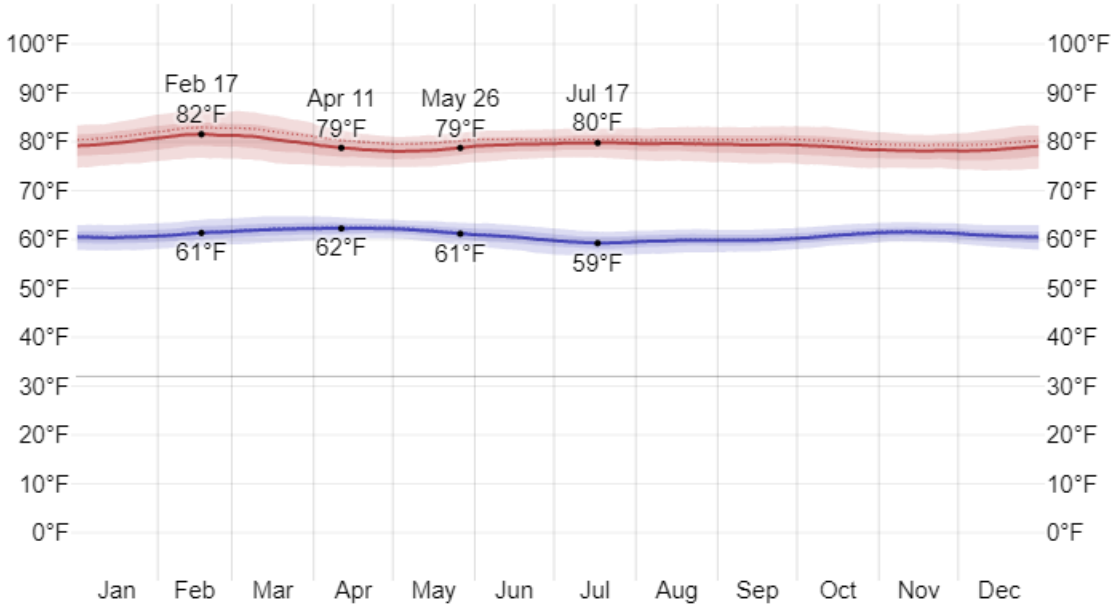


Figure 5-6: Average High and Low Temperature in Rakai

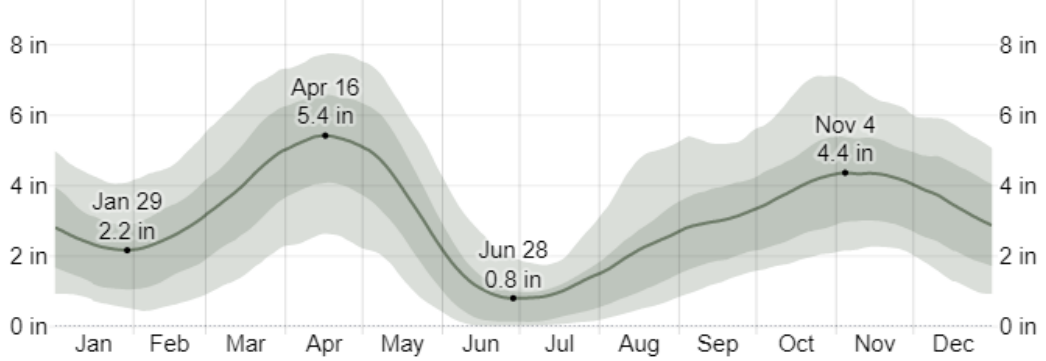


Figure 5-7: Average Monthly Rainfall in Rakai

5.1.5 Ambient Air Quality

The project scope includes water intake, storage tanks, distribution and transmission line routes. Particulate matter was captured for 10 micrometers or less in diameter i.e. PM_{10}. This is because particles in this diameter range constitute the majority of pollutants absorbed by the lungs (dust, pollen). $PM_{2.5}$ measures finer particles of 2.5 micrometers or less in diameter. By volume, ambient air contains 78.09% Nitrogen, 20.95% Oxygen, 0.93% argon, 0.04% CO_2 plus a host of other gases in small amounts**Invalid source specified.**.

Results obtained in the survey indicated acceptable values of O_2 and CO_2 in ambient air at all locations tested. Baseline ambient air quality data collected specifically for this project was collected over the course of three days.

A series of measurements, using passive samplers (an electronic light-scattering device (CEL-712 Microdust Pro) and portable electronic monitors were undertaken at selected areas. The choice of measurement locations was guided by presence of relevant sensitive receptor exposure (homesteads, health facility, school) as well as vicinity of proposed sites for major project components.

From the active air sampling method described, the results of the baseline ambient air quality are presented in the table below. Note that Uganda does not have national standards for PM_{10} and $PM_{2.5}$, thus a comparison with the Draft National Air Quality Standards and IFC/WHO Air Quality Guidelines was completed to make inferences on the ambient air quality in the project area.

Table 5-1: Results of active sampling air quality measurements (TSP regulatory limit = 0.3 μg/m³)

GPS Coordinates (UTM WGS 84 – 36 M)		**Location**	**Particulates (μg/m³)**		**CO_2 (%)**	**O_2 (%)**	**Notes / relevance**
Easting	**Northing**		**Max**	**Average**			
310140	9908506	Ndaga Reservoir Tank site	0.281	0.032	0.03	20.9	Gravel road; Pedestrians
305869	9915574	Kizinga Reservoir site	0.217	0.083	0.03	20.9	Secluded area; little to no traffic
315804	9919889	Treatment Plant site	0.176	0.092	0.03	20.9	Secluded area; little to no traffic
315316	9913703	Kibaale Trading Centre	1.621	0.224	0.03	20.9	Active traffic; Busy trading centre. Baseline for Kibaale Tank site
325739	9912419	Kifamba Trading Centre	1.012	0.310	0.03	20.9	Busy centre Light traffic on gravel road.
327801	9914115	Nabunga Trading Centre	0.143	0.077	0.03	20.9	Light traffic on gravel road

Analysis of the results of air quality measurements and comparison with draft national standards
These measurements indicate the following with respect to air quality;

a) Monitoring at the selected project sites reveals conformity concerning air quality. During the exercise, monitoring equipment did not detect volatile organic compounds (VOCs) and combustible gases.
b) Kibaale Trading Centre exhibited the highest overall concentration of particulates. This measurement point is within a busy trading centre and a hive of activity and a lot of traffic. Grills roasting meats were also operational during the monitoring and the smoke from this activity contributed to the peak result. The measurement at the market also lasted one (1) hour due to the higher concentration of receptors thus being a point of interest.
c) Overall results of the monitored sites indicate a pristine environment in terms of air quality.

5.1.6 Wind Speed and Meteorology

It is important to establish wind speed, direction and frequency when carrying out Air Quality monitoring measurements. Wind measurements help to estimate the flow pattern of any generated emissions, smoke plumes direction and fire behavior. When combined with precipitation data, wind speed is used to estimate the amount of vegetable cover drying.

Table 5-2: Wind measurements in project area

GPS Coordinates (UTM WGS 84 – 36 M)		**Location**	**Wind measurement**	
Easting	**Northing**		**Direction (⁰)**	**Speed (m/s)**
310140	9908506	Ndaga Reservoir Tank site	269 S	0.7
305869	9915574	Kizinga Reservoir site	258 WSW	1.0
315804	9919889	Treatment Plant site	194 SSE	0.2
315316	9913703	Kibaale Trading Centre	005 N	1.0
325739	9912419	Kifamba Trading Centre	199 SW	0.9
327801	9914115	Nabunga Trading Centre	13 NNE	1.6

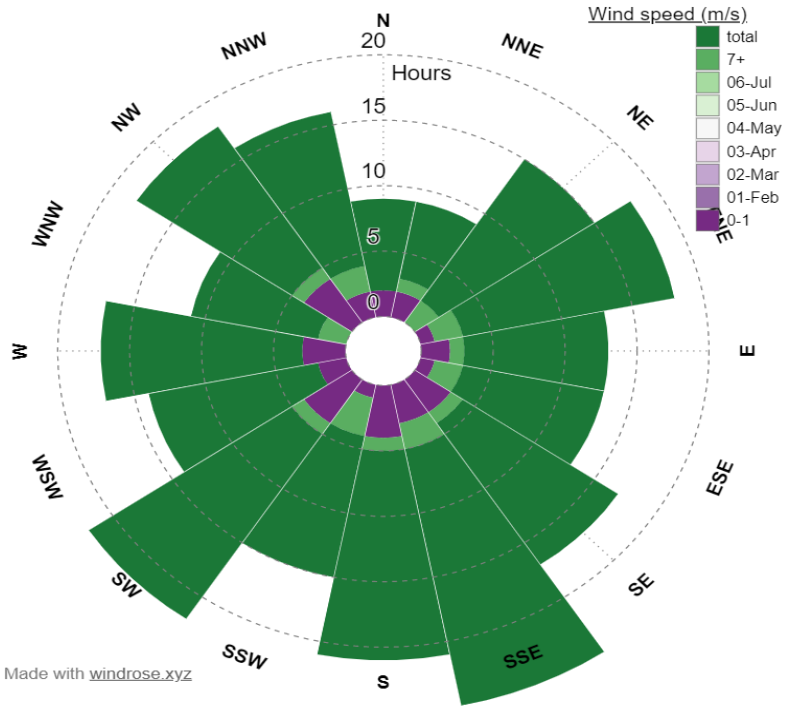


Figure 5-8: Wind rose plot for Rakai District

Inferences:

1. In general, wind speeds around the project area also exhibit a 0% calm condition ratio, indicating quick pollutant dispersion at sources once generated.
2. Wind Rose modelling indicates the wind in the project area is moving south of the Project Area, with average wind speed of 1.0 m/s, characterized as level one winds – light air (0.3 – 1.5 m/s). In this wind class, direction of wind shown by smoke-drift but not wind vanes.

Table 5-3: Table of wind speed equivalents

Beaufort scale number and description	**Wind speed equivalent at a standard height above flat ground**		**Specifications for estimating speed over land**
	m/s	**km/hr**	

0 Calm	0 – 0.2	< 1	Calm; smoke rises vertically
1 Light air	0.3 – 1.5	1 – 5	Direction of wind shown by smoke-drift but not wind vanes
2 Light breeze	1.6 – 3.3	6 – 11	Wind felt on face; leaves rustle; ordinary vanes moved by wind
3 Gentle breeze	3.4 – 5.4	12 – 19	Leaves and small twigs in constant motion; wind extends light flag
4 Moderate breeze	5.5 – 7.9	20 – 28	Raises dust and loose paper; small branches are moved
5 Fresh breeze	8.0 – 10.7	29 – 38	Small trees begin to sway, crested wavelets form on inland waters
6 Strong breeze	10.8 – 13.8	39 – 49	Large branches in motion; whistling heard; umbrellas used with difficulty.
7 Near gale	13.9 – 17.1	50 – 61	Whole trees in motion; inconvenience felt when walking against the wind
8 Gale	17.2 – 20.7	62 – 74	Breaks twigs off trees; generally, impedes progress
9 Strong gale	20.8 – 24.4	75 – 88	Slight structural damage occurs
10 Storm	24.5 – 28.4	89 – 102	Seldom experienced inland; trees uprooted; considerable structural damage occurs
11 Violent Storm	28.5 – 32.6	103 – 117	Very rarely experienced; accompanied by structural damage
12 Hurricane	32.7 and over	118 and over	Widespread damage

Source: The National Meteorological Library and Archive, UK.
(https://web.archive.org/web/20121002134429/http://www.metoffice.gov.uk/media/pdf/4/4/Fact_Sheet_No._6_-_Beaufort_Scale.pdf)

Figure 5-9 Shows location of the sampling points for baseline air quality measurements.

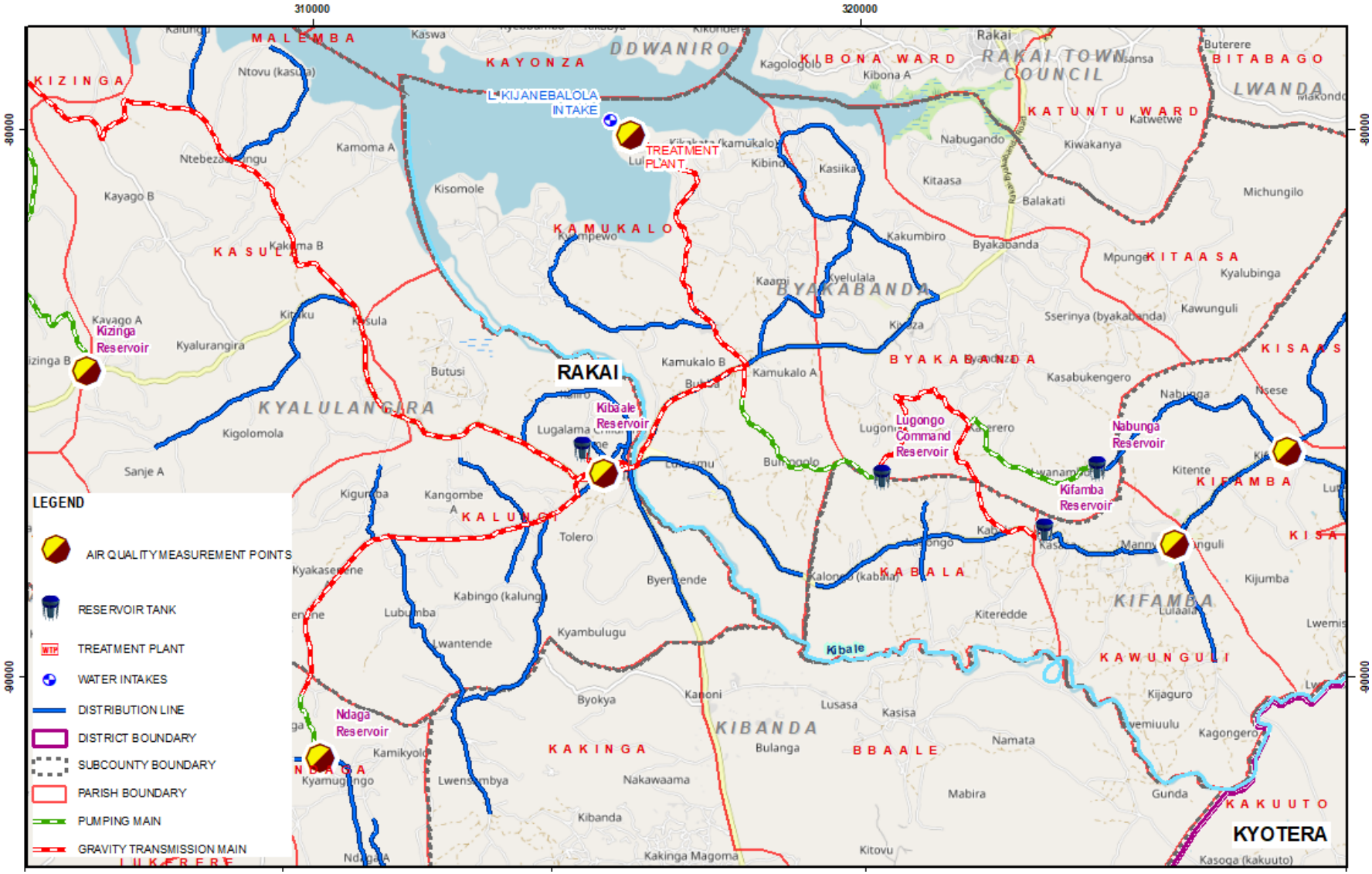


Figure 5-9: Location Map for Air Quality Measurement Points

5.1.7 Ambient Noise

From the baseline noise measurements conducted, inferences were made on the baseline noise in the Project Area, with comparison against the standards provided in the National Noise Standards and Regulations. Results from the measurement exercise are summarized in table below.
from the measurement exercise are summarized in table below.

Table 5-4: Baseline noise quality as determined from different roads in Hoima Municipality (guideline noise limit = 60 dBA)

GPS Coordinates (UTM WGS 84 – 36 M)		**Location**	**L_{Aeq}**	**L_{max}**	**Notes**
Northing	**Easting**				
310140	9908506	Ndaga Reservoir Tank site	48.9	79.8	Quiet; only noise from passing motocycles.
305869	9915574	Kizinga Reservoir site	44.9	58.3	Light traffic; mostly motorcycle
315804	9919889	Treatment Plant site	47.4	59.8	Secluded location; birds chirping.
315316	9913703	Kibaale Trading Centre	65.7	87.4	Busy trading centre; speakers announcing products; Traffic
325739	9912419	Kifamba Trading Centre	58.6	77.0	Light traffic; mostly motorcycle
327801	9914115	Nabunga Trading Centre	60.4	80.7	Light traffic; mostly motorcycle

Inferences

1. Baseline noise measurements indicate highest noise levels recorded at Kibaale Trading Centre. The buzz of activity consisting of the offloading of delivery trucks, pedestrian traffic, and other activities around the trading centre contributed to higher than regulatory limit results.
2. Project construction works and related activities are projected to alter the general noise landscape of the area. It is recommended to keep all construction activities to daytime to avoid noise complaints.
3. In the regulations, areas monitored are compared against 60 dBA, which is the maximum permissible noise level for general environment under commercial facilities (Regulation Class D). The proposed sites for storage tanks and treatment plant however are compared against 55 dBA, which is the regulatory level required for mixed residential facilities (Regulation Class C).

Photographic Record of Air Quality and Noise Measurements

Measurements near Kizinga Reservoir site (36 M 305869 9915574)

Measurements near Treatment Plant site (36 M 315804 9919889)

Figure **5-10** shows location of sampling sites for baseline noise measurements

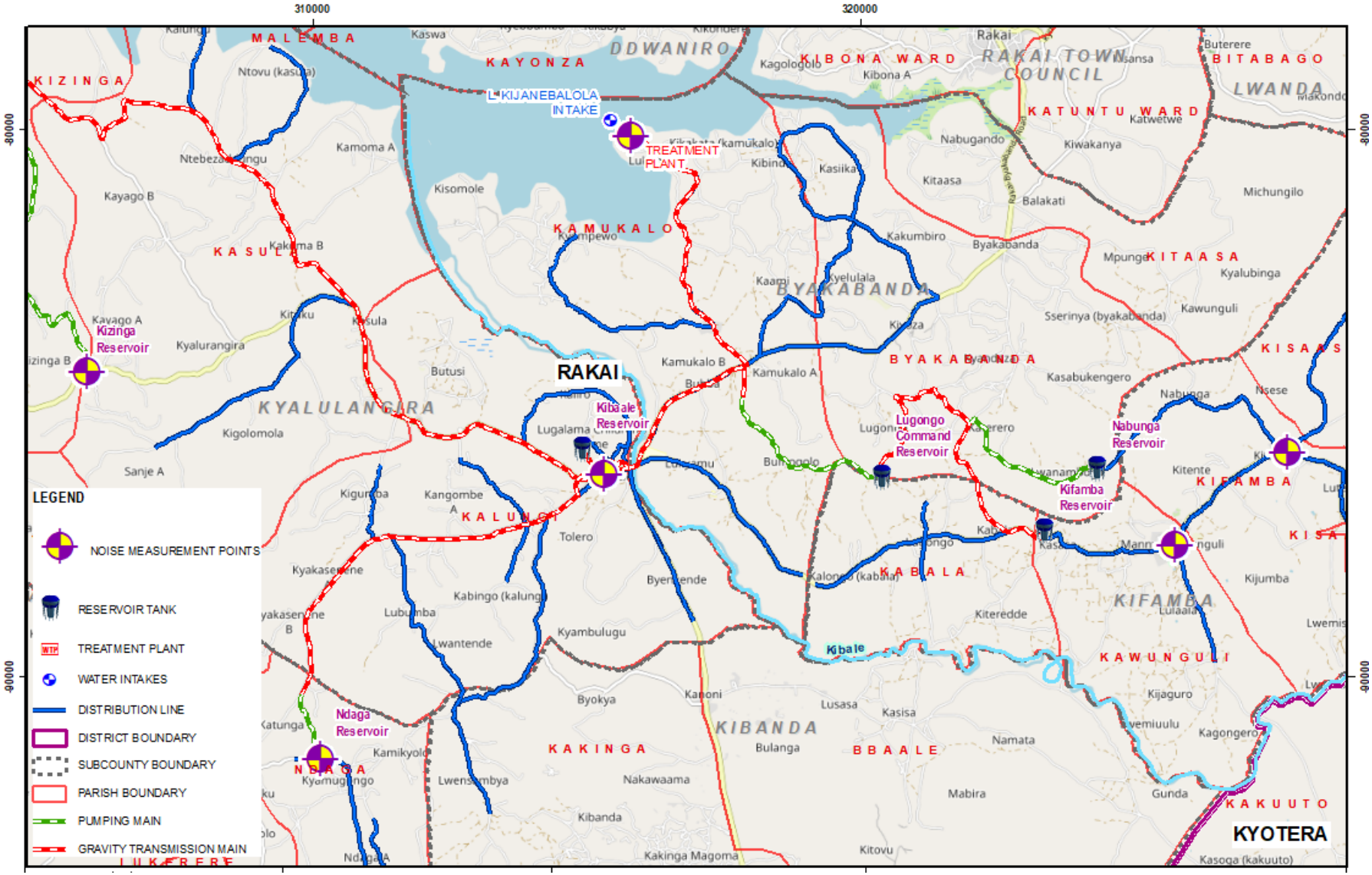


Figure 5-10: Location Map for Noise Measurement Points

5.1.8 Soils

Over 75% of Rakai soils are ferralitic representing an almost final stage of weathering with little or no mineral reserve left. Some "heavy" clay varieties have some fertility but sandy varieties are particularly poor. Other types include lithosols, alluvial and lacustrine sands and alluvial clays. Generally, lithosals and humus loams are the dominant upland components while the grey sandy soils derived from hill wash or river alluvium, grey clays of the valley bottoms and lacustrine sands dominate the lowland component. Lithosols are soils without horizons and thus young and stony or bare rocks. Generally, the soils of Rakai District can be classified into four soil catenas, four soil series and peat soils. Taking a rough estimate of the district aerial coverage it will be noted that the Kooki catena is the dominant soil type accounting for over 40% and dominant in most of Kooki County and parts of Kyotera County of the dry land in the district. This is followed by Teloro series about 14% mostly in Buyamba and Lwamaggwa, Bukora series about 8%, Sango series about 4%, Mulembo series. Some of the soils especially in Kooki are loose and often collapse making the construction of sanitation facilities very difficult and more expensive.

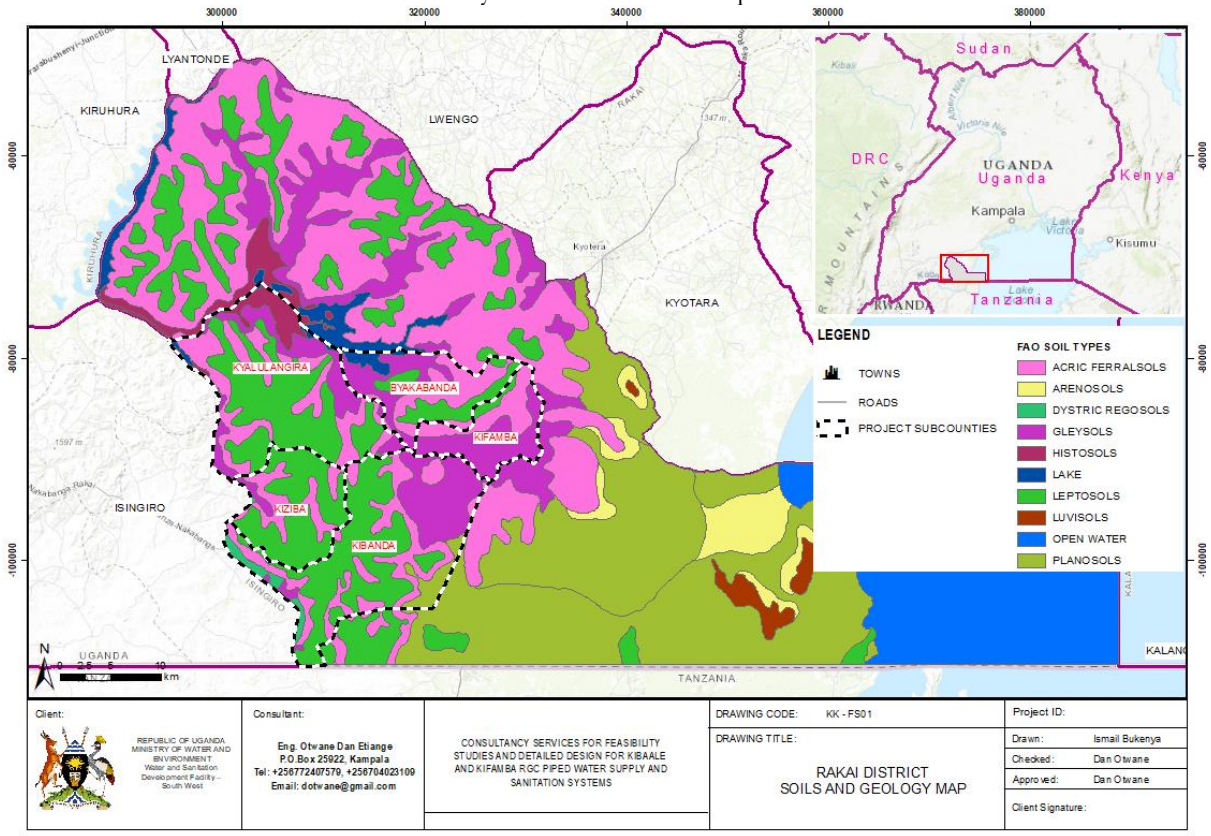


Figure 5-11: Soil map of Rakai district

5.1.9 Water Resources

Despite the skewed distribution, Rakai District can be generally said to have adequate surface and sub-surface water reserves, although in some parts of the district especially on the North-Western plains and especially during the dry season, severe water shortage is occasionally experienced. However, this may be explained in terms of inadequate resources exploitation rather than resource scarcity. The South-East of the District lies the giant Lake Victoria with its well-known great fresh water and fisheries potential. In the centre west, lies Lake Kijjanebalola which, though shallow (5m deep), is fairly large with an area of 35 square km and a circumference of 88 km. Further west, at the border with Mbarara District is Lake Kacheera which is also shallow (4m deep) with an area of 42square km and a circumference of 81 km (including the part in Mbarara District). The numerous streams, wetlands and several rivers as well as the many springs, which emerge from the valley sides adds to these lakes to indicate how rich in surface water resources, Rakai District is. The availability of surface water implies a huge investment potential in the fisheries sector,

which could contribute to the increased local revenue. However, it also poses challenges especially sanitation improvement for the fishing communities.

Although no decisive survey has been done to determine actual potential and distribution of subsurface water resources in the district, it is well known that significant water reserves occur in the fissures and aquifers of the rocks and quite a large number of bore-holes have been drilled into these rocks to harvest the water especially for domestic supplies. However, although the water yields are satisfactory, they are not especially high, and sustainability is not assured. Often drilled boreholes dry up before their estimated lifetime and this spells out clearly some degree of uncertainty in water supply from boreholes. The other common problem with boreholes and springs especially in the parts of Kooki County is the prevalence of iron oxide within the bedrocks, a factor that limits the use of boreholes and spring water in these parts.

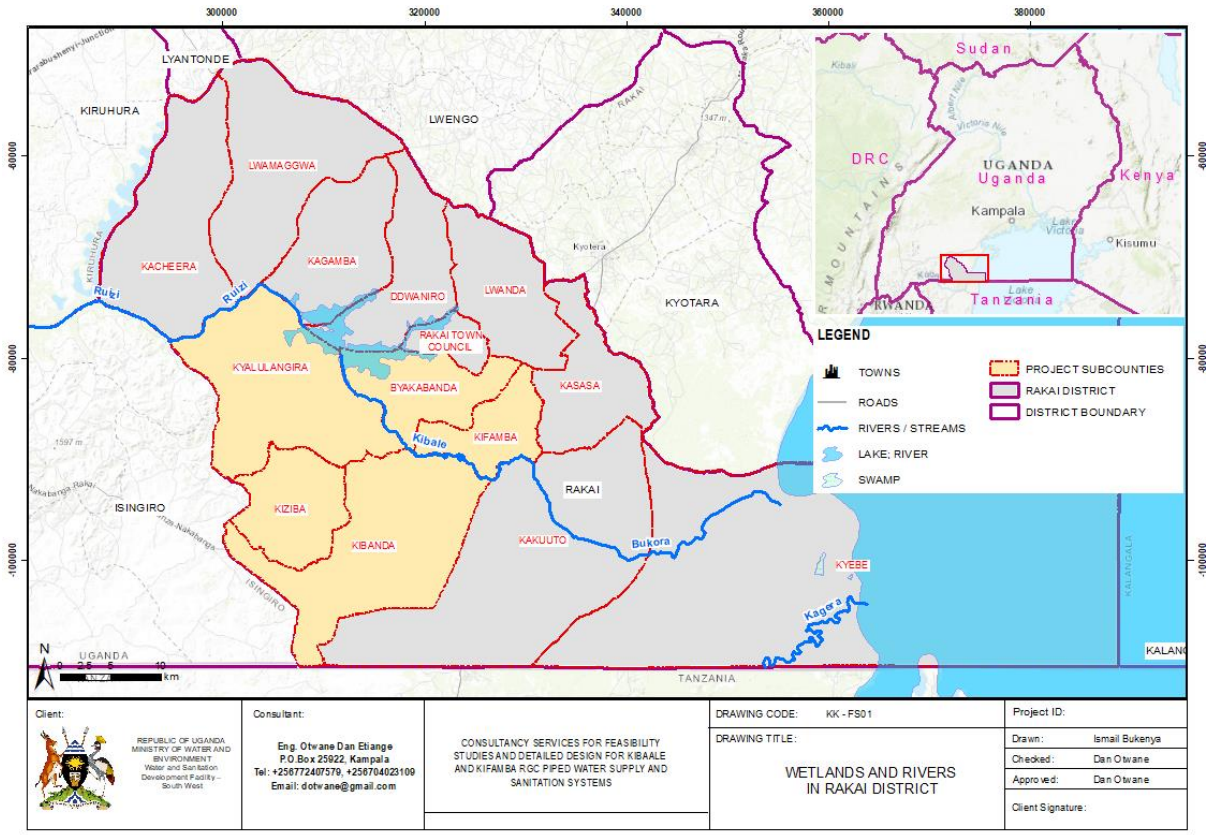


Figure 5-12: Hydrology map of Rakai district

5.1.10 Vegetation

Rakai is endowed with a rich natural environment ranging from high forest, savannah grassland forest and man-made forest. The vegetation of Rakai District is as varied as the different ecosystems that characterize the area.
It ranges from the medium altitude forests on the shores of Lake Victoria, through swamps to savannas. Three broad categories can be used to classify the vegetation of the district, namely: forests, swamps and savannas.

5.2 SOCIO-ECONOMIC BASELINE

5.2.1 Administrative structures

5.2.1.1 Kibaale RGC

The Project Area covers 4No. Sub Counties in Rakai District, namely, Kyalulagira, Byakabanda, Kiziba and Kibanda. 7No. parishes and 75No. villages will be supplied by the piped water supply system. Under the Government of Uganda decentralization policy, the delegated political guidance, policy formulation and legislative authority is vested in the directly elected Local Council III Chairman (Mayor) together with the Councilors. The administrative affairs of the town are handled by a Town Clerk, who is also the head of the subordinate civil servants. The Villages (Local Council I) are headed by the Local Council I (LC I) Chair Persons. The administrative structure of the Project Area is shown in **Table 5-5**

Table 5-5: Kibaale RGC Administrative Structure

Kibanda Sub County	**Byakabanda Sub County**		**Kiziba Sub County**	**Kyalulangira Sub County**		
Bbale Parish	**Byakabanda Parish**	**Kamukalo Parish**	**Ndaga Parish**	**Kalungi Parish**	**Kasula Parish**	**Kizinga Parish**
Bulanga A	Byakabanda	Kamukalo A B	Katunga	Lubumba	Sanje B	Kabungo
Bulanga B	Lugongo	Kamukalo A A	Ndaga A	Kagombe B	Kigolomola	Kawenda
	Kiyooza B	Kamukalo B A	Ndaga B	Kigumba A	Sanje A A	Kizinga C
	Kiyooza A	Kamukalo B B	Kyamugongo	Kigumba B	Sanje A B	Kizinga B
		Lukyamu B	Kamikyolo	Butusi B	Kayago B B	Kizinga A
		Lukyamu A		Butusi A	Kayago B A	
		Bbuba B		Kagombe A	Kayago A	
		Bbuba A		Tolero	Kyalulangira A	
		Kisomole A		Kalungi	Kyalulangira B	
		Kisomole B		Kibaale B	Kyamuwumba A	
		Kyawanyana		Kibaale A	Kyamuwumba B	
		Bumogolo		Kibaale C	Kalungu	
		Kaami A		Kaliro	Kasula A	
		Kaami B		Lwantende	Kasula B	
		Kibinda		Byenkende B	Ntovu	
		Kikakata		Byenkende A	Kamoma A	
		Lukondo B		Kyakasenene A	Ntebezaddungu A	
		Lukondo A		Kyakasenene B	Ntebezaddungu B	
		Kyampewo B		Kabingo	Kamoma B	
		Kyampewo A		Kyambulugu		
	Villages in Kibaale Town Council					
	Proposed enroute villages					
Source: ToR, Field Surveys 2020						

5.2.1.2 Kifamba RGC

The Project Area covers 1No. Sub County in Rakai District, namely, Kifamba. All the four parishes in Kifamba Sub County will be supplied by the piped water supply system.
The administrative structure of the Project Area is shown in **Table 5-6**.

Table 5-6: Kifamba RGC Administrative Structure

District	County	Sub County	Parish/Ward	Village
Rakai	Kakuuto	Kifamba	Kabala	Kalongo LCI A
				Kalongo LCI B
				Mbirizi LCI B
				Mbirizi LCI A
				Mbirizi LCI C
				Kabala LCI B
				Kabala LCI A
				Kiteredde LCI
			Kifamba	Kitente LCI A
				Kitente LCI B
				Nabunga LCI B
				Nabunga LCI A
				Kifamba LCI C
				Kifamba LCI B
				Kifamba LCI A
				Kifamba LCI D
				Lutemi LCI
				Lwemisege LCI
				Kijumba LCI
			Kisaasa	Nseese LCI A
				Nseese LCI B
				Kisaasa LCI A
				Kisaasa LCI B
				Kiruuli LCI A
				Kiruuli LCI B
				Nyanga Kentele LCI A
				Nyanga Kentele LCI B
			Kawunguli	Kasaasa LCI B
				Kasaasa LCI A
				Mannya Kawunguli LCI B
				Mannya Kawunguli LCI C
				Mannya Kawunguli LCI A
				Lulaala LCI
				Kagongero LCI A
				Kagongero LCI B
				Lwemivulu LCI
1No. District	**1No. County**	**1No. S/ County**	**4No. Parishes**	**36No. Villages**
Source: UBOS 2014 NHPC, Rakai District				

5.2.2 Demographic characteristics

5.3.2.1. Population distribution

According to the UBOS 2014 National Housing and Population Census (NHPC), the population of Rakai district was 516,309 composed of 254,366 male and 261,943 female. Kakuuto, Lwamaggwa, Kibanda, Ddwaniro, Kagamba and Kyalulangira were some of the sub counties with the highest population, whereas Rakai town council, Kyotera town council, Kalisizo town council and Kifamba Sub County were among those with the least population as shown in **Table 5-7.**

Table 5-7: Population distribution by Sub county

Sub-county	Male	Female	Total	Sex Ratio*	Land Area (Sq. Km)	Population Density**
Byakabanda	9,436	9,319	18,755	101.3	84.9	221
Ddwaniro	16,097	16,717	32,814	96.3	109.5	300
Kabira	15,683	15,114	30,797	103.8	338.5	91
Kacheera	11,671	12,152	23,823	96.0	197.3	121
Kagamba	16,426	17,476	33,902	94.0	124.1	273
Kakuuto	19,772	19,472	39,244	101.5	404.6	97
Kalisizo	8,856	9,136	17,992	96.9	78.2	230
Kalisizo Town Council	6,343	7,638	13,981	83.0	16.3	858
Kasaali	13,208	13,344	26,552	99.0	109.8	242
Kasasa	8,431	8,673	17,104	97.2	114.8	149
Kibanda	12,241	12,318	24,559	99.4	246.4	100
Kifamba	7,242	7,296	14,538	99.3	70.0	208
Kirumba	12,219	12,773	24,992	95.7	86.5	289
Kiziba	9,922	10,519	20,441	94.3	99.8	205
Kyalulangira	13,556	14,266	27,822	95.0	223.3	125
Kyebe	10,512	10,175	20,687	103.3	425.2	49
Kyotera Town Council	5,767	6,902	12,669	83.6	3.8	3334
Lwamaggwa	21,628	22,376	44,004	96.7	219.3	201
Lwanda	14,275	14,422	28,697	99.0	125.3	229
Lwankoni	7,391	7,496	14,887	98.6	61.3	243
Nabigasa	10,135	10,523	20,658	96.3	83.7	247
Rakai Town Council	3,555	3,836	7,391	92.7	28.4	260
District	**254,366**	**261,943**	**516,309**	**97.1**	**3,251.0**	**159**

Source: UBOS 2014

It is expected that the construction phase of the water supply and sanitation will lead to an increase in the population of the project area as a result of influx of people from within and outside the district seeking job opportunities on the project. Although the increase may not be significant, there is need to control this influx, to prevent increase of pressure on existing infrastructure. this can be done by prioritizing recruitment of natives of the project communities especially for semi-skilled and unskilled labour.

5.3.2.2. Ethnicity

Rakai District can be categorized as an ethnically rich District. The dominant tribe is the Baganda followed by the Banyankole. The Baganda are predominantly found in Kyotera, Kakuuto and Kooki Counties. There is also a large number of people of the Rwandese origin especially in Kakuuto and Kooki and a significant number of other tribes like Barundi, Baziba and Banyambo people especially in Kakuuto County. Notwithstanding the heterogeneity, most of the people in Rakai District can communicate in Luganda making packaging of development messages easier, less costly and more effective.

5.3.2.3. Household Size

Data regarding household size was gathered and table below presents the results.

A. Kibaale RGC

Table 5-8: Percentage Distribution of Sample Household Size

Age Group	0		1-3		4-6		7+	
	Male	Female	Male	Female	Male	Female	Male	Female
Under 5yrs	370(43%)	366(42.5%)	366(42.4%)	365(42.4%)	2(0.2%)	0(0%)	0(0%)	1(0.1%)
6-17yrs	470(54.6%)	400(46.8%)	363(42.2%)	366(42.5%)	27(3.1%)	29(3.4%)	1(0.1%)	1(0.1%)
18-35yrs	309(35.9%)	287(33.3%)	546(63.3%)	573(66.5%)	4(0.4%)	1(0.1%)	3(0.3%)	0(0%)
36-60yrs	581(67.5%)	677(78.6%)	280(32.5%)	184(21.4%)	0(0%)	0(0%)	0(0%)	0(0%)
60+yrs	838(97.3%)	848(98.5%)	23(2.7%)	13(1.5%)	0(0%)	0(0%)	0(0%)	0(0%)
Source: Field Findings								

As indicated in **Table 5-8** above, 42.4% of the sample households have 1-3 male children under 5 years as members, while 42.4% of the sample households have 1-3 female children, 63.3% of the sample households have 1-3 males between 18-35 years as members, while 66.5% of the sample households have 1-3 females aged 18-35years as members. The most mentioned household size (mode) was found to be 1 for the males and 2 for the females, the median household size was 2 for both males and females, while the average (mean) household size was 2.5 people for the males and 2.7 people for the females.

The survey findings revealed that Kibaale Town Council has 60 People with Disabilities (PWDs) of which 33 were males and 27 were females.

B. Kifamba RGC

Findings of the household survey indicate that 40% of the sample households have 4-6 persons as members, while 6% households had more than 9 persons. There are 42% households with between 1-3 persons. The most mentioned household size (mode) was found to be 1, the median household size was 5 and the average (mean) household size was 4.5 people.

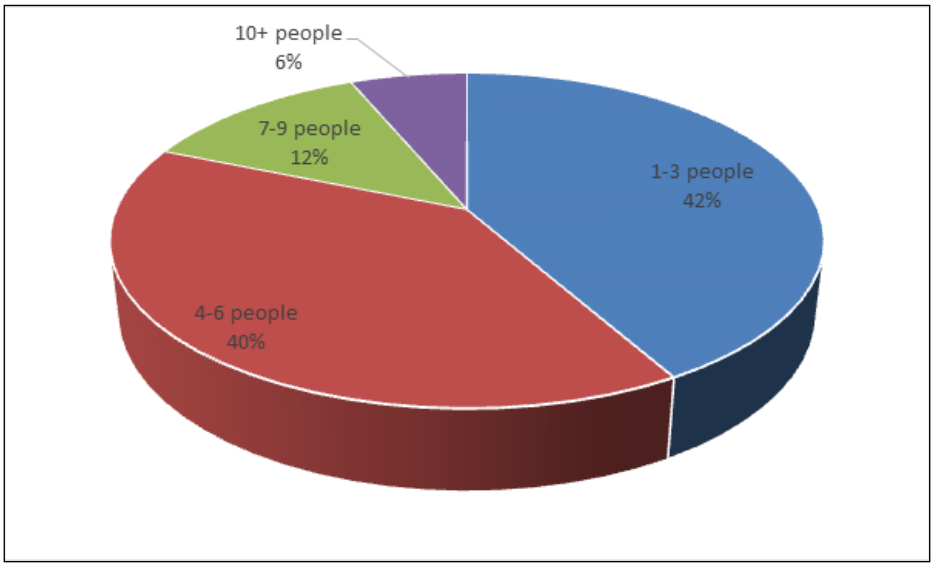


Figure 5-13: Percentage distribution of sample household size

The survey findings revealed that the RGC has 6 People with Disabilities (PWDs) of which 4 were males and 2 were females.

5.3.2.4. Household Headship

A. Kibaale RGC

The total number of respondents as indicated by their sex in the study was 861 out of which 52% were males and 48% female. Results in **Figure 5-14** also show that majority (84.1%) of the respondents were household heads.

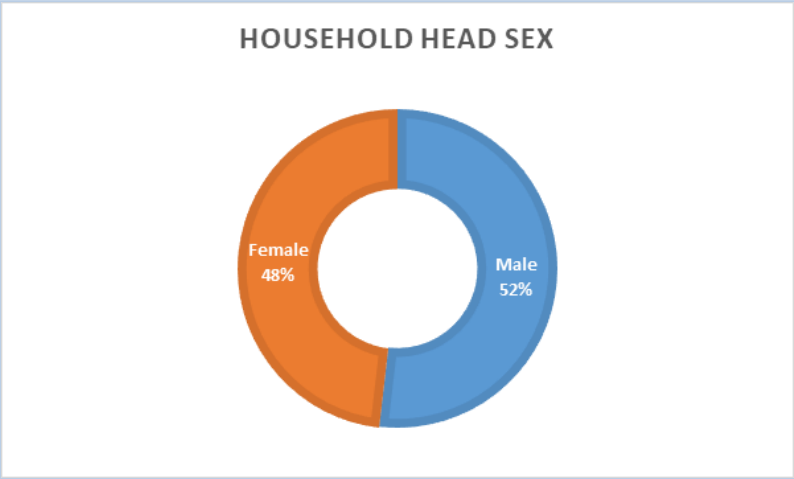


Figure 5-14: Percentage distribution by sex

B. Kifamba RGC

The total number of respondents as indicated by their sex in the study was 395 out of which 62.5% were males headed Families and 37.5% female headed families. Results in **Table 5-9** also show that majority (79.7%) of the respondents were household heads.

Table 5-9: Percentage Distribution by Sex

Respondent	No. of HHs	%
Male	247	62.5
Female	148	37.5
Total	395	100.0
H/hold headship	**No. of HHs**	**%**
Yes	315	79.7
No	80	20.3
Total	395	100

5.3.2.5. Education

i. Kibaale RGC

Education is a fundamental human right. According to the household survey, results in **Figure 5-15** indicate that 34% of the population in the sample (and project area) have at least attained primary level of education compared to only 4% of the sample reported they did not attend any formal education at all.

The survey findings also indicate that a greatest number of households are able to read and write. 82.8% of the HHs had one person who is able to read and write. This is an indication that information can be passed on through written Communication as majority of the household heads are able to read and write. This is an indication that the Household heads will be able to read and interpret any communication pertaining to Water, Sanitation and hygiene.

The results of the education levels of the sample respondents are presented in **Figure 5-15** below:

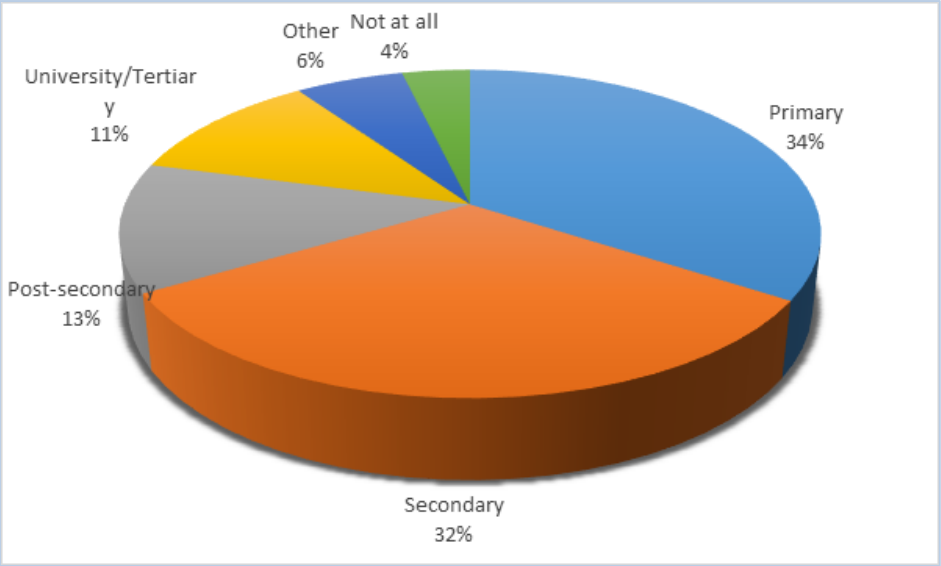


Figure 5-15: Distribution of household heads by education levels in Kibaale RGC

ii. Kifamba RGC

The results of the education levels of the sample respondents are presented in **Figure 5-16** below:

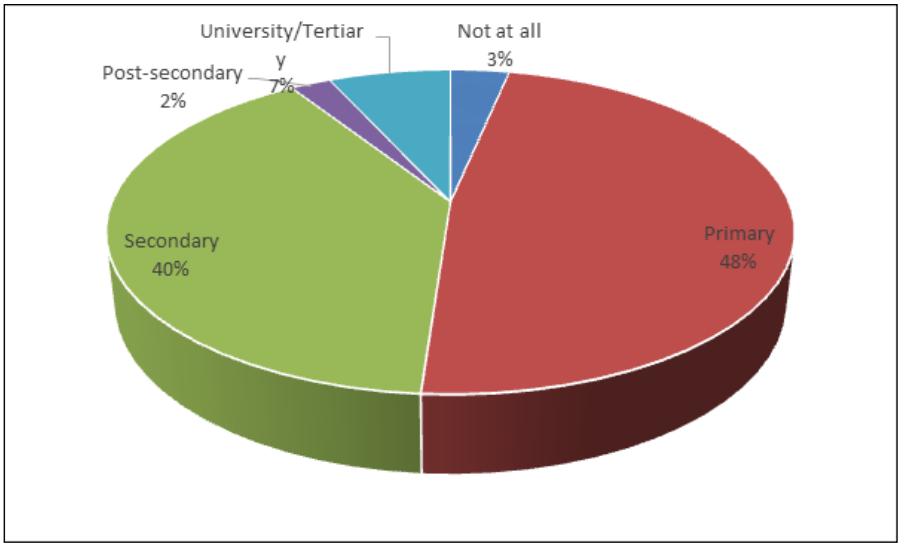


Figure 5-16: Distribution of household heads by education levels in Kifamba RGC

The results above indicate that 48% (189) of the population in the sample (and project area) have at least attained Primary level of education compared to only 3% (13) of the sample reported they did not attend any formal education at all. More still, The SES findings also showed that a greatest number of households have at least people who are able to read and write. 126 (31.9%) revealed they had one people who could read and write, 119 (30.1%) said they had 2 people and 44 (11.1%) had 3 people.

Thus, written project promotional materials in simple and more specifically the project area language may widely be used in the project area since a majority of the people may be able to read. This is an indication that information can be passed on through written Communication as majority of the households have people who are able to read and write. This is an indication that the Household heads will be able to read and interpret any communication pertaining to Water, Sanitation and hygiene.

A. Education institutions in Kibaale RGC

The education institutions comprised of 3No. secondary schools and 17No. primary schools. The government aided schools number 1No. secondary school and 11No. primary schools.

Table 5-10: Population in Education Institutions

Students / Staff	Gender	Population
Day Scholars	Boys	4,932
	Girls	5,071
Boarding Scholars	Boys	158
	Girls	323
Total Scholars	Boys	**5,090**
	Girls	**5,394**
Total Staff	Male	217
	Female	172

The majority of schools rely on a river / stream (32%) for a primary water source **(see Figure 5-17).** The schools also rely on dams, rainwater harvesting and boreholes.

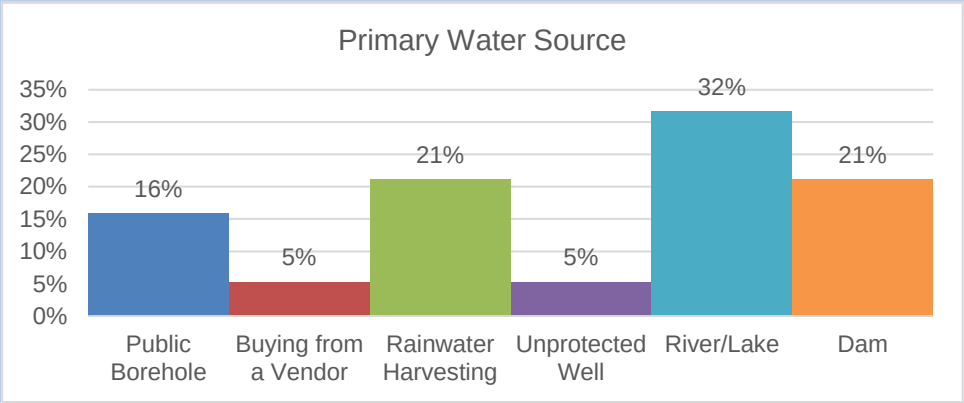


Figure 5-17: Primary water source for education institutions

Almost all the institutions (98%) rely on students to collect the water for use within the institutions. The distance to the primary water source for most of the institutions ranges between 0 to 100 meters.

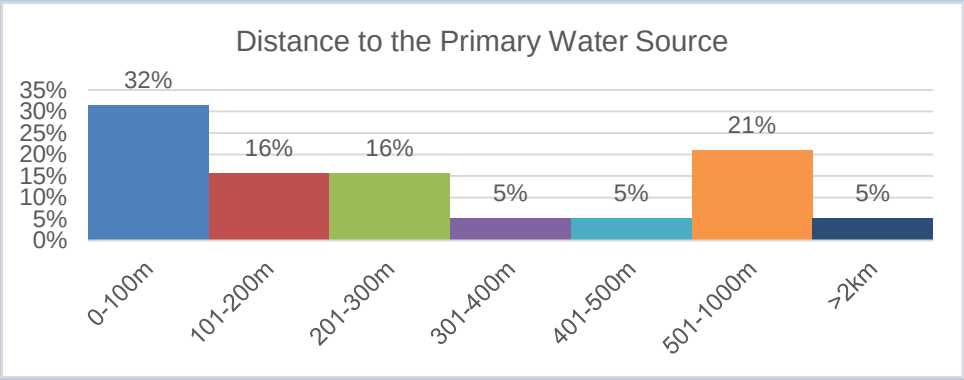


Figure 5-18: Distance to the primary water source

94% of the primary water sources were functional at the time of the survey. In addition, only 32% of the respondents were satisfied with the quality of the water from the primary water source.
The most relied on secondary water source is rainwater harvesting at 56% for the institutions.

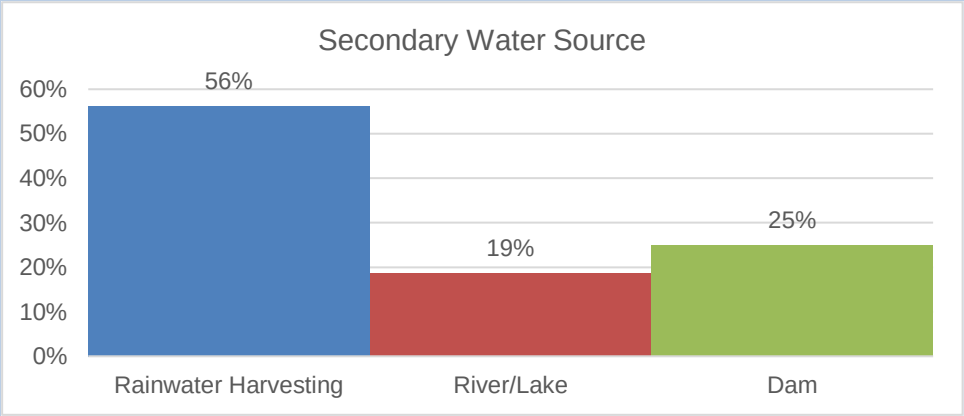


Figure 5-19: Secondary Water Source at Institutions

The education institutions rely on on-site sanitation facilities. The sanitation technologies are unlined VIP latrines (33%), lined VIP latrines (40%) and biogas toilets (26%). The biogas toilets are constructed in private schools funded by a civil society organization called Cotton Foundation.

B. Education institutions in Kifamba RGC

14 educational institutions were surveyed. These comprise of Government aided and Private founded schools. The educational institutions comprise of Nursery and Primary schools and Secondary schools. **Table 5-11** shows the name of the school, enrolment, Number of staff, main water source, EDF presence, HWF presence, solid waste management.

Table 5-11: Educational Institutions in Kifamba RGC

			No. of Day Students		No. of Boarding Students		NO. of staff			Presence of a HWF with Water and soap: Yes/No/N/A						
No.	**Name of the school**	**Village**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Type of EDF**	**Availability**	**Water**	**Soap**	**Pres. of a drying rack**	**Pres of a Kitchen**	**Waste Disposal**	**Water Source**
1	St Peter & Paul Kindergarten	Mannya	174	191	0	0	5	13	Lined VIP	Yes	Yes	No	Yes	Yes	Collect and burn	BH/RWH
2	St Francis Little Birds N&P/S	Mannya	157	154	0	0	8	12	Lined VIP	Yes	Yes	No	Yes	Yes	Dump in Rubbish pit	Well/BH
3	St. Nicholas Mannya P/S	Mannya	287	289	250	251	23	24	UnLined VIP	Yes	Yes	No	Yes	Yes	Dump in Rubbish pit	RWH/BH
4	Kifamba P/S	Kifamba	384	388	0	0	10	11	UnLined VIP	No	N/A	N/A	Yes	Yes	Collect and burn	Well/RWH
5	Kifamba Comprehensive S/S	Kifamba	248	522	0	0	14	14	Lined VIP	No	N/A	N/A	Yes	Yes	Dump in open collection area	BH/well
6	St Andrew's Mbirizi P/S	Mbirizi	309	355	0	0	10	5	UnLined VIP	No	N/A	N/A	Yes	Yes	Dump in open collection area	RWH/Well
7	Kasaasa C/U P/S	Kiterede	253	258	0	0	8	7	UnLined VIP	No	N/A	N/A	Yes	Yes	Collect and burn	BH/Well
8	Kagongero P/S	Kagongero	208	187	0	0	4	7	UnLined VIP	No	N/A	N/A	No	Yes	Dump in Rubbish pit	RWH/Well
9	Kisaasa P/S	Kisaasa	196	235	0	0	5	10	Lined VIP	Yes	No	No	Yes	Yes	Collect and burn	RWH
10	Kitente Moslem Academy	Kitente	50	42	0	0	10	0	UnLined VIP	Yes	No	No	Yes	Yes	Collect and burn	RWH/Vendor
11	Kabuta - Kiruuli P/S	Kiruuli	224	215	0	0	4	8	UnLined VIP	No	N/A	N/A	No	No	Dump in Rubbish pit	Well/RWH
12	Lwemisege P/S	Lwemisege	304	243	0	0	5	6	Tradit pit	Yes	No	No	Yes	Yes	Collect and burn	Well
13	St Aloysius Nseese P/S	Nseese	283	298	0	0	10	9	Lined VIP	Yes	No	No	Yes	Yes	Collect and burn	RWH

			No. of Day Students		No. of Boarding Students		NO. of staff			Presence of a HWF with Water and soap: Yes/No/N/A						
No.	**Name of the school**	**Village**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Type of EDF**	**Availability**	**Water**	**Soap**	**Pres. of a drying rack**	**Pres of a Kitchen**	**Waste Disposal**	**Water Source**
14	St Bernard's Mannya S/S	Mannya	282	483	280	290	62	25	Bio gas	No	N/A	N/A	Yes	Yes	Collect and burn	BH/RWH
	Total		**3,359**	**3,860**	**530**	**541**	**178**	**151**								
Source: Field Findings																

5.3.2.6. Livelihood sources

In Rakai district, 77.6% of people living in rural depend on subsistence farming. The economy is basically reliant on crop production and livestock production. Main food crops include finger millet, maize, beans, bananas, sorghum, sweet potatoes, Irish potatoes, cassava and groundnuts. Coffee is the major cash crop in the district. Fruits and vegetables such as passion fruit, tomatoes, pineapples, onions and cabbage are also grown. Others are fishing and the upcoming fish farming, agro-forestry, sand excavation, and brick making. The huge percentage of the population that is engaged in agriculture implies that people's economic livelihoods are dependent on exploitation of natural resources with all its attendant effects including exploitation and degradation.

A. Kibaale RGC

Commensurate to the above, survey results in **Figure 5-20** indicate that, a significant size of the household heads in Kibaale are engaged in subsistence farming (45.1%), 22.7% are informal traders, 10% commercial farmers and 5.8% boda boda operators.

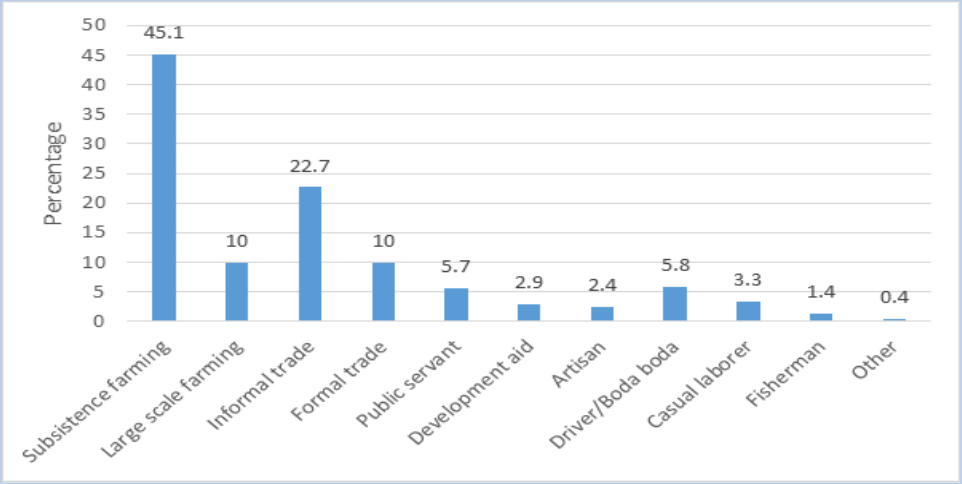


Figure 5-20: Distributions of Household Heads by Employment Type

B. Kifamba RGC

Survey results in **Figure 5-20** indicate that, a significant size of the household heads in in Kifamba are engaged in subsistence farming (38.7%), 10.4% commercial farmers, 10.1% boda boda operators and 9.4% are informal traders.

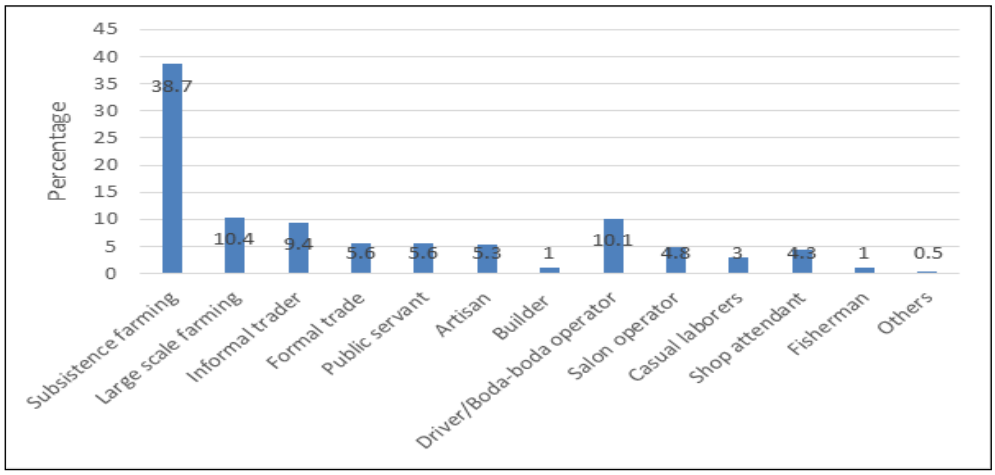


Figure 5-21: Distributions of Household Heads by Employment Type

Overall, the salaries and wages in some of these sectors are still a long way from the much-desired living wage. During the construction of the water supply and sanitation system, employment opportunities should be given to people from within the project communities as this will provide an alternative income source and overall improve their livelihoods.

5.3.2.7. Income and expenditure patterns

Since ranking household incomes based on the number of assets possessed is highly fraught with difficulties in assessment, for a study like this one (that is not fully focused on establishing income levels), we used the expenditure approach towards deriving income approximations. This approach is thought valid in estimating incomes since expenditures are made based on the life cycle hypothesis. Expenditure today does not only depend on what a household earns now but is a reflection of past savings and expected future earnings.

One of the questions on household income and expenditure concerned diet, it was a difficult question to ask in most circumstances and the replies received sketched out only the broad dimensions of daily consumption patterns on household basis; they did not distinguish between individual members of the household or give details of the quantities of food consumed. Nevertheless, the results are still extremely revealing, at a crude aggregate level, they highlight the material differences between areas in terms of income and provide a rough indication of poverty levels and their ability to pay for future maintenance of the water and sanitation facilities in their towns.

A. Kibaale RGC

Table 5-12: Distribution of household heads by monthly income levels

Income level per month	Frequency number	Percent
Less than 50,000	194	22.7
50,000-200,000	290	33.9
200,001-400,000	215	25.1
400,001 - 800,000	113	13.2
800,001-1,000,000	32	3.7
more than 1,000,000	11	1.3
Total	**856**	**100**
Source: Field Findings		

As depicted in **Table 5-12** above, 33.9% of the respondents earn between 50,000-200,000/=, 25.1% between 200,000-400,000/= and only 1.3% earn more than 1,000,000/=
Table 5-13 below presents the summary findings on the expenditure pattern for the sample respondents. From the survey results indicated in **Table 5-13** below 33.2% of the sample households spent between 20,000-50,000/= monthly, 30.8% between 50,000-100,000/= and only 0.2% spent more than 1,000,000/=.

Table 5-13: Distribution of household heads by monthly expenditure levels

Expenditure level per month	Frequency number	Percent
Less than 20,000	167	19.4
20,001-50,000	286	33.2
50,001-100,000	265	30.8
100,001 - 300,000	104	12.1
300,001-500,000	37	4.3
More than 500,000	2	.2
Total	**861**	**100**
Source: Field Findings		

B. Kifamba RGC

Table 5-14: Distribution of household heads by monthly income levels

Income level per month	Frequency number	Percent
<10,000	0	0.0
10,001 - 25,000	2	0.5
25,001 - 50,000	4	1.1
50,001 - 75,000	4	1.1
75,001 - 100,000	67	17.0
100,001 - 150,000	44	11.1
150,001 - 300,000	176	44.6
300,001 - 500,000	67	17.0
500,001-700,000	16	4.1
700,001-1,000,000	5	1.4
>1,00,000	4	1.1
Total	**389**	**100**
Source: Field Findings		

As depicted in **Table 5-12** above, 44.6% of the respondents earn between 150,000-300,000/=, 17% between 300,000-500,000/= and only 1.1% earn more than 1,000,000/=. **Table 5-13** below presents the summary findings on the expenditure pattern for the sample respondents. From the survey results indicated in **Table 5-13** below a 30.6% of the sample households spent between 150,000-300,000/= monthly, 4.7% between 300,000-500,000/= and only 0.6% spent more than 1,000,000/=. The mean monthly household expenditure is computed as shs 165,642/=. Even considering the typical under-reporting of incomes/expenditures by respondents in such surveys, it is only clear that on average the population in the area is low-income earners.

Table 5-15: Distribution of Household Heads by Monthly Expenditure Levels

Expenditure level per month	No. of HHs	Percent
<10,000	0	0.0
10,001 - 25,000	2	0.6
25,001 - 50,000	36	10.0
50,001 – 75,000	26	7.2
75,001 – 100,000	121	36.4
100,001 – 150,000	44	12.2
150,001 – 300,000	110	30.6
300,001 – 500,000	17	4.7
500,001-700,000	1	0.3
700,001-1,000,000	1	0.3
>1,00,000	2	0.6
Total	**360**	**100**
Source: Field Findings		

5.3.2.8. Informal money markets

A. Kibaale RGC

The results in **Figure 5-22** also indicate that informal money markets exist in Kibaale town. 57% of the respondents reported it is quite easy to borrow shillings 100,000/= from a non - member of their own family for a period of one month. Another 26% reported they would all the same borrow the money, albeit, after some time and yet a number (17%) reported it is impossible to borrow money. We did not attempt to seek reasons for the "impossible" response, but it is logical to argue that lenders would of course have a number of considerations directed towards ensuring that their money is paid.

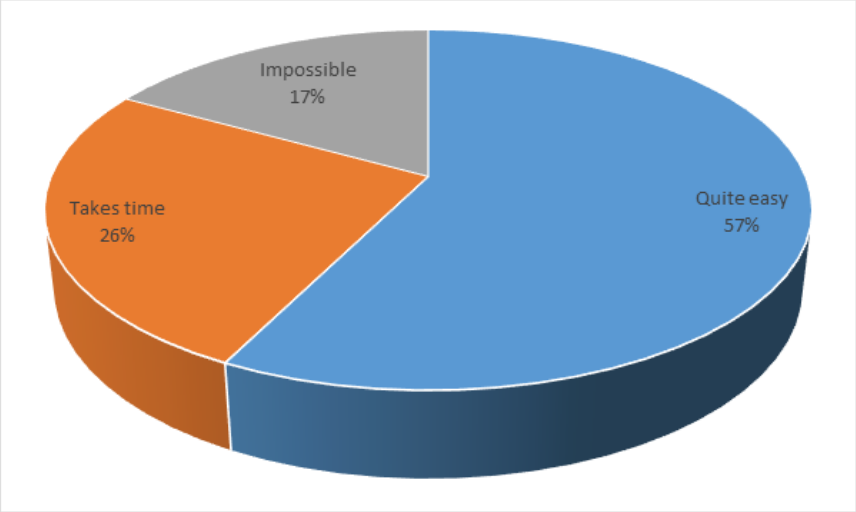


Figure 5-22: Percentage of sample respondents by possibility to borrow 100,000/-

B. Kifamba RGC

The results of our survey also indicate that informal money markets exist in Kifamba RGC. 35% of the respondents reported it is quite easy to borrow shillings 100,000/= from a non - member of their own family for a period of one month. Another 44% reported they would all the same borrow the money, albeit, after some time and yet a number (21%) reported it is impossible to borrow money. We did not attempt to seek reasons for the "impossible" response, but it is logical to argue that lenders would of course have a number of considerations directed towards ensuring that their money is paid.

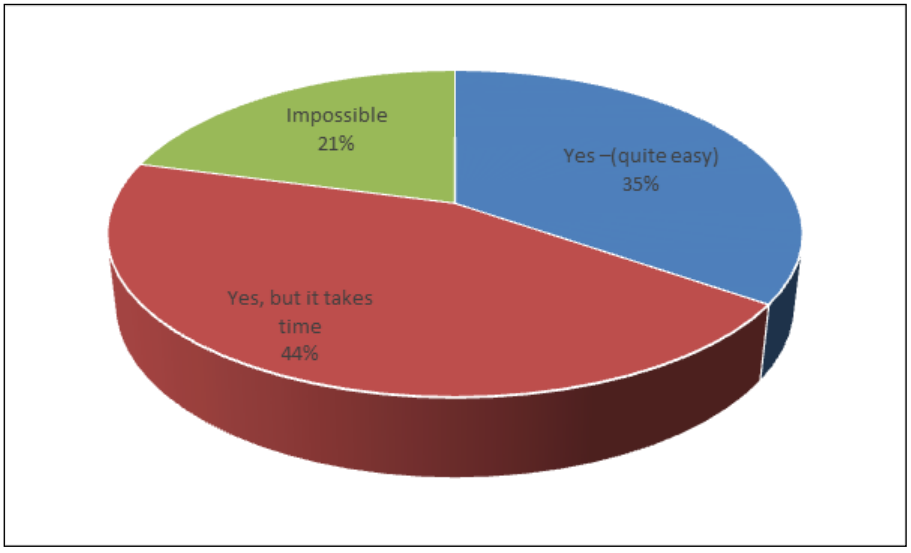


Figure 5-23: Percentage of sample respondents by possibility to borrow 100,000/-

5.2.3 Water Supply Situation

5.2.3.1 Existing Water Uses and Sources

There are a few options for obtaining water in Kibaale. These include Boreholes, Traditional wells, streams and vendors. The sources are used in differing magnitudes and at different times of the year. This clearly explains that use of water from different sources for specific activities is known to exist but distinction is blurred. However, what is clear and easy to obtain from respondents is the most frequently used water source by the household in the dry and rainy seasons.

A. Kibaale RGC

Many of the households (38.2% in the rain season and 53.2% in the dry season) reported fetching water from a river. Other respondents reported fetching from boreholes (9.9% in the rain season and 17.6% in the dry season) and some from a shallow well (10.7% in the rain season and 10.8% in the dry season). Vendors are the other reported source as seen in **Figure 5-24** (3.8% in the rain season and 2.1% in the dry season).

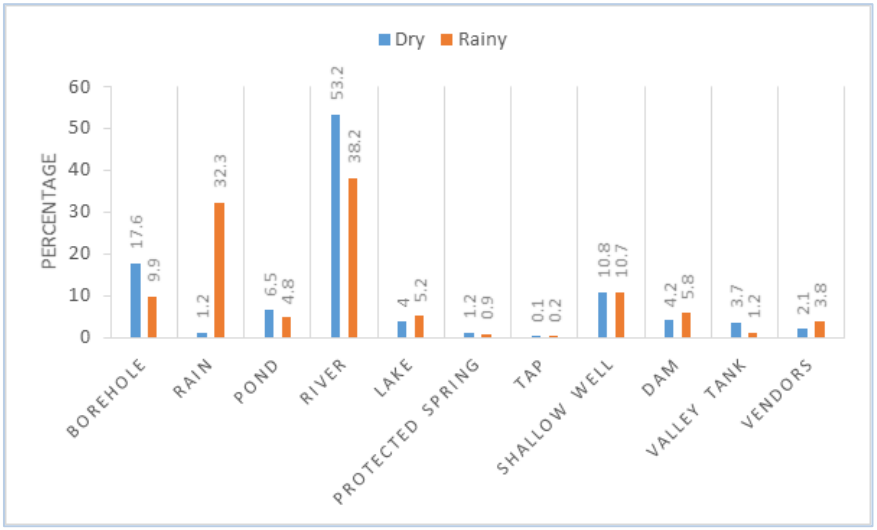


Figure 5-24: Distribution of respondents by major sources of water

The user households proved not to trust the quality of water in Kibaale town during both the dry and rainy season. Of the 373 households in the sample, 96.5% reported treating drinking water compared to 3.5% who reported drinking untreated water. To corroborate figure reporting they treat drinking water, all report treating their water by boiling. Although we could not ascertain to what extent the water is "boiled", it is clear that a sense (desire) of having safe drinking water exists among the households in the project area.

B. Kifamba RGC

Many of the households (41.3% in the rain season and 40.8% in the dry season) reported fetching water from a traditional well. Other respondents reported fetching from boreholes (28.9% in the rain season and 37.7% in the dry season) and some from a pond/stream (28.4% in the rain season and 28.4% in the dry season). Vendors are the other reported source as seen in **Figure 5-24** (23.8% in the rain season and 18.2% in the dry season).

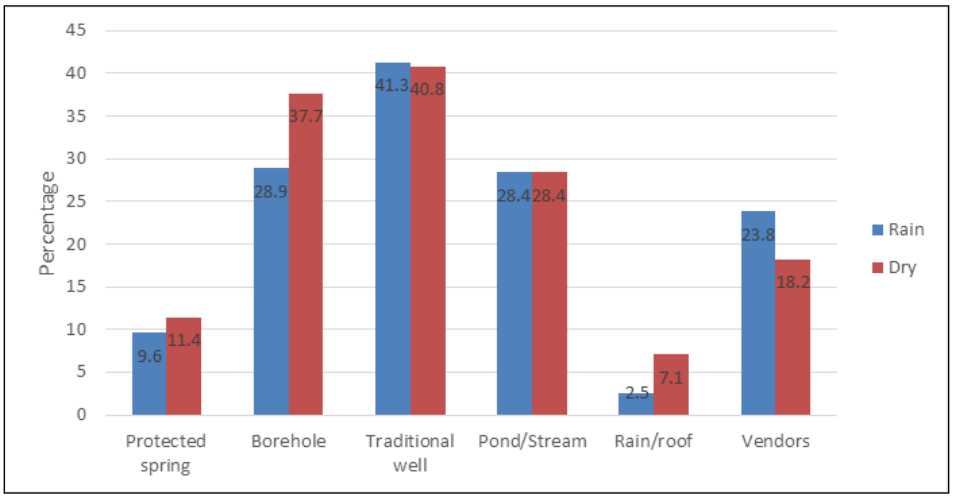


Figure 5-25: Distribution of respondents by major sources of water

The user households proved not to trust the quality of water in Kifamba RGC during both the dry and rainy season. Of the 395 households in the sample, 96% reported treating drinking water compared to 4% who reported drinking untreated water. To corroborate figure reporting they treat drinking water, 95.3% report treating their water by boiling, 3.1% boil and filter the water while 0.8% filter the water. Although we could not ascertain to what extent the water is "boiled", it is clear that a sense (desire) of having safe drinking water exists among the households in the project area.

Table 5-16: Percentage Distribution of Households by Treatment of Drinking Water

Availability of Drinking water	No. of HHs	%
Yes	381	96
No	14	4
Total	**395**	**100.**
Method of water treatment	**No. of HHs**	**%**
Boiling	363	95.3
Filtering	3	0.8
Boil and Filter	12	3.1
Others	3	0.8
Total	**381**	**100.0**
Source: *Field Findings*		

5.2.3.2 Water Collection

In both Kibaale and kifamba RGCs, the responsibility to fetch water is spread to all categories of people. The data in **Figure 5-26** above indicate that, water fetching is equally share with (29.3%) reporting all, followed by boys (26.9%), girls (23%), women (19.4%) and 15.7% men fetch water. For Kifamba RGC, water fetching is dominated by men 167 (42%), followed by 119 boys (30%), women 69 (18%) and 40 (10%) girls fetch water.

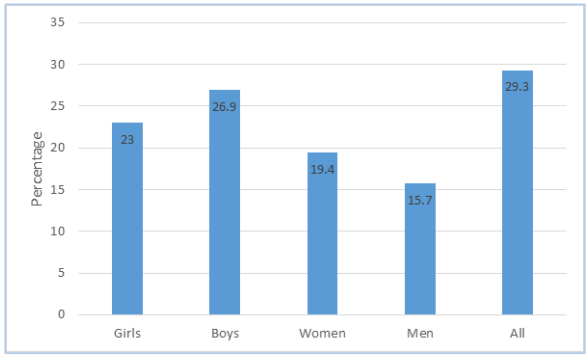


Figure 5-26: Distribution of households by persons who fetch water most in Kibaale RGC

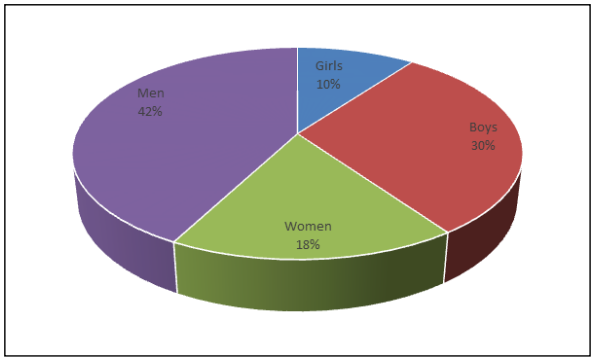


Figure 5-27: Distribution of households by persons who fetch water most in Kifamba RGC

5.2.3.3 Water Vending in the project area

Water vending exists in both Kibaale and Kifamba RGCs and is carried out by mostly men. Although they have not organized themselves into any formal association, they can easily be identified by the number of jerry cans carried. Water is commonly sold to households at their doorsteps hence distributive vending. Some vendors report they sell water to specific households over an agreed upon time but a majority of them report selling at random to any buyer.

In Kibaale RGC, 44.4% of the HHs revealed to buy water from the water venders. 83.4% of the water venders use bicycles to take water to the intended users. It was also revealed that 149 (35.3%) that there are between 5-10 venders, 96 (22.8%) mentioned that there are between than 10-20 venders and 90 (21.3%) confirmed that there are more than 20 venders in the RGC.

In Kifamba RGC, according to the findings of the household survey, 39% of the respondents reported they buy water from these vendors especially in the dry season. 135 (87.7%) use bicycles as their major means of transport, 17 (11%) use motorcycles. It was also reported that the water venders charge between 1,000/= to 2,000/= per 20litre jerry can of water. The table below show the price of a 20litre jerry can during the dry and rainy season.

Table 5-17: Cost of 20 Litre Jerry Can

Cost of a 20 Litre Jerry can of water during the dry season			Cost of a 20 Litre Jerry can of water during the rainy season		
Cost	No. of HHs	%	Cost	No. of HHs	%
500	3	1.9	500	5	3.2
600	1	.6	600	1	.6
1000	51	33.1	1000	51	33.1
1500	47	30.5	1500	49	31.8
2000	30	19.5	2000	27	17.5
2100	1	.6	2400	1	.6
2400	1	.6	2500	10	6.5
2500	9	5.8	3000	9	5.8
3000	9	5.8	3300	1	.6
3300	1	.6	Total	154	100.0
5000	1	.6			
Total	154	100.0			
Source: Field Findings					

5.2.3.4 Water source used by water vendors

When asked where they collect the water, they sale, majority (55%) reported getting the water from a river, 10% from a lake and 7% reported them collecting the water from boreholes In Kibaale RGC whereas In Kifamba RGC, 61.7% reported getting the water from boreholes, 30.5% from traditional wells and 4.5% reported them collecting the water from ponds/streams.

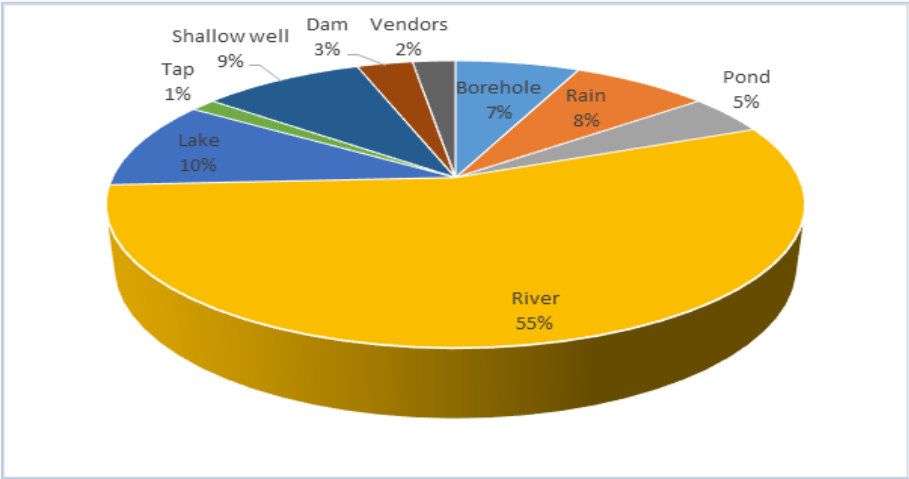


Figure 5-28: Source of Water for Vendors in Kibaale RGC

Table 5-18: Water source used by water vendors in Kifamba RGC

Water source used during the rainy Season

Water Source	No. of HHs	%
Protected spring	3	1.9
Borehole	95	61.7
Traditional well	47	30.5
Pond/stream/lake	7	4.5
Rain/roof	1	.6
Other	1	.6
Total	154	100.0

Water Source used during the dry season

Water Source	No. of HHs	%
Protected spring	3	1.9
Borehole	95	61.7
Traditional well	47	30.5
Pond/stream/lake	7	4.5
Rain/roof	1	.6
Other	1	.6
Total	154	100.0

Source: *Field Findings*

5.2.3.5 Water Quality and Reliability

The respondents had a broad perception about the water problems in their town. People indicated a wide awareness of the need for safe water for drinking. Of the respondents of the sampled households who indicated that treat their drinking water all do this by boiling. The respondents said the main reason for treating water was to avoid diseases since their water sometimes appears visibly dirty especially during rainy season when storm water with garbage is suspected to find its way to the water sources.

On the other hand, when asked to rate the quality and reliability of the water they are currently using, majority, 54.0% rated the water quality as bad, 69.6% rated the reliability of the water supply system as bad while 38% rated the quality of the water supply system as fair. The implication of this is that, we shall have a number of households willing to pay for improved services since the current service delivery is not satisfactory.

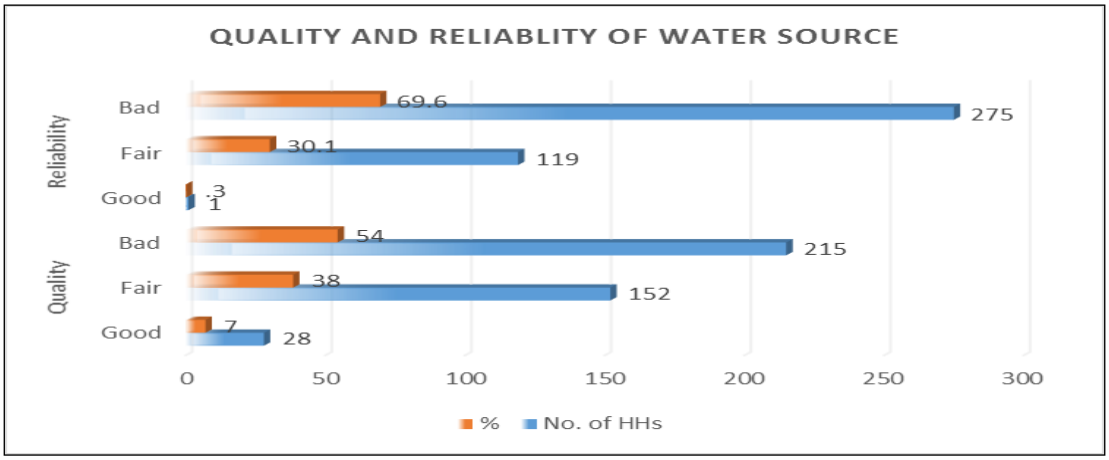


Figure 5-29: Households' assessment of water quality and reliability in the area

5.2.4 Sanitation

i. Type of excreta disposal facility used

The results of the household survey in Kibaale Town Council indicate that 48.2% of the households use a traditional pit latrine, 32% a VIP line, 11% an unlined VIP and 1.4% use an ecosan. In Kifamba RGC almost all (99%) of the households use private pit latrines and 1% use public pit latrines.

Table 5-19: Percentage of Households using the different Excreta Disposal Systems

Kibaale RGC

Toilet facility used	Frequency	Percentage
VIP Line	273	32.0
Eco san	12	1.4
Traditional pit	411	48.2
Flush	62	7.3
Unlined VIP	94	11.0
Total	**852**	**100.0**
Source: Field Findings		

Kifamba RGC

Toilet facility used	Frequency	Percentage
Private pit latrine	391	99.0
Public pit latrine	4	1.0
Plastic bag	0	.0
Flash toilet connected to septic tank	0	.0
None/Bush	0	.0
Total	**395**	**100.0**
Source: Field Findings		

Of the households that use a pit latrine in Kibaale RGC, 66% households report they share the latrine with other households. The remainder, 34% have a pit latrine for exclusive use by their household members. In Kifamba RGC, 83.3% have a pit latrine for exclusive use by their household members. Of the households that use a pit latrine, 16.7% households report they share the latrine with other households.

Regarding the status of the latrines, in Kibaale, majority of the households rate their pit latrines as in a good state (75.6%), 19.8% in a poor state while 4.5% reported their pit latrines as filled up and similarly, more than half of the households in Kifamba RGC rate their pit latrines as fair (54.9%), 34.9% as very satisfactory while 10.1% aren't satisfied at all about their pit latrines

ii. Waste disposal facilities

On the disposal of rubbish, in Kibaale RGC, 33.3% of the households reported drying and burning their rubbish, 14.2% reported pouring it in the open, 32.5% disposed it off at a central collection point while 4.9% disposed it off in the plantation. Similarly, with waste water, 82.9% reported pouring it in the open, 10.8% pour it in the open drain while 1.5% pour it in some sort of soak pit.

In Kifamba RGC, 26% of the households reported drying and burning their rubbish, 46% reported pouring it in a pit within the compound, 4% disposed it off at a central collection point while 23% disposed it off in the open (see Table 4 29). Therefore, there is need to sensitize the Community on proper waste management. For waste water, 50% reported pouring it in the open, 38% pour it in the open drain while 12% pour it in some sort of soak pit.

Table 5-20: Percentage Distribution of Households by Solid / Wastewater Disposal

Kibaale RGC

Solid waste disposal	**No. of HHs**	**Percentage**
In the open	122	14.2
Composite pit	280	32.5
Dry and burn	287	33.3
At central collection point	148	17.2
In plantations	42	4.9
Total	**861**	**100**
Wastewater disposal	**No. of HHs**	**Percentage**
Pour water in open backyard	708	82.9
Pour water in open drain	92	10.8
Soak pit	13	1.5
Roadside	31	3.6
Stagnation seen	10	1.2
Total	**854**	**100**
Source: Field Findings		

Kifamba RGC

Solid waste disposal	**No. of HHs**	**%**
In the open	92	23
Dug pit within compound	184	46
Dry and burn	102	26
At central collection point	17	4
Total	**395**	**100.0**
Waste water disposal	**No. of HHs**	**%**
Pour water in open	199	50
Pour water in open drain	150	38
Soak pit	46	12
Total	**395**	**10**
Source: Field Findings		

5.2.5 **Health**

5.2.5.1 Health facilities

A. Kibaale RGC

The health institutions comprised of 3No. government institutions and 1No private institutions. The government institutions comprised of 1No. Health Center II (Kisomole HCII) and 2No. Health Center III (Kyalulangira HCIII and Kiyonza HCIII). The private institution was located in Kibaale Community and was at a level of Health Center III.

Table 5-21: Population in Health Institutions

Staff / Patients		Population
Patients	In Patients	68
	Outpatients	191
	No. of beds	68
Total Staff	Male	33
	Female	53
Resident Staff	Male	14
	Female	21

The majority of health institutions (50%) rely on boreholes fitted with a handpump. All the health institutions rely on rainwater harvesting as a secondary water source.

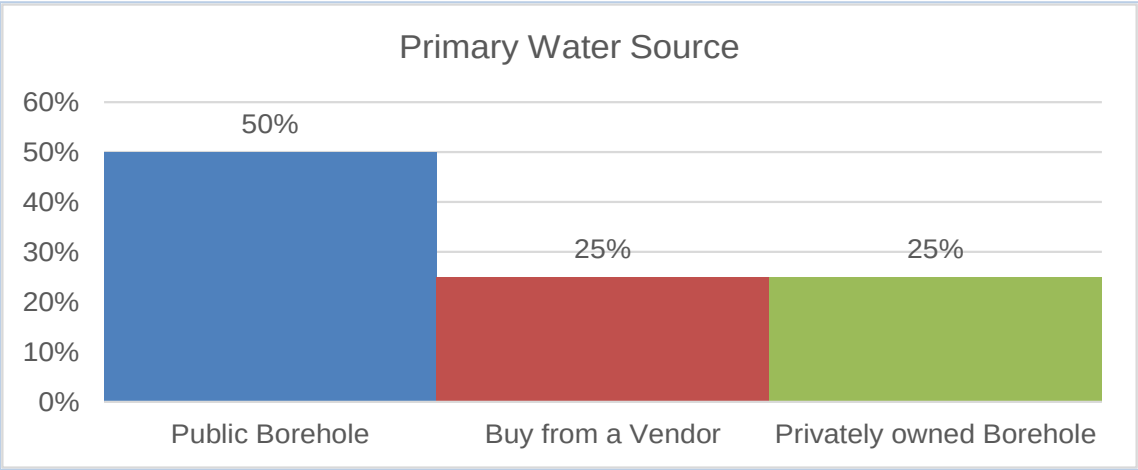


Figure 5-30: Primary water sources for health institutions

All the health institutions rely on onsite sanitation facilities in the form of lined VIP latrines. Only one of the health institutions had reportedly emptied the sanitation facility (Kibaale Community) and relied on a cesspool emptier. All the health centers had handwashing facilities at / near the sanitation facilities. There was water at each of the handwashing facilities.

B. Kifamba RGC

Kifamba RGC relies on 2 health centres, the facilities have a total number of 39 beds. The diseases commonly treated in the health facilities include; Typhoid, Malaria, STDS, HIV, TB, Skin and eye infections, diarrhoea, Respiratory tract infections, sexually transmitted diseases (Report from Health Centre, Officers in Charge).

Table 5-22 Health Institutions in Kifamba RGC

			Type of H/C	**Population**			**NO. of staff**			**Presence of a HWF with Water and soap**				
No.	**Name of the institution**	**Village**	**Type of H/C**	**Inpatients**	**outpatients**	**No. of Bed**	**Male**	**Female**	**Type of EDF**	**Water**	**Soap**	**Waste Disposal**	**Water Source**	**Provision of Drinking water**
1	Kifamba HC III	Kifamba	Govt	10	70	7	6	9	Lined VIP	Yes	Yes	Collect and Burn	RWH	Yes
2	St Bernard's Mannya H/C	Mannya	Private	10	40	32	11	18	Eco san	Yes	Yes	Collect and Burn	BH	Yes
	Total			**20**	**110**	**39**	**17**	**27**						

Source: Field Findings

Access to health facilities

Findings of the household survey indicated that in Kibaale RGC, 45% households prefer to get treatment from a health facility as compared to 30% that preferred to access treatment from the hospitals. In Kifamba, 44% (27) households prefer to get treatment from a public health facility as compared to 56% (34) that preferred to access treatment from the private health facilities.

However, it should be noted that, in most parts of the country public health units are ill-equipped with drugs and personnel hence services are inadequate. There is a practical danger in seeking to provide health service through diverse channels. Although private clinics are duly registered and permitted to operate upon satisfying minimum requirements set up by government, it is in the interest of some of them to make money than provide a genuine service. The MWE is a partner in the quest to provide health services to the people through safe water, hence accompanying hygienic and health practices are important. Where government health units (non-profit bound) offer inadequate services there is a danger of reaping no results or at worst negative results. For a project like this, the initial steps in educating households on their hygiene and health practices needs to be encouraged well beyond the project phase, since this is lacking in public health units at the present and costly for the private health units to adequately undertake.

5.2.5.2 Household Morbidity

The focus of water as a medium of disease transmittal was addressed in the survey. Respondents were asked whether in the last 14 days, any member of their household fell sick/ill enough to seek treatment outside their home. We also sought disaggregated data on any such persons who might have obtained treatment.

In Kibaale RGC, findings of the household survey indicated that 30.8% (260) of the respondents had at least one person with sickness requiring treatment in the specified period. 38% (93) of the sick people were female and 47% (117) male. For KIfamba RGC, 15% (61) of the respondents had at least one person with sickness requiring treatment in the specified period. 56% (34) of the sick people were female and 44% (27) male.

Common Illnesses

In the analysis of the morbidity data, malaria accounted for a majority (42%) of sickness in all the patients followed by flue and cough (1.8%) in Kifamba RGC.

Table 5-23: Type of Illness suffered within the last 2 weeks

Type of Illness	No. of HHs	%
Yellow fever	1	.3
Back ache	1	.3
Cough	1	.3
Cough and flue	7	1.8
Diarrhea	1	.3
Malaria	42	10.6
Malaria and headache	1	.3
Stomachache	1	.3
Typhoid	4	1.0
ulcers	2	.5

Similarly, in Kibaale RGC, malaria accounted for a majority 133 households (57%) of sickness in all the patients followed by diarrhea 39 households (17%) and other diseases account for 15 households (6%).

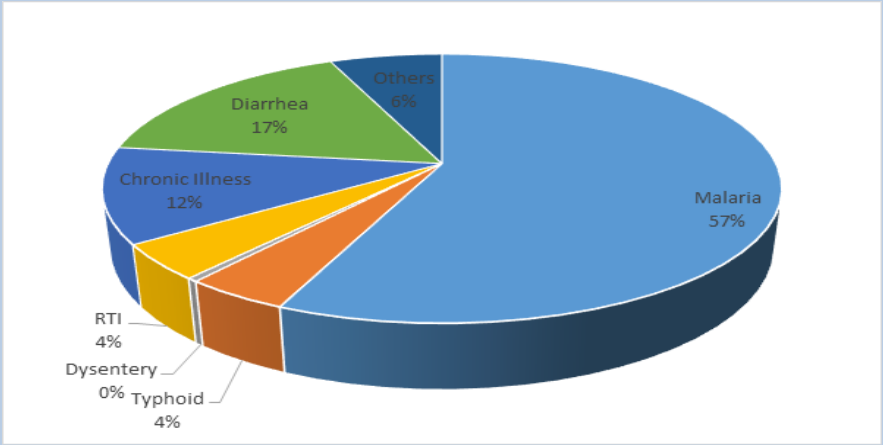


Figure 5-31: Type of Illness suffered within the last 2 weeks

5.2.5.3 COVID19 situation in the district

COVID-19 is a new virus that causes a respiratory illness in people and therefore no population-level immunity exists. The disease can spread from person-to person through sneezing and coughing droplets. On Saturday 21st March, 2020, Uganda registered her first case of COVID-19[2] and at the time of this study, the country was experiencing the second wave of the deadly virus and was still under partial lockdown. The country had seen emergence and entry of different variants into the country and mass vaccination was ongoing[3].

According to Rakai District Health Officer (Dr. Sakor Moses), due to high levels of sensitization, there has been positive attitude by the masses towards vaccination. At the time of the study (December 2021) about 3500 people in Kibanda had received the 1st vaccination shot, while over 3000 people in Kibaale had also received their 2nd vaccination doze. To curb the spread of the disease during project implementation, the DHO recommended that the contractor should set up a policy of only employing COVID free people and only those who have been vaccinated.

5.2.5.4 HIV/AIDS

Findings of the household survey indicated that in Kibaale RGC, 79.7% of the HHs had male People living with HIV/AIDS and 73.5% had female People living with HIV/AIDS. In Kifamba RGC, the survey established that 42 HHs out of 395 had people living with HIV/AID of which 22 were Males and 20 Females

During construction of the water supply and sanitation system, there will be interaction of workers, some of whom may be from different parts of the country, with the local community. This may result into an increase in the spread of HIV/AIDS. Influx of people into the project area during the construction phase will also increase pressure on the existing already burdened health facilities. It is therefore imperative that during construction, the contractor conducts regular workers and community sensitization to create awareness on HIV/AIDS. He/she should establish a site clinic and hire a service provider to implement all HIV/AIDS prevention measures in collaboration with existing health systems.

5.2.6 Communication

Through interaction with the Community, it was noted that radios were commonly used as means of communication as compared to Television station. This is because Television was owned by minority of the people. It was also noted that radios ease communication therefore could be used to pass on information in regard to implementation of the Water and Sanitation Scheme

[2] Ministry of Health update on COVID-19 response in Uganda 02nd April 2020

[3] Ministry of Health update on the response to COVID-19 resurgence 02nd July 2021

Presence of a radio in a home

Findings of the household survey established that in Kibaale RGC, 486 (57%) households had radios in their homes whereas in Kifamba, 333 (84%) households had radios and 62 (16%) lacked did not. The most listened to radio stations were CBS and Buddu, followed by others such as Karo, Star, Beat, Bukedde and Simba among others.

5.2.7 Energy Sources and usage

A. Kibaale RGC

The survey data in **Table 5-24** revealed that 347 (40.8%) households were using Solar power as their major source of lighting and 36 (4.2%) households use electricity for lighting that expose the households to fire outbreak risks. 328 (38.6%) of the households in the Cluster were using electricity as their source of lighting.

The survey finding showed that 50.5% (432) of the households in Kibaale are using Firewood and 52.2% (447) are using Charcoal as their energy source for cooking this has a great impact on the environment as forests are destroyed in the search for firewood and charcoal. Therefore, there is need to sensitize the community on the dangers of environmental degradation during construction of the water supply system.

Table 5-24: Energy Source for Lighting and Cooking

Energy source for lighting

Source for Lighting	No. of HHs	Percent
Electricity	328	38.6
Paraffin	108	12.7
Candle	36	4.2
Solar	347	40.8
Torch	66	7.8
Total	**849**	**100.0**

Energy source for Cooking

Source for cooking	No of HHs	%
Electricity	10	1.2
Gas	2	0.2
Paraffin	16	1.9
Charcoal	447	52.2
Firewood	432	50.5
Total	**856**	**100.0**

Source: Field Findings

B. Kifamba RGC

The survey data also revealed that 31 (8%) households were using paraffin as their major source of lighting and 43(11%) households use candles for lighting that expose the households to fire outbreak risks. 86 (22%) of the households in the RGC were using electricity as their source of lighting, 235(59%) households were using solar power.

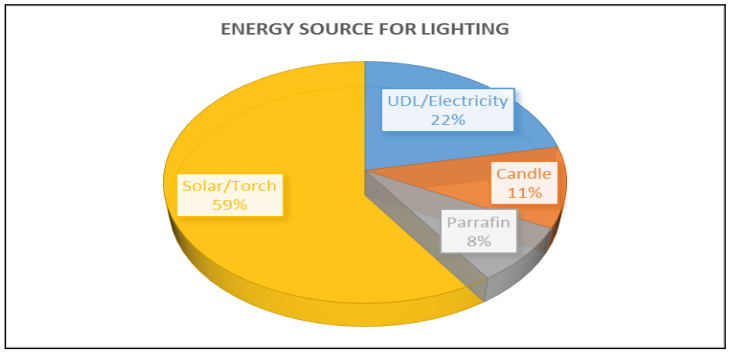


Figure 5-32: Sources of energy

The survey finding showed that 72% (283) of the households in the RGC are using Firewood and 26% (104) are using Charcoal as their energy source for cooking this has a great impact on the environment as forests are destroyed in the search for firewood and charcoal. Therefore, there is need to sensitize the community on the dangers of environmental degradation during construction of the WSSS.

6 KEY STAKEHOLDER VIEWS

During the study, consultations were conducted in order to;

i. Share project information with key stakeholders,
ii. Obtain baseline information, and
iii. Allow stakeholders the opportunity to participate in identifying any environmental and social impacts that could occur from the project implementation and take note of the concerns and views of all the stakeholders so that appropriate mitigation measures are incorporated before the project commences.

Information disclosed includes details of the purpose, nature, location, the project benefits and adverse impacts, as well as the proposed enhancement and mitigation measures and duration of project activities. In this context, meetings were held with relevant Rakai District Local Administration, Sub counties and with the local communities.

Arrangements for stakeholder consultation and the meetings were conducted in adherence to the SOPs issued to prevent the spread of COVID19.

A summary of the key findings from the consultation process are presented in **Table 6-1** and a detailed transcription of the meetings is provided in Appendix III.

Table 6-1: Summary of key stakeholders' views

Issue	**Stakeholder concern(s)**	**Incorporation in ESIS / Consultants Response**
Land acquisition for project facilities	The project will need land for setting up tanks and other facilities in addition to laying of the pipes. To avoid conflicts, land owners should be approached and engaged, especially where big facilities such as reservoir tanks and treatment plant will be set up. To avoid conflicts, the process should be timely before commencement of construction and transparent. To avoid conflicts in land acquisition, the project developer should capitalise on sensitizing and engaging the community in time to handle the expected challenges and above all bring on board the different opinion leaders like local council leaders, cultural leaders amongst others in the sensitization process.	Land on which the project support structures are to be set up will be acquired. These facilities include water treatment plant and reservoirs. The transmission pipe network will as much as possible utilise the existing road corridor / reserves to avoid impact on property. In unavoidable circumstances shall be dealt with on a case-by-case basis.
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.	As part of this study, consultations were conducted in order to inform the stakeholders about the project and as well gather their views, concerns and recommendations on how the likely impacts of the project can be managed. Section 9.4 of this reports highlights the management plans that the contractor should develop and implement to ensure compliance to environmental and social safeguards.

Issue	Stakeholder concern(s)	Incorporation in ESIS / Consultants Response
		Among these is the stakeholder management plan, in which the contractor shall show commitment and also provide a strategy on how project stakeholders will continuously be engaged during the project. this has further been emphasised in the ESMP matrix.
Potential increase in domestic and gender-based violence	According to the ESIA Baseline, there are 48% female headed households in Kibaale. With the influx of new people during construction, these may be seen as targets by the male workers and may be taken advantage of. Also according to the ESIA Baseline, of the 60 persons reported as Disabled, 27persons are of the female gender. These people are vulnerable and especially during the construction period of the project, with new people mixing with the communities, they could be targets for violence, rape, faked marriages and may even contract sexually transmitted diseases 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. Additionally, the contractor has been required under section 9.4 to prepare a gender management plan that will detail his commitment, strategy and specific measures to be implemented.
Employment of local community	Local labor should be prioritized both skilled and unskilled, this will help in reducing unemployment cases in the community but the contractor should equally avoid child labor, delayed payment or defaulting payments to avoid conflict. The contractor should avoid importing foreign labor especially for casual work that the youths in the area can ably do.	The need to employ local labour has been emphasized under section 8.1.1. this not only economically benefits the local communities but also promotes project ownership which is very important for project success.
Destruction of intake facilities by Hippopotamus	There is a concern of presence of hippopotamuses in the lake that may destroy the intake pipes and this might affect the pumping process in a long run.	The designs for the intake structures have put into consideration the potential sources of damage. We shall liaise with the Wildlife Authority to give us a clear demarcation where the Hippopotamus passes/grazes and the time it likes moving around not forgetting estimating the level of its destruction. We shall also show them (Wildlife Authority) where we intends to setup the intake structure. And we also give them a buffer zone area of 60meters - 120meters).

Issue	Stakeholder concern(s)	Incorporation in ESIS / Consultants Response
		We recommend a barrier like floating boom and traps hence not reducing the water quality.
Potential increase in spread of communicable diseases	There is potential of increase of spread of diseases such as STDs and COVID19 due to the influx of new people in the community. The contractor should caution the workers on the appropriate code of conduct when out in the community.	The impact of spread of COVID19 has been analysed under section 8.2.1 of this report and measures recommended to mitigate it. Additionally, among other plans, the contractor is required to prepare and implement a COVID19 management plant (section 9.4) detailing the measures to be implemented, including adherence to the SOPs issued by the Ministry of Health to curb the spread of the disease.
Accidents	Increased risk of accidents caused by the over speeding of trucks in the course of operations.	The contractor is required to develop and implement a traffic management plan which should be updated as work progresses. This will guide management of traffic flow during project implementation and protect other road users by mitigating accidents related to the project.

7 PROJECT ALTERNATIVES

This section provides an overview of the location and design alternatives that have been considered as part of project planning. The current description of the Project as provided above (Chapter 2) is the result of examining various alternatives, aimed at developing a Project that is both technically and financially feasible, and which minimizes environmental and social impacts to as low as reasonably practicable.

7.1 "No Project" Option

This option means that the proposed project would not be undertaken and that Ministry of Water and Environment through Water and Sanitation Development Facility – South West (WSDF-SW) would completely do away with construction of the piped water and sanitation system in Kibaale and Kifamba RGCs. From an extreme environmental view, the "no-project" is the suitable alternative in ensuring non-interference with the existing conditions. However, this cannot be a means to achieve the objectives of the proposed project of bringing water closer to the populations and improving the health and livelihood of the community.

If this scenario is considered, therefore, the communities in these areas would continue experiencing the challenges of access to clean water and sanitation facilities. Additionally, the "no-project" option would deny the community of the direct benefits that would accrue from the project construction phase such as employment opportunities and boost to local trade, among other socioeconomic benefits.

Therefore, the "no project" option is not a supportable proposition.

7.2 Hydrological Analysis of Potential Surface Water Sources

7.2.1 Option 1: Kibaale River

Kibaale River originates from south-western Uganda and flows through predominantly pastoral districts of Mbarara and Ntungamo (locally known as Ruizi in these districts). The river drains through Lake Kijjanebalola and eventually joins Bukora River located on the downstream side of the river after Kyotera-Mutula road. The river traverses a series of wetlands systems as it flows from Kibale to Bukora eventually draining into Lake Victoria.

The river is located within Bukora sub-catchment of the Lake Victoria basin (also called Ruizi catchment). There are two hydrological stations (Kibale and Bukora) located along the river. Details of the stations are provided in **Table 7-1**.

Table 7-1: Hydrological Stations along River Kibale – Bukora System

Station ID	Latitude	Longitude	Area (Km^2)	Name	Data	% available
81233	0:46: 0 S	31:21: 0 E	4715	R. Kibale at Kalungi (Lower Site)	1968 - 2017	88.5
81258	0:54: 0 S	31:36: 0 E	7395	R. Bukora at Katera	1998 - 2005	40.3

The catchment drained by River Kibaale has been delineated using GIS tools using the gauging station (Stn 81233) as the outlet (see **Figure 7-1**). The catchment area is about 6310.9 Km^2 and includes two parts:

i. The upper catchment, also called Ruizi catchment which includes River Rwizi itself, traversing the districts of Buhweju, Sheema, Bushenyi, Mbarara, Ntungamo, Isingiro and Kiruhura before discharging into Lake Mburo,
ii. The downstream catchment which linked to Lake Mburo via Lake Nyakivale and a number of wetland systems (**Figure 7-1**). Both lake systems are subsequently drained by River Kibale which flows through another series of wetlands into Lake Kijjanebalola in Rakai district, draining Lake Kachera en route. From Lake Kijjanebalola, the river changes name to River Bukora which finally flows into Lake Victoria.

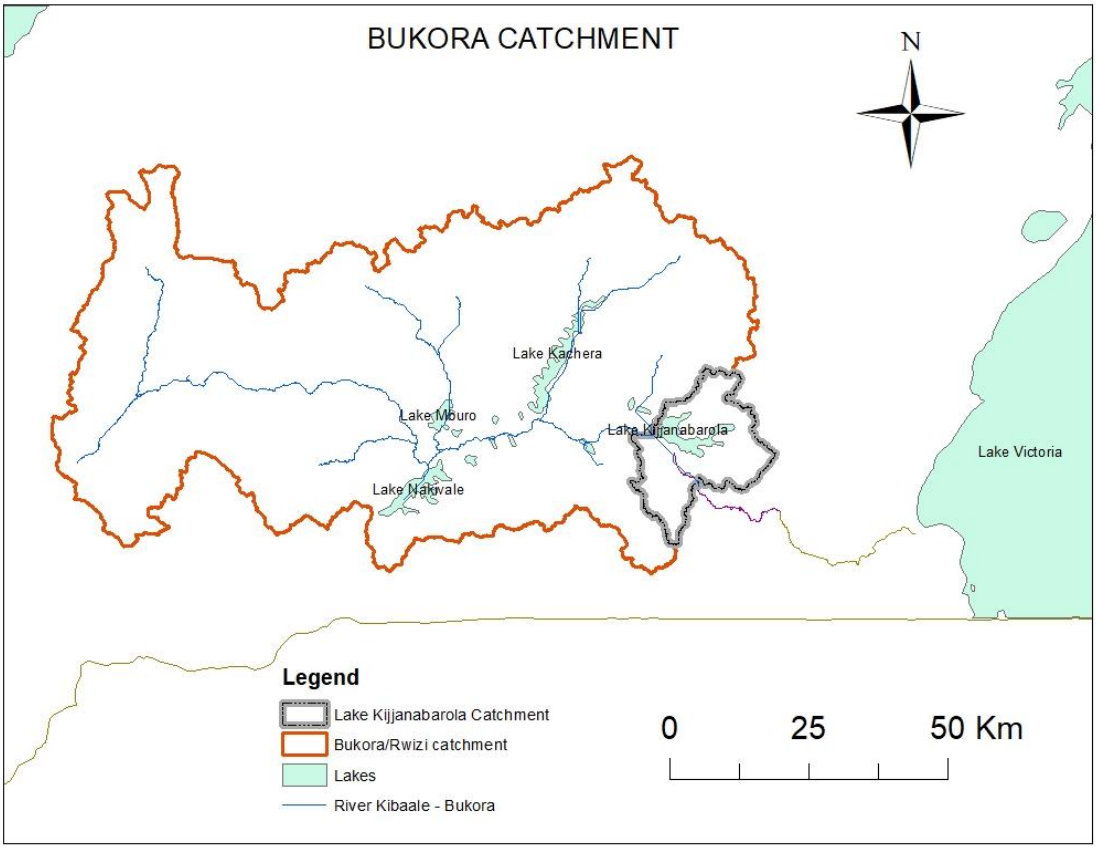


Figure 7-1: Bukora Catchment

River Kibale is gauged at the following coordinate 0:46: 0 S; 31:21: 0 E. This station is poorly gauged and there is a lot of missing data. **Figure 7-2** shows the hydrograph of the observed flows at the Kalungi gauging station for the period 1998 – 2005 which is the longest consistent set of data. The hydrograph shows that the flows are highly variable with maximum flows of up to 25m^3/s and low flows as low as 0.1 m^3/s recorded.

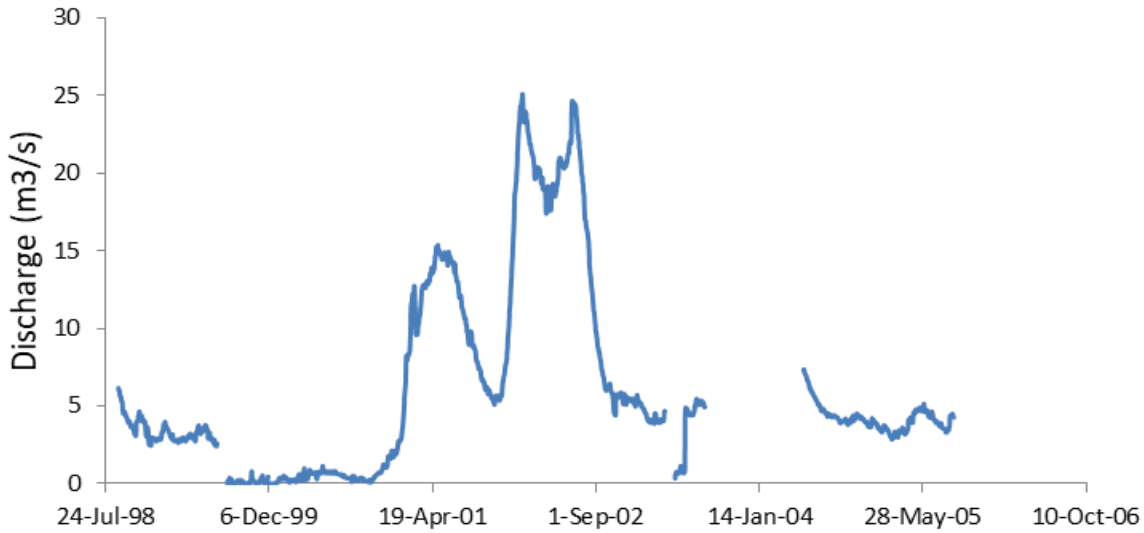


Figure 7-2: Daily Flow Data for River Kibaale from 1998 to 2005 (Missing Data indicated by Plots along the zero)

Flow duration curve analysis (FDC) has been carried out to determine the safe yield of the Kibale River at the gauging station. The FDC was developed based on daily discharges of River Kibaale observed at the Kalungi (lower site).

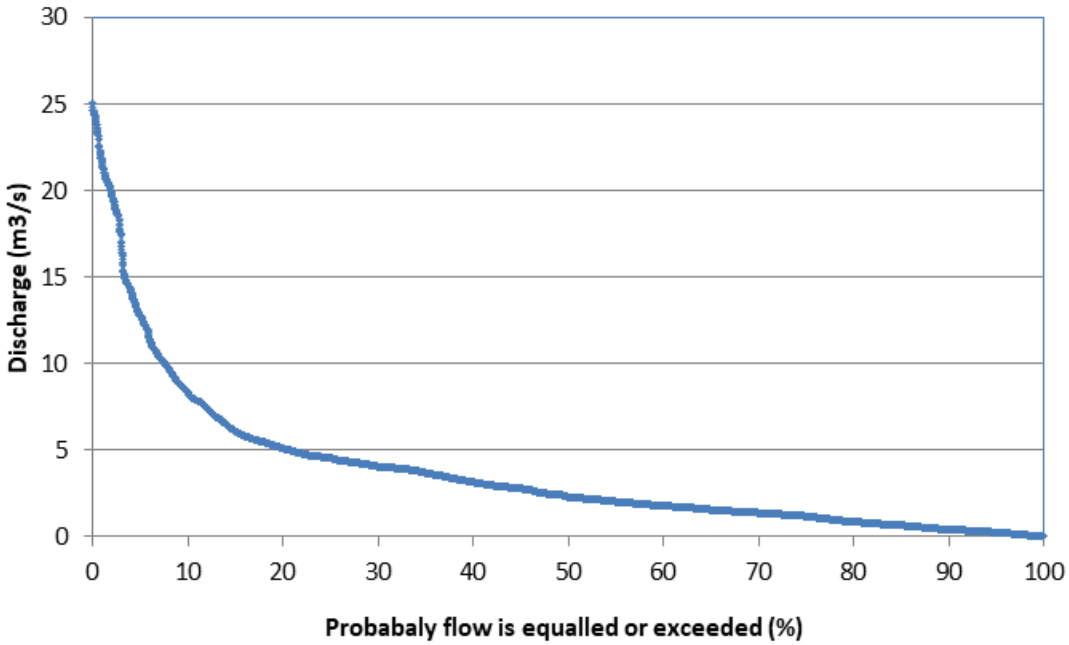


Figure 7-3: Flow Duration Curve for River Kibaale at the Gauging Station

It is, however, important to note that the river flow data obtained has a lot of missing data which is limitation in estimating low flows as the design will be based on few events. This limitation can be overcome through hydrological modelling. However, given that complexity of the catchment characterized with wetlands and lakes, rain-runoff process can be modelled using more complex distributed models to account for storages

in this system. For this feasibility study, it has been considered appropriate to analyses the flow statistic based on the data available.
The corresponding flow statistics from the flow duration statistics are summarized in **Table 7-2**. The safe yield of the river is based on 95% flow duration after subtracting the environment flow estimated to be 20%.

Table 7-2: Flow Duration Statistics for the Proposed Abstraction Point on River Kibaale

Flow statistic	**R. Kibaale**	
	m^3/s	**m^3/day**
Q_{mean} (long term average)	3.71	320,544
Q_{50} (Daily flow that is exceeded 50% of the time)	2.298	198,547
Q_{95} (daily flow that is exceeded 95% of the time)	0.248	21,427
Q_{95} after deducting environmental flow	**0.200**	17,280

Hence the safe yield of River Kibaale is estimated about 0.2 m^3/s. If this source is considered, a more precise estimation will be required through distributed hydrological modelling which accounts for storages and wetlands in the catchment.

7.2.2 Option 2: Lake Victoria

Lake Victoria is a fresh water lake, the biggest in Africa. It has a surface area of about 68,000 km^2 and a catchment area of 194,000km^2.

Figure 7-4: Lake Victoria and its Catchment Area

Regular measurements of Lake Victoria Levels have been recorded at Jinja pier and several other locations since 1912. **Figure 7-5** shows a plot of historical variations of the Lake Victoria water levels.

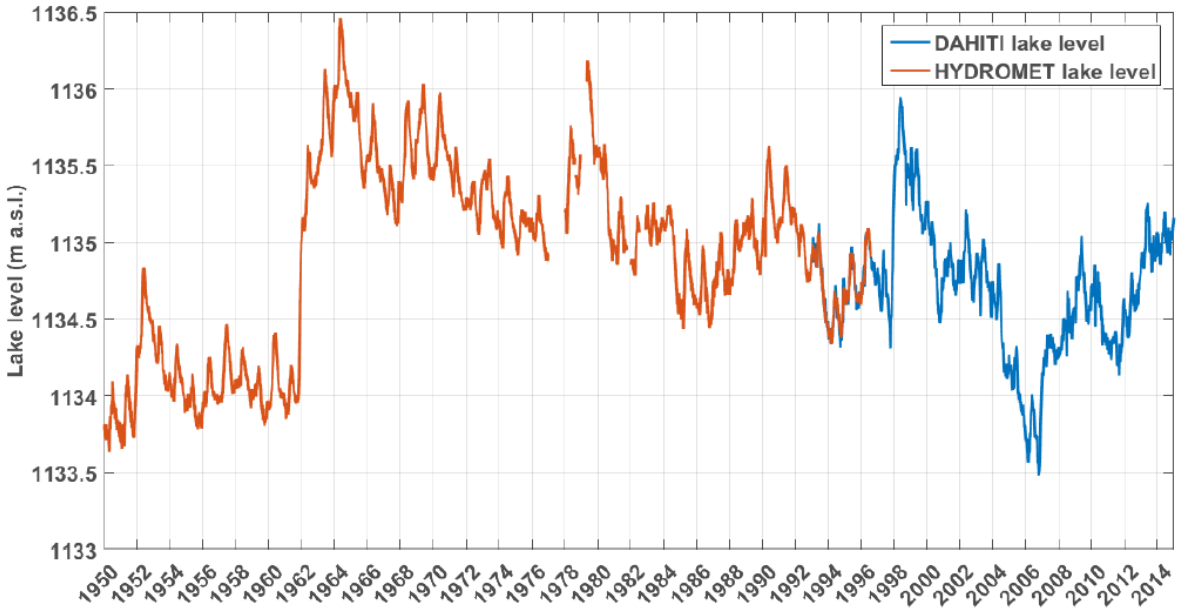


Figure 7-5: Lake Victoria Historical Levels (Vanderkelen et al., 2018)

Water balance

The main inputs to Lake Victoria are Precipitation and river inflows including Rivers Kagera (30%), Nzoia, Yala, Sondu and Awach. The main outflow is River Nile at Owen fall dams in Jinja where water releases are constrained to follow an agreed curve that is the best estimate of the rating curve at the lake outlet under natural conditions. Another outflow is Lake Evaporation. The river inflows and outflows have been gauged extensively since the 1960's and this has enabled several studies (e.g. Vanderkelen et. al., 2018, Yin and Nicholson, 1998 and Swenson and Wahr, 2009) on the Lake Water balance to be undertaken. **Figure 7-6** represents graphically the water balance of Lake Victoria based on these studies.

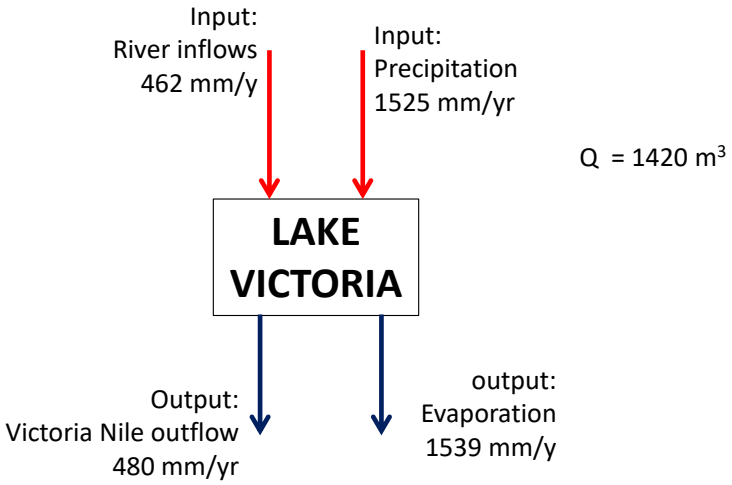


Figure 7-6: Lake Victoria Long Term Water Balance

Precipitation and Evaporation are the most important terms with 76% of the input and 77% of the output respectively. Inflow accounts for 24% of input and outflow 23% of the output. The average annual net change in Lake Storage is -32 mm. However, of recent, variations of up to 1 m have been observed leading to flooding of the Lake Shores in 2019 and 2020.

The lake variations are largely dependent on rainfall variations across the region. Hence the observed reduction in water levels (e.g. in 2006, **Figure 7-5**) is attributed to limited rains over the region in recent years. However, there is enough water available for abstraction. The intake structure however should cope with minimum and maximum water levels which are expected to vary between 1136.5 – 1133.5 masl.

7.2.3 Option 3: Lake Kijjanebalola

Lake Kijjanebalola is a fresh water Lake located in the central western part of the Rakai district. It is about 10 km from the Kifamba RGC. The Lake is shallow (5 meters deep) but fairly large with a surface area of 50 km^2 (BEC, 2014). The estimated capacity of the Lake is about 250,000,000 m^3.
It is important to assess the variability of the lake levels in order predict whether there may be water shortages which can affect water supply. For this, a water balance analysis of the Lake is required. Here, changes in the water level of the lake are specified by the difference in the input and output sides of the water balance divided by the water surface area according to the continuity equation below:
dH = (Inputs – Outputs)/Area

The catchment area for Lake Kijjanebalola was delineated using a 30 m DEM and GIS tools (**Figure 7-8**). The catchment drains Bukora sub-catchment (or Ruizi catchment as called in Mbarara and Ntungamo). The river system starts as River Rwizi in the upper parts of the catchment up to Lake Mburo. The river name then changes to Kibaale River which drains Lake Mburo, Lake Kachera and Lake Kijjanebalola.
For the water balance, the catchment area of the Lake has been considered up to the Lake inflow. Hence the components of the water balance of the lake are illustrated in **Figure 7-7** below: The catchment area was determined as 401.84 km^2.

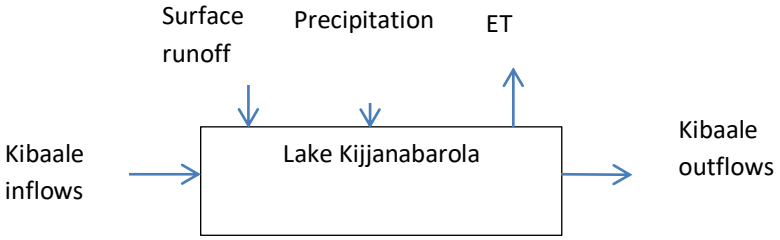


Figure 7-7: Components of Water Balance for Lake Kijjanebolola

7.2.3.1 Catchment characteristics

Elevation varies from 1221 to 1531 giving a head difference of about 310m. The slopes are steep with an average slope of 13.5% and a maximum of 84%.
The land use in the catchment is dominated by subsistence farmland (56.4%), grasslands (25.8%) and open water (10.1%). Other land uses include bush (3.5%), wetlands (2.6%), and built-up areas (0.6%).
The soils in the catchment are dominated by reddish brown clay loam (42%) and humose loams over rock rubble (30%) (**Figure 7-9**). Other soils types include sandy loams and peat and clays (2%).
The Geology of the watershed was characterized from the new Geological Map of Uganda (2014). The underlying rocks are predominantly of the preCambrian era. They consist of metamorphosed younger rocks comprising of slates, quartzite and conglomerate of the Kagera-Buhjewu Supergroup.

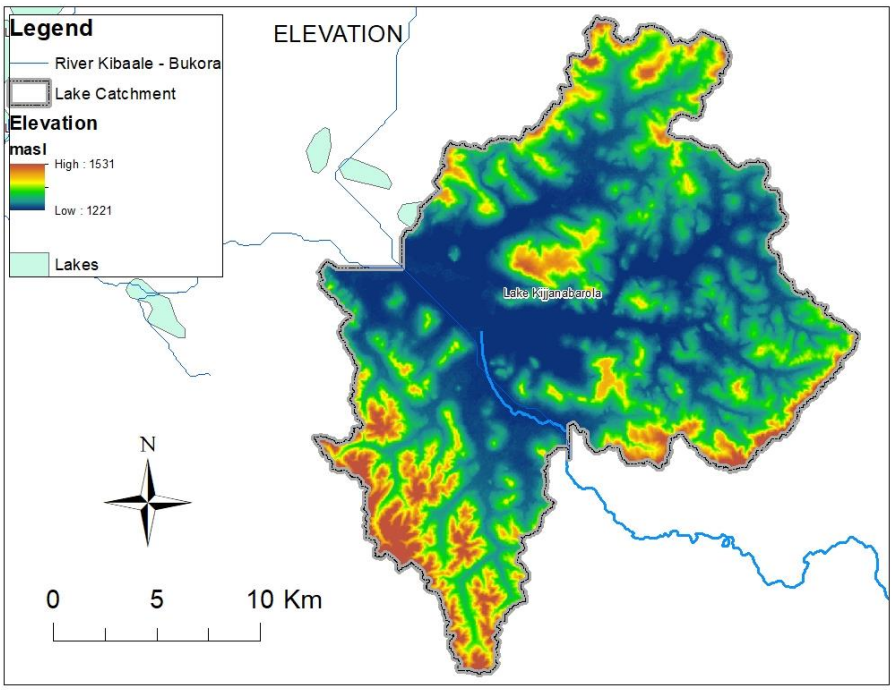


Figure 7-8: Elevation Map of Lake Kijjanebalola Catchment

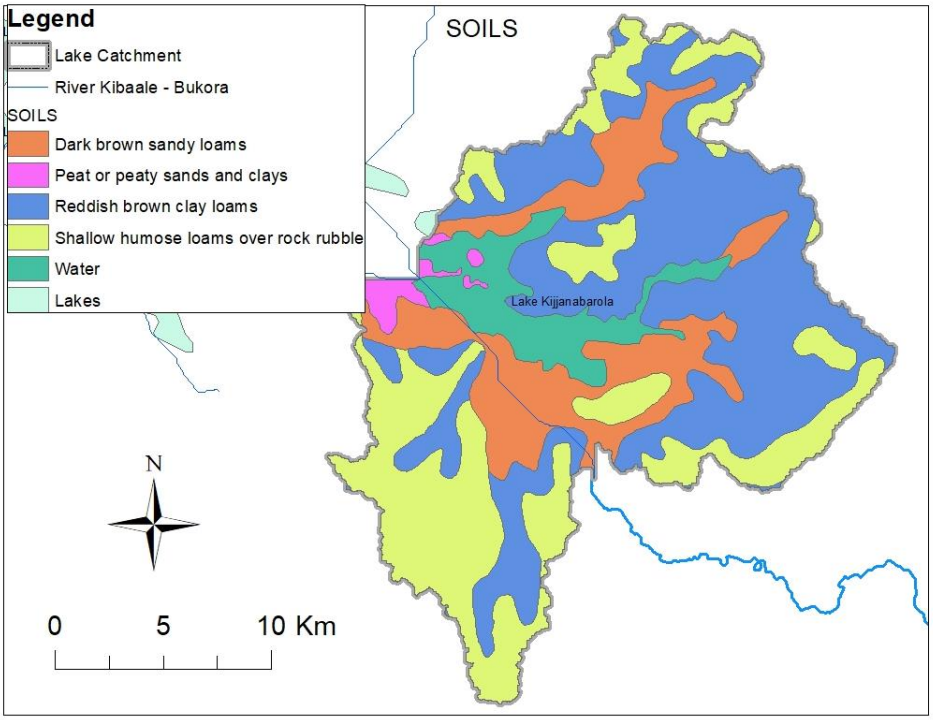


Figure 7-9: Soils in Lake Kijjanebalola

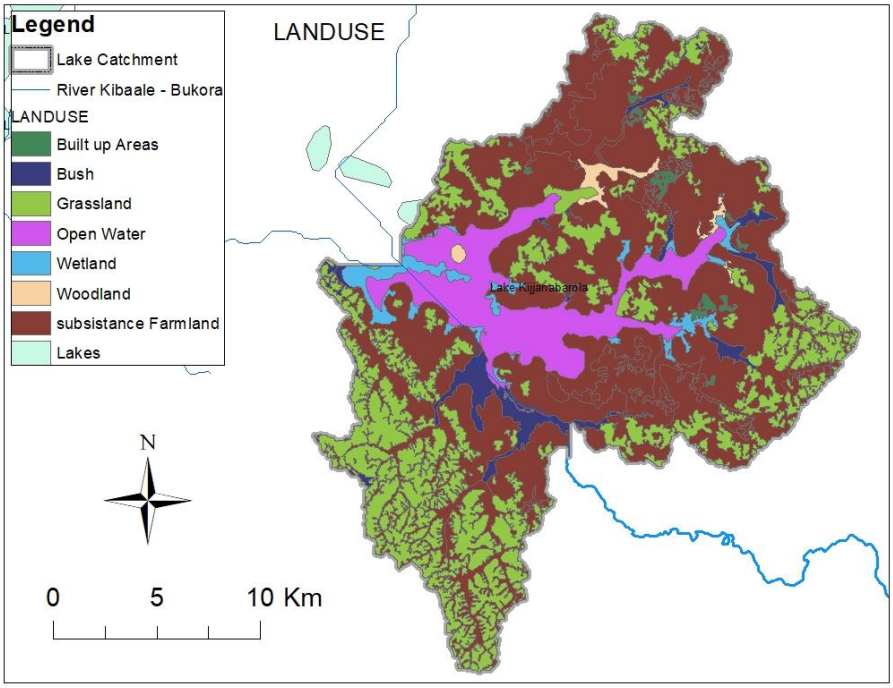


Figure 7-10: Land Use Map of Lake Kijjanebalola Catchment

7.2.3.2 Water Balance Analysis of Lake Kijjanebalola

Lake Kijjanebalola is recharged by direct precipitation, surface runoff, groundwater and Kibaale River. The catchment area of the Lake about 2.1 km² and characterised by subsistence farmland and black loam sandy soils. The main outlet of the Lake is River Kibaale, evapotranspiration and groundwater discharge. The depth is estimated to be 5 m and surface area is about 50 m² based on previous studies.
Quantification of the water balance of the hydrologic system of a lake or watershed requires defining the inflow and outflow components of the hydrologic cycle. Precipitation, stream inflow and runoff from the catchment provide the main input to the lake. Water is then lost by evaporation and infiltration and deep recharge.
It is assumed here that the losses due to seepage are negligible. The net groundwater flux has also been assumed to be negligible.
Hence, the main components of the water balance have been estimated as:
The water balance equation is given by:
$dh = P - E - (Qin + R - Qout)/AL$
Where:
P= precipitation on the lake
Qin = Inflow through rivers and streams
R = Surface runoff into the lake
Qout = Lake outflow
E = Lake evaporation
AL = Area of the lake

Water balance modelling was done on a monthly basis. Usually, the water balance of the lake is used to model the lake level fluctuations.
The individual components of the water balance were estimated as below:

- Precipitation and evaporation data were estimated from the FAOCLIM (2005) agro-climatic database.
- Lake evaporation was estimated from the Penman method by multiplying the potential evapotranspiration by 0.8 (WMO, 1973, Farnsworth et al., 1982).
- The catchment inflow has been estimated using the Soil Conservation System (SCS) curve number method.

- The outflow through River Kibaale was estimated from the gauged data at Kibaale gauging station located just downstream of the lake.
- The inflow at the inlet of the Lake was estimated using the Kibaale gauged data using the drainage – area ratio as:

Inflow = gauged station discharge at Kibaale x Inflow basin area/gauged data area.

The Soil Conservation Service (SCS) curve number

The method estimates runoff depths from rainfall given an index (the curve number, CN) describing the runoff response characteristics. The general runoff equations are given as:

$$Q = \frac{(P - 0.2S)^2}{P + 0.8S} \quad \text{For P} > 0.2S$$

$$S = \frac{25400}{CN} - 254$$

Where Q is the direct runoff depth (mm), P is total rainfall depth (mm), I_a is the initial abstraction (mm), S is the potential maximum retention (mm) and CN is the Curve Number.

The Curve Number is dimensionless index indicating the runoff characteristics of the catchment based on land use, soil type and hydrologic condition. Curve numbers have been developed for various combinations of landuse and soil types and are documented for average or normal moisture conditions (SCS, 1972).

The average weighted curve number was estimated as 83.

The results of the estimated catchment runoff are summarized in **Table 7-3**.

Table 7-3: Estimated Monthly Catchment Runoff of Lake Kijjanebalola Catchment

Month	Rainfall Depth (mm)	Runoff depth (mm)
1	58.44	0.00
2	64.38	0.00
3	124.76	0.95
4	154.68	5.88
5	108.91	0.00
6	23.27	0.00
7	27.16	0.00
8	34.69	0.00
9	62.92	0.00
10	107.47	0.00
11	98.79	0.00
12	68.18	0.00
Total	**933.65**	**6.83**

A monthly water balance model was developed using an Excel spreadsheet and run for periods of data available for each component. The monthly values presented average values for that period. The model was calibrated using the recorded water levels on Lake Kijjanebalola as shown in **Table 7-4**. Observed water levels of the Lake were only available for the period 1958 – 1980

Table 7-4: Average Water Levels of Lake Kijjanebalola

Month	Water levels (m)		
	8:00:00 AM	16:00:00 PM	Average
Jan	1.230132	1.228607	1.22937
Feb	1.222894	1.221421	1.222158

Mar	1.231984	1.231177	1.231581
Apr	1.281537	1.28137	1.281454
May	1.344346	1.343944	1.344145
Jun	1.300274	1.297239	1.298757
Jul	1.204759	1.201148	1.202953
Aug	1.098498	1.096058	1.097278
Sep	1.075676	1.073704	1.07469
Oct	1.050831	1.049662	1.050246
Nov	1.078952	1.077568	1.07826
Dec	1.131214	1.130369	1.130791

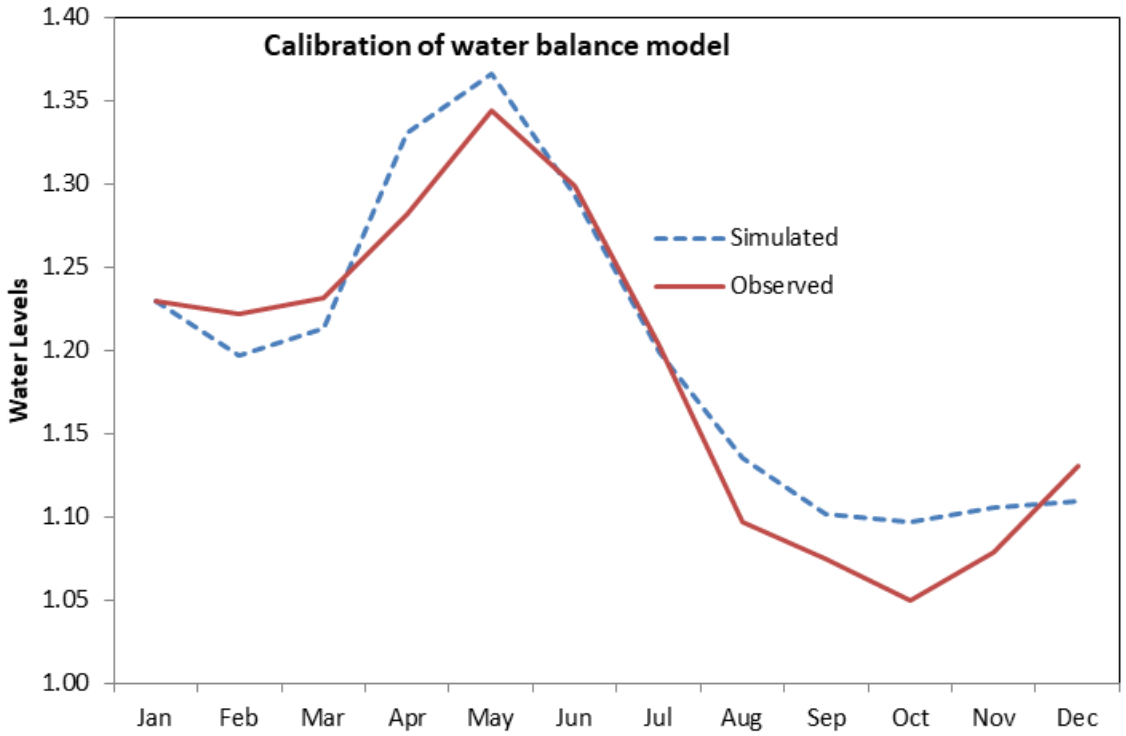


Figure 7-11: Comparison of observed and simulated Kijjanabarola lake levels

Table 7-5 shows the estimated water balance components of Lake Kijjanebalola.
The results show that the Lake inflow and the Lake outflow through Kibaale River are the most important terms with 68% of the input and 69% of the output respectively. This suggests that the water resources in Lake Kijjanebalola are highly dependent on the inflow from the Bukora/River Catchment and the outflow. In order to ensure sustainability of the Lake resources, the upstream catchment areas should be conserved with appropriate catchment protection mechanisms. A catchment protection plan for Rwizi catchment already exists and should provide measured to be followed to preserve the catchment.
Precipitation and runoff contributes a small percentage of the Lake water balance component. The average annual net change in Lake Storage is -156 mm.
The lake variations are therefore largely dependent on Kibaale river flows. On an annual basis, the water levels fluctuate between 1.10 – 1.37 m (i.e. by 270 mm). Hence for water supply design purposes, a minimum depth of the intake structure should be at least 0.3 m deep. The estimated lake capacity is about 250,000,000 m^3.

Table 7-5: Water Balance of Lake Kijjanebalola

Month	Lake Precipitation (mm)	Lake INFLOW (mm)	catchment RUNOFF (mm)	Lake Evaporation (mm)	Lake Outflow (mm)	Difference (mm)	Simulated Water level (m)	Measured water levels
Jan	61	169.4	0.0	85.44	180.9	-35.9	1.23	1.23
Feb	61	186.7	0.0	80.96	199.4	-32.6	1.20	1.22
Mar	113	195.6	6.7	89.76	208.8	16.6	1.21	1.23
Apr	173	217.4	41.4	82.32	232.1	117.3	1.33	1.28
May	131	240.9	0.0	79.2	257.3	35.5	1.37	1.34
Jun	22	239.6	0.0	78.8	255.9	-73.1	1.29	1.30
Jul	12	211.5	0.0	91.68	225.8	-94.0	1.20	1.20
Aug	30	146.7	0.0	83.2	156.6	-63.2	1.14	1.10
Sep	57	123.1	0.0	82.4	131.4	-33.8	1.10	1.07
Oct	88	103.9	0.0	86	111.0	-5.0	1.10	1.05
Nov	97	114.7	0.0	80.24	122.5	9.0	1.11	1.08
Dec	96	149.3	0.0	82.72	159.5	3.1	1.11	1.13
Annual	**941**	**2098.8**	**48.0**	**1002.7**	**2241.2**	**-156.1**		

7.2.3.3 Water Demand

Lake Kijjanebalola was identified as the water source for the Greater Rakai piped water supply system. A linear regression model was used to determine the maximum day demand 2045 (see **Table 7-6**).

Table 7-6: Maximum Day Demand for Greater Rakai Piped Water Supply System

Project Area	Maximum Day Demand (m^3/day)					
	2020	2025	2030	2035	2040	2045
Greater Rakai WSS	2,300.14	2,595.175	2,890.21	3,185.245	3,480.28	3,775.315
Source: Feasibility Study Report for Greater Rakai WSS 2018, M/S BEC Engineers; Project Estimates						

The maximum day demand for Kifamba RGC is 786.69 m^3/day. The total maximum day demand for Greater Rakai piped water supply system and Kifamba RGC is 4,562 m^3/day (0.05m^3/s)
The storage for Lake Kijjanebalola is 7.93 m^3/s. The total water demand represents only 0.67% of the storage for the lake. Hence the lake is a potential water source for the piped water supply systems.
The estimated water demand for Kifamba RGC is 787 m^3/day. Significant change in lake water levels can occur following water abstractions hence hindering its services for a wide variety of ecosystems. The water balance model was rerun with water abstractions and the results suggest that there will not be significant reduction with water levels in the lake (< 0.5%). Slight reductions would be expected in the period August to December (about 0.5%) but are not significant.

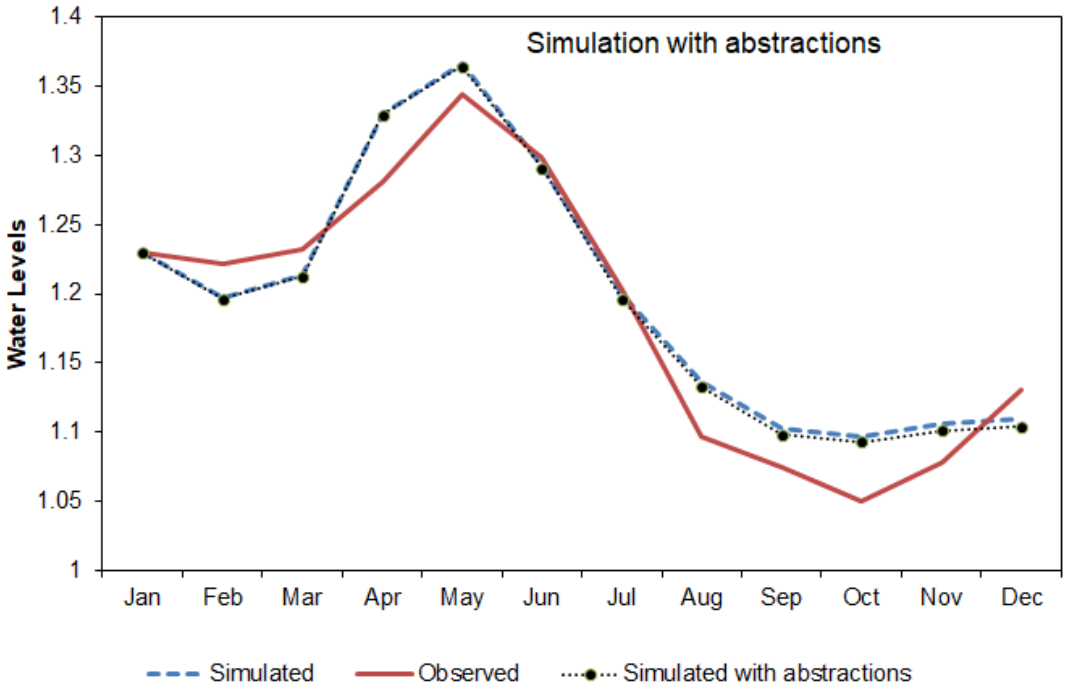


Figure 7-12: Lake Kijjanabarola water level modelling with abstractions

7.2.3.4 Water Quality

In terms of water quality, many people who use surface water sources in Rakai complain of its poor quality. River Kibaale is reported to be dirty and contaminated because it is shared with animals especially during the dry season. People who also live near the shores of Lake Kijjanebalola also complain that the water causes their bodies to itch, when they bath it. There has also been presence of weeds reported in the Lake Kijjanabarola and the Lake waters are reported not to have fish.

Based on this background, raw water quality samples were collected Lake Kijjanebalola and tested for drinking water parameters. Both onsite and laboratory measurements were undertaken. Laboratory water quality measurements were carried out at the Makerere University Public Health and Environmental Engineering Laboratory Water Quality. Samples were preserved in a cool box at 4 degrees using ice cubes. **Table 7-7** shows the results of the physical-chemical results from laboratory analysis. The certificate is attached in the **Appendix IV.**

Table 7-7: Raw Water Quality Laboratory Results for Lake Kijjanebalola

		Drinking water standards	
Parameter	**Lake Kijjanebalola**	**WHO**	**National (EAS 12: 2014)**
pH	7.65	-	5.5-9.5
Electrical conductivity (µS/cm)	**454**	-	2500
Apparent colour (PtCo)	330	-	
Total dissolved solids (mg/l)	372	1000	1500
Turbidity (FAU)	**49**	5	25
Total Alkalinity (mg/L)	150	-	
Bicarbonates (mg/L)	0	-	
Ammonia as N (mg/L)	nd	-	0.5
Nitrates (mg/L)	12.8	50	45
Phosphates as P (mg/L)	0.12	-	-
Sulphates (mg/L)	21.3	250	400
Chlorides (mg/L)	15.2	250	250
Fluoride (mg/L)	0.7	1.5	1.5

Total iron (mg/L)	0.03	0.3	0.3
Manganese (mg/L)	0.23	0.4	
Calcium (mg/L)	31.1	100-300	150
Magnesium (mg/L)	16.8	100 -300	100
Sodium (mg/L)	32	200	200
Potassium (mg/L)	9.7	-	
BOD_5 (mg/L)	57	50	
Feacal Coliforms (cfu/100ml)	770	0	50
E.Coli (cfu/100ml)	485	0	0
Source: Makerere University Public Health and Environmental Engineering laboratory			

All water quality parameters from Lake Kijjanebalora (except turbidity, faecal coliform and E.Coli) comply with WHO drinking water standards. Hence, there are no health risks envisaged with regard to these parameters. The turbidity is however high and likely due to presence of organic material given that the BOD levels were high. The water represents fresh water with pH in the range of 6.5 – 8.5. The levels of BOD (> 50 mg/l) and bacteria (up to 500 cfu/100ml) indicate that the water is polluted likely from household wastewater and therefore requires treatment prior to consumption. The treatment should focus on removal of organics and disinfection. The chemical quality is generally fine but the high conductivity levels (454 μS/cm) and the relative high levels of cations particularly Ca and Mg suggest that the water in the lake are prone to high levels of mineralization. During the dry season when the water levels reduce, it is possible for the water to become saline.

Lined Ventilated Improved Pit latrines will be constructed for the deserving beneficiaries to improve the sanitation situation in the supply area. A communal Lined VIP latrine with Community Management Committee will be constructed and the pit latrines around demolished.

7.2.4 Conclusion

The safe yield (Q95) of River Kibaale was estimated to be 17,280 m^3/day. However, field visits and analyses carried out revealed that the river water is dirty. It is often shared by animals and its quality is characterized by a brownish colour and is smelly. During the dry season (months of August, September and October), the water level in the stream goes down corresponding to the low rainfall (< 40 mm per month) received in this period. Other nearby streams are reported to dry up. Therefore, in terms of quantity and quality, Kibaale stream is not a viable source of water.

Lake Victoria is another option but it is located far away from the Rural growth centre (about 30 Km).

Existing groundwater data shows that the groundwater yields in Kibaale TC and Kifamba RGC are good and range between 0.5 – 8.0 m3 /hr. The aquifer present is the fractured rock aquifers accessible at depths ranging from 50 – 60 m. The geology is, however, characterised by mudstones, slates and phyllites which make bad aquifers in terms of quality and quantity. Permeability in these rocks can be low meaning that they are poorly recharged and groundwater can only be accessed deep in the fractured rocks. In terms of groundwater quality, the water is highly mineralised with high levels of Fe and Mn making the water not suitable for consumption from the aesthetic point of view. High levels of minerals in groundwater also corrode water supply pipes due to presence of iron bacteria.

The most viable surface water source for the RGC was found to be Lake Kijjanebalola. The lake is about 10 km from Kifamba RGC. It has a capacity is about 250 Mm^3 with an average depth of 5m. The Lake resources are heavily dependent on Kibaale river flows which drains Bukora/Rwizi catchment. Hence, it is important that future water resources development take into account catchment protection measures in Rwizi catchment in order to ensure sustainability of the water resources. The Lake levels fluctuate through a depth of about 300 mm on an annual basis. This implies intake works should be at least 300 mm deep. The lake water quality is generally in compliance with most drinking water standard except the high levels of biological and bacteriological contamination likely originating from the poor sanitation in the area. The Lake waters are prone to high mineralization due to the geology of the area.

The selected option for the Kibaale RGC piped water supply system is utilization of Lake Kijjanebalola as the water source for the piped water supply systems for Kibaale and Kifamba RGCs.

7.3 Action Option – Considered

This option means that MWE through Water and Sanitation Development Facility – South West proceeds with the construction and operation of the water supply and sanitation system in Kibaale and Kifamba RGCs in Rakai district. This option will enable the entity to achieve its objectives of improving the socio-economic situation for people living in the Rural Growth Centres through provision of safe, adequate, reliable and accessible water supply, promotion of sanitation facilities, and improve general health conditions through the reduction of water borne diseases in the targeted small towns and RGCs.

The environmental team of the project made a comprehensive environmental impact study for the proposed project area. Details of the study are the subject of this ESIS. The study has found no significant issues (environmental, economic or social) to stop the implementation of the project. Mitigation measures for the identified negative impacts of this alternative have been thoroughly discussed throughout this report. If they are implemented, the project will not have any adverse impacts to the environment.

8 POTENTIAL SOCIAL-ENVIRONMENTAL IMPACTS

This section of the report presents an assessment of the potential impacts. Enhancement measures for the positive impacts have been presented while mitigation measures are presented to avoid, minimize/reduce, or offset the identified adverse impacts.

8.1 Positive Impacts

8.1.1 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, 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.

8.1.2 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.

8.1.3 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.

8.1.4 Improved access to water

The proposed water supply system is to serve a total population of 52,403 in Kibaale and Kifamba RGCs by the ultimate year 2045. In Kibaale alone, a total of 7 parishes and 75 villages will be served whereas in Kifamba RGC, all the four parishes in the sub county will be supplied by the piped water supply system. 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 – South West 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 – South West and Rakai district will ensure that the system is well operated and maintained

8.1.5 Clean water supply

To ensure the water that reaches the consumer is portable, 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 dieses 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

8.1.6 Improved sanitation and hygiene

Clean and safe water supply will play a major role in improving the sanitation and hygiene of the community. Hygiene practises 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 practises such as hand washing and personal hygiene at home

8.1.7 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, Rakai 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.

8.1.8 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

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

8.2 Negative Impacts

8.2.1 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

i. Adequate soap and water shall be provided at the site to ensure workers and visitors wash their hands frequently.
ii. 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
iii. The contractor shall provide washable masks to all workers and visitors and enforce always wearing of the same while at the worksites
iv. Screening of all workers and visitors for signs of COVID-19 such as temperature shall be done before they access any work site.

v. The contractor shall adhere to all measures and guidance issued by the Ministry of Health and presidential directives

Residual Impact:

Impact evaluation	Intensity	Sensitivity	Significance
Before mitigation	High	High	Major 16
Residual Impact	Low	High	Moderate 8

8.2.2 Impact on Surface Waters

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.

Impact evaluation: The extent of the pollution will be local since the system source is Lake Kijanebalola.
Impact Receptors: Lake Kijanebalola
Impact significance: The likelihood of the impact occurring is ***medium.*** The duration of the impact will generally be short-term during construction therefore the intensity of the impact is assessed as ***low*** considering the dilution impact to the Lake. This results in ***moderate*** impact significance.

Mitigation Strategies

i. The contractor should ensure that all vehicle and equipment are regularly maintained to avoid oil or fuel leakages
ii. 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)
iii. Washing of project vehicles and equipment in water courses should be prohibited
iv. Drainage / water channels should to be arranged throughout the perimeter of potentially polluting sites of wastewater
v. The contractor should ensure proper management of generated waste in accordance with the National Environment (Waste management) Regulations, 2020.
vi. Ensure proper decommissioning and rehabilitation of all sites that potentially contain polluting material
vii. In case of spillage of oil/lubricants, spilled product should be localized / cleaned
viii. The contractor should conduct regular training and sensitization of workers on pollution prevention

Residual Impact

Impact evaluation	Intensity	Sensitivity	Significance
Before mitigation	Low	Medium	Moderate 6
Residual Impact	V. Low	Low	Minor 2

8.2.3 Air Pollution

Construction activities more often result in air pollution generating dust particles of varying sizes from visible to invisible. The smaller the particle, the longer it stays in the air and the further it can travel. Fine dust particles are more likely to penetrate deeply into the lungs while ultrafine particles can be absorbed directly into the blood stream. However, the possible harm the dust may cause to health is mostly determined by the amount of dust present in the air and how long one is exposed, therefore this impact is localised in spatial extent and short term since its occurrence will be limited to the construction phase.

Source od dust emissions on the project will include excavations, transportation, storage and usage of bulk construction materials, movement of equipment and vehicles, and others.

Source of gaseous emission will include vehicle engines, loading during the work and during idle mode. In process of stationary diesel-generator operation, harmful (pollutants) substances are allotted in the exhaust gasses into the air. Due to the temporary nature of construction, dust emissions are not anticipated to have a long-term impact on local air quality. Dust nuisance will decline as stripped areas of land re-vegetate.

Impact Receptor; The community and construction contractor.
Impact Significance: The likelihood of occurrence of this impact is ***low*** since the trenches will be dug in a very short period and traffic hauling materials and equipment to the project site is anticipated to be too low. The Intensity is rated ***Very low,*** since the impact will be short-term, localised in spatial extent, limited to the construction phase and in a particular section of the project site.the significance is therefore ***minor.***

Mitigation Measure

i. The contractor should ensure that all vehicles transporting dust generating material are covered with tarpaulins.
ii. In the storage areas for such materials from which dust is expected to be easily spread, a special pavement or watering is required in order to prevent windblown dust from spreading
iii. Generators and other gaseous emitting equipment should be stored away from sensitive receptors
iv. All workers in sections where they are exposed to dust or gaseous emissions should be provided with appropriate protection equipment (Respirators)
v. The contractor's machinery will be regularly serviced to optimum working conditions to minimize potential emissions
vi. Backfill trenches as soon as possible after laying pipes to avoid dust generation from the excavated heaped soils

Residual Impact

Impact evaluation	Intensity	Sensitivity	Significance
Before mitigation	V. Low	Low	Minor 2
Residual Impact	V. Low	V. Low	Negligible

8.2.4 Noise Pollution

Noise generation will mainly occur during the construction phase. The use of heavy equipment including excavators, and dump trucks during site preparation and transportation of materials will generate noise and vibrations. The pumping system during operation will also generate sounds alien to the area which could be a nuisance to the operators and residents around the facility.

Impact Evaluation: The project site is currently experiencing an average of 63 - 55 dB (A). Noise at construction sites can rise up to 75-90 dB (A) during major construction works. Noise from construction activities may be a nuisance to the neighbour schools and residents; however, they will be temporary and localized. The impact will be short term, lasting only during construction.

***Receptors*:** Community, neighbouring schools and construction workers.
Impact Significance: Sensitivity of the impact is rated **low** given the fact that anticipated noise generation from the construction activities will be less than 75 dB and one or two trucks may haulage material and equipment to the proposed construction site at interval delivery. The Intensity is rated ***low*** since construction activities will be conducted only during day time, in the vicinity of an area currently exposed to 63 dB, hence less sensitive to the residents. However, the sound may distract students during lessons hence the Significance of the Impact is ***Minor***

Mitigation Measures

i. The contractor on site will be made aware of, and adhere to, the regulatory noise limits for a construction site in a commercial area (75 dBA) and that in a residential area (60 dBA) as provided for by the National Environment (Noise Standards & Control) Regulations, 2003;
ii. Construction activities will be limited to daytime;
iii. Regular care and maintenance of vehicles and equipment will be undertaken to ensure they run smoothly so as to minimize emissions of noise;
iv. Project machines will be turned off when not in use.

Residual Impact

Impact evaluation	Intensity	Sensitivity	Significance
Before mitigation	Low	Low	Minor 4
Residual Impact	V. Low	V. Low	Negligible

8.2.5 Vegetation loss

There will be loss of vegetation during site clearance for establishment of system support facilities such as reservoirs and the water treatment plant, as well as during excavations for laying transmission and distribution pipes.

Impact Evaluation: The vegetation to be lost as a result of digging trenches will be minimal and is not of significant conservation nature. After construction, re-vegetation will be encouraged by restoring the disturbed sites with topsoil that was stripped off during vegetation clearance.
Impact Receptor: vegetation at the designated site in the proposed site
Impact significance: The likelihood of the impact occurring is **high** since vegetation clearance is inevitable in digging trenches. However, the identified grass shrubs are not on the ecological red list. Impact Intensity is rated **very low** considering that clearance will be limited to the extent of the required trench width. The significance is rated **minor**.

Mitigation measures:

i. Restrict equipment to the Project footprint and designated areas; Movement of workers and equipment through the routes provided for access to the work site shall be performed in a manner to prevent damage to crops or property
ii. A restoration plan for the opened-up areas will be drawn and followed to ensure re-establishment of the original vegetation.

Residual Impact

Impact evaluation	Intensity	Sensitivity	Significance
Before mitigation	V. Low	High	Minor 4
Residual Impact	V. Low	Low	Minor 2

8.2.6 Occupational Health and Safety (Accidents)

During the construction phase, potential sources of occupational hazards will include operation of construction equipment and vehicles that will expose workers to accidents. Excavation and working in trenches may pose risks of falls into the trenches or deep waters for those that will be working at the intake

site at Lake Kijanebalola. Occupational risks could be exacerbated by neglect of safety equipment, precautions and procedures.

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.

Impact evaluation: Accidents could cause considerable damage, financial loss and harm to human life. While largely reversible, some impacts such as loss of human life and body injury are irreversible.
Impact significance: The receptor sensitivity is considered ***medium*** given that although such impacts may be irreversible once they occur; the workers have done similar work and have knowledge on how to avoid such incidences. The impact intensity is ***low*** since the district will procure a qualified contractor who is aware of OHS measures and has vast experience. Nevertheless, this gives rise to an impact of ***moderate*** significance.

Mitigation measures

i. 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
ii. 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.
iii. Construction sites; especially water treatment plant and reservoir sites shall be hoarded off to prevent access by unauthorized person
iv. The contractor shall recruit a qualified Health and Safety Officer to oversee OHS matters on a daily basis.
v. Clear communication line will be set between workers and operators/ drivers of heavy equipment.
vi. 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.
vii. Appropriate signage will be used to warn staff and/ or visitors that are not involved in construction and operation activities in risky places.
viii. Strict instructions will be given to drivers and operators of equipment/ machinery

Residual Impact:

Impact evaluation	Intensity	Sensitivity	Significance
Before mitigation	Medium	Medium	Moderate 6
Residual Impact	Low	Low	Minor 4

8.2.7 Ill behaviour by 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.

Impact Evaluation: Duration of the impact will be short-term lasting the construction period.
Impact Receptor: Local communities within and outside the project area, school students, and workers
Impact significance: 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 hence the significance is ***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 Subcounty 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 operationalised

Residual Impact:

Impact evaluation	Intensity	Sensitivity	Significance
Before mitigation	Medium	Medium	Moderate 6
Residual Impact	Low	Low	Minor 4

8.2.8 Poor management of generated waste

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.
Impact receptors: Construction workers, water courses, and the neighbouring local community.
Impact significance: The likelihood of occurrence of this impact is **medium** given that some of these waste materials especially the plastic/polythene is not biodegradable may cause long term injurious effects to the environment. The impact Intensity is rated **medium,** because the impact will be a short-term impact, localised in spatial extent since its occurrence will be limited to the construction phase in a particular section of the project extent hence the significance of the impact before Mitigation is rated **moderate.**

Mitigation Measures

i. The contractor shall develop and implement a waste management plan that will entail measures for handling waste, including, type of waste generated, storage and disposal, waste inventory and record keeping, training and awareness among others.
ii. The contractor shall identify and engage an approved waste transportation company, in consultation with the District Environment Officer, who will undertake transportation of waste from sources to a disposal site
iii. All excavated material will be handled in a manner that minimizes the release of fugitive dust (especially during hot and dry weather) and where possible the movement of material will be kept to a minimum.
iv. The contractor shall ensure that all workers handling waste are provided with the appropriate PPE especially gloves, boots and nose masks.
v. Waste transportation vehicles will be covered to avoid spillage or waste getting blown off during haulage
vi. Waste minimization will be emphasized and implemented throughout this stage of the project

Residual Impact:

Impact evaluation	Intensity	Sensitivity	Significance
Before mitigation	Medium	Medium	Moderate 6
Residual Impact	V. Low	Low	Minor 2

8.2.9 Insecurity and increased crime

Construction activities will attract a number of people into the project area. These people may come with various habits including theft which will likely increase insecurity in the area, and if the thefts involve construction material and equipment, the quality of works will be affected and delays may ensue.

Impact Receptors: Local community and the project works.
Impact significance: The sensitivity is rated medium because the occurrence of security threats may pose a problem and risk to both the works and the workers and will have a **moderate** impact on the project as this can delay construction works or even hinder project implementation.

Mitigation Measures

i. "No Trespassing" signs will be prominently displayed on fencing or the perimeter of the sites. Such signs will discourage unauthorized intrusion onto the job site and if correctly worded aids in the prosecution of apprehended trespassers.
ii. The contractor shall involve LC1s and police in vetting of applicants during recruitment of workers who should all present national IDs for easy identification. This will help screen out persons with criminal records
iii. Ensure adequate lighting at the site at night at construction sites
iv. Issue out Identifications for employees
v. The contractor shall hire security guards from a registered company that has records of each guard, to protect both the contractor and the project sites.
vi. The contractor shall institute disciplinary measures on errant workers based on the project structures established (Disciplinary Committee) and including specific clauses on discipline in the all-workers' contracts.
vii. The contractor shall collaborate with the local security (police stations and posts) in the area to ensure safety of project materials

Residual Impact:

Impact evaluation	Intensity	Sensitivity	Significance
Before mitigation	Medium	Medium	Moderate 6
Residual Impact	V. Low	Low	Minor 2

8.2.10 Impact on Public safety

There is a likelihood of accidents occurring during construction especially when school children, who have little awareness of construction site safety and traffic safety, come near to construction sites. Other community health and safety hazards include trenches, noise and dust. Schools surrounding the proposed project are particularly at risk if no control measures are instituted or weak compliance.

Impact Evaluation: Curious pupils and locals may hang around the sites and dug trenches causing a safety risk like accidents due to falls in open trenches. These impacts are largely reversible upon completion of the construction phase although some may last a lifetime if the incident is fatal.
Impact Receptors: Pupils, animals and locals
Impact Significance: Given that the project will involve construction of support facilities such as water treatment plant, reservoirs and pipe trenches, the likelihood of occurrence of this impact is ***medium***, the intensity is however rated ***medium*** because in case of occurrence of these hazards, there may be legal implication causing a delay in operation hence causing a lagging in the project time lines. Overall significance is therefore ***moderate*** if not properly managed leading to minor and major wounds or fatalities.

Mitigation Measures

i. Enforce restrictions on unnecessary entry into the construction working area
ii. Hoarding off the sites will be mandatory
iii. Conduct safety awareness campaigns in schools about the risks of students coming close to the construction site;
iv. Safe vehicle speed limits will be instituted and enforced at site including site vehicle manoeuvres
v. Put warning signs in areas and on equipment considered dangerous;
vi. Backfilling the trenches immediately after laying pipes
vii. Sensitization of project drivers on speed control

Residual Impact:

Impact evaluation	Intensity	Sensitivity	Significance
Before mitigation	Medium	Medium	Moderate 6
Residual Impact	V. Low	Low	Minor 2

8.2.11 Increase in Gender inequalities including Gender Based Violence and infringement on the rights of women and girls at the work place and in communities

During construction of the water supply and sanitation system, gender inequalities and infringement on women rights may manifest through the following ways;

a) Engagement in extra marital affairs by men as a result of accumulating disposable income from the project. The extra marital affairs often involve both married and un-married male and females and sometimes young females below the age of consent and may lead to high level of family conflict, family break-ups and physical violence among others
b) Immorality could also result especially with the young girls of the area in efforts to gain favour for employment opportunities, this can result into spread of sexually transmitted diseases such as HIV/AIDS and other sexually related diseases.
c) Female project workers may face inconveniences if the contractor does not provide enough gender sensitive sanitary facilities that allow for privacy
d) Since jobs at construction sites are often perceived as "masculine", women may be denied opportunities even for jobs that they can ably do.
e) There is likelihood of sexual harassment especially from the male workers on the female workers or young girls and women staying in the vicinity of the construction sites.
f) Women might be lured into sexual relationship by contractor's workers since they will have more money than the ordinary men in the villages

Receptors; Women and girls
Impact severity: Duration of the impact will be short term lasting construction phase; however, Impact sensitivity is high since consequences of family breakages, sexual assault and sexually transmitted diseases can lead to long term effects, resulting in an overall significance level of major.

Mitigation measures

i. The contractor will develop and implement a Code of Conduct that will prohibit use of abusive and obscene language and prohibit sexual relations with the local communities especially married couple to avoid family break ups.
ii. The contractor will develop and implement a sexual harassment policy containing reporting procedures in case of any incident and penalties to the culprits. The contents of the policy will be disseminated to all workers.
iii. Jobs will be equitably distributed to both women and men as long as one has the qualification rather than basing on gender to allocate jobs. Employment records disaggregated by sex will be kept by contractor and easily accessed by the monitoring and supervising team.
iv. IEC material prohibiting violence and sexual harassment will be displayed in conspicuous places at all work sites including the camp

v. Workers will be sensitized on gender related issues, including rights and responsibilities. The Contractor will conduct gender sensitization to the work force on matters such as gender sensitive communication and on the gender sensitive conduct of workers towards women amongst others. During construction, gender sensitive messages should be adopted (examples include "Go Slow, Road Works in Progress" as opposed to "Men at Work"
vi. Workers will be sensitized to desist from any sexual relations with the local people to avoid cases of family break ups. Sensitization of employees and supervisors about sexual harassment will be undertaken at the beginning of the construction so as to avoid any possible sexual harassment. In addition, continuous reminders will be made from time to time.
vii. Recruitment of Social Development Officer/ Sociologist to ensure compliance with Gender and equity requirements under the contract
viii. Information dissemination about dangers of HIV/AIDS to the community will be done all throughout the period of the project. The messages will be passed on using the locally understood language for better understanding and the main means of information access to make them effective.
ix. The contractor shall ensure provision of both male and female condoms, preferably in the toilets.
x. The project will install gender sensitive facilities (toilets and bath shelters).
xi. Conduct community sensitizations on gender inclusiveness and equity

Residual Impact:

Impact evaluation	Intensity	Sensitivity	Significance
Before mitigation	High	High	Major
Residual Impact	Low	Medium	Moderate

8.2.12 Impact on Utilities

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.

Mitigation measures

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

Residual Impact:

Impact evaluation	Intensity	Sensitivity	Significance
Before mitigation	Medium	Medium	Moderate 6
Residual Impact	V. Low	Low	Minor 2

8.2.13 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.

Mitigation measures

i. All works should be carried out in accordance with an approved method statement.
ii. Temporary accesses should always be provided wherever an existing access is affected.

iii. Existing accesses should be restored after works, or convenient alternatives provided.
iv. Land Agreements should be secured or due compensations made especially where Reservoirs and the Water Treatment Plant are sited.

Residual Impact:

Impact evaluation	**Intensity**	**Sensitivity**	**Significance**
Before mitigation	Medium	Medium	Moderate 6
Residual Impact	V. Low	Low	Minor 2

Possible of land take and failure to compensate especially where the reservoirs or WTP will be sited

9 ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN (ESMMP)

This ESMMP matrix (subsection 9.5) 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.

9.1 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 EMP 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.

9.2 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

Reporting Procedures

The Project management should institute a team for monitoring of environment and social safeguards that will comprise but not limited to project recruited staff, the contractor, the independent supervisor, NEMA and MoGLSD that shall report to the steering committee of the Project.

Internal (HSE Department)
Any observation of an environmental problem, such as non-compliance or adverse impacts will be reported immediately to the HSE Manager. On a monthly basis, the HSE Manager will prepare a summary HSE report. Any non-compliance or safety issues will be highlighted with proposed corrective actions.

External (Governmental Agencies)
Periodic HSE report summarizing the status of the environment and social conditions in the project area will be submitted by the Contractor/Consultant to the Ministry of Water and Environment project implementation team, other relevant government departments and stakeholders and the local authorities. The reports will summarize the progress of works, issues encountered and their mitigation measures performed for the project. Any impacts that are beyond the regulatory limits will be specifically identified, together with an explanation of the circumstances involved and corrective measures to ensure compliance in the future.

9.3 Institutional Arrangements

To enhance the potential for integrating sustainability concerns in the proposed project development and activities, it is important to assign clear roles and responsibilities to dominant professionals, contractors and/or sub-contractors so as to ensure that the project ESMMP will be implemented effectively.

Construction Phase

NEMA or the district environmental officer who represent NEMA at the Local administration Level will act as NEMA's representative at site. Monitoring by NEMA is "third party monitoring" but this is its regulatory mandate according to Part XII of the National Environment Act 2019.

MWE through its Water and Sanitation Development Facility – South West will appoint from the technical members, the project focal person to oversee the day-to-day implementation of the ESMMP, and to whom the contractor will report to

Rakai District Engineer; inspect the project works as per the engineering specifications and verify all acquired permits.

Rakai District Water Officer (DWO); inspect the project on behalf of the district technical administration wing/ Chief Administrative officer (CAO). Monitor all technical water works.

Rakai District Environmental Officer (DEO); inspect the project sites on behalf of NEMA and monitor against approval project environmental conditions.

Rakai Senior Community Development Officer (SCDO); inspect the project sites on behalf of the district and monitor against approval project social conditions, review and approve community engagement minutes and reports, and assess the effectiveness of the project grievance system

Rakai District Labour Officer (DLO); inspect the project sites on behalf of MGLSD, monitor project site working environment in relation to OHS defined standards.

Community through its leaders will advise district and the contractor on matters of project community and their concerns.

Contractor will undertake construction activities and oversee the implementation of mitigation measures as specified in this document and any other actions that will be deemed necessary. The contractor can undertake internal auditing and monitoring to assess progress in implementation of the ESMMP.

9.4 Roles and Responsibilities in the ESMP Implementation

Ministry of Water and Environment will coordinate with NEMA on ensuring that environmental and social issues are addressed effectively throughout the lifecycle of the Project. Implementation of the different environmental issues is done through the relevant government institutions (Lead Agencies) within whose mandate the respective issues lie. The role of NEMA is to coordinate the input by all the different lead agencies and ensure compliance with the National Environmental Policy and Law. The monitoring team/ institutions shall be required to report on a quarterly basis. The reporting matrices shall include mong others accident and incidents, compliance with ESMPs, challenges and how to address the challenges

Implementation of the ESMP will involve multiple institutions at all levels as detailed out below in Table below.

Table 9-1: Roles and responsibilities in the ESMP Implementation

Ministries and Departments	Roles and responsibilities
The Ministry of Water and Environment (MWE)	The ministry of Water and Environment (MWE) has the overall mission: to promote and ensure the rational and sustainable utilization, development and effective management of water and environment resources for socio-economic development of the country. The ministry has three directorates; Directorate of Water Resources Management (DWRM, Directorate of Water Development (DWD) and Directorate of Environmental Affairs (DEA). MWE shall take lead on implementation of the project and shall ensure all recommendations contained in the mitigation plan are implemented
Ministry of Local Government-MoLG	The ministry of is mandated to carry out a number of responsibilities in the Local Government Act as follows; to inspect, monitor, and where necessary offer technical advice/assistance, support supervision and training to all Local Governments, to coordinate and advise Local Governments for purposes of harmonization and advocacy, to act a Liaison/Linkage Ministry with respect to other Central Government Ministries and Departments, Parastatals, Private Sector, Regional and International Organizations, and to research, analyze, develop and formulate national policies on all taxes, fees, levies, rates for Local Governments; Rakai DLG falls under this Ministry and will be supervised and supported by MoLG
STATUTORY AGENCIES	
National Environment Management Authority (NEMA)	NEMA retains its mandatory role of coordination, supervision and monitoring environmental issues. As for the implementation of the ESIA process, NEMA's role will involve coordinating the review of the ESIAs of the planned interventions with relevant line agencies. Other lead agencies that would participate in the review are the Ministry of Local Government. Specifically, the Environmental Monitoring and Compliance Department of NEMA is responsible for the review and approval of ESIAs, post-implementation audits and monitoring of approved projects. Although project sponsors have a responsibility for monitoring their own activities, NEMA carries out its own monitoring largely through District Environmental Officers and environmental inspectors at NEMA's head office/ Lead Agencies.
DIRECTORATE	
Directorate of Environmental Affairs (DEA)	The DEA is responsible for environmental policy, regulation, coordination, inspection, supervision and monitoring of the environment and natural resources as well as the restoration of degraded ecosystems and mitigating and adapting to climate change.

Directorate of Water Development (DWD)	The DWD is responsible for providing overall technical oversight for the planning, implementation and supervision of the delivery of urban and rural water and sanitation services across the country, including water for production. DWD is responsible for regulation of provision of water supply and sanitation and the provision of capacity development and other support services to Local Governments, Management Authority and other service providers.
Directorate of Water Resources Management (DWRM)	The DWRM is responsible for developing and maintaining national water laws, policies and regulations; managing, monitoring and regulation of water resources through issuing water use, abstraction and wastewater discharge permits; Integrated Water Resources Management (IWRM) activities; coordinating Uganda's participation in joint management of trans boundary waters resources and peaceful cooperation with Nile Basin riparian countries.
DISTRICT	
District Environmental Officer (DEO)	The functions of the District Environment Officer is amongst others, advice the district Environment committee on all matters relating to the environment amongst others.
District Environmental Committees	The functions of the District Environment Committees include: to act as a forum for community members to discuss and recommend environmental policies and bye laws to the District Council and advice the District Technical Planning Committee, the District Council and NEMA on environmental management issues in the district.
NGOs	The NGOs working in the sector are coordinated at the national level through UWASNET, Uganda Water and Sanitation NGO Network an umbrella organization, which has been largely funded by sector development partners through MWE
Water Management at District Level	They receive funding from the center in the form of a conditional grant and can also mobilize additional local resources for water and sanitation programs. Local Governments, in consultation with MWE appoint and manage Management Authority for urban piped water schemes that are outside the jurisdiction of NWSC.
COMMUNITY	
Beneficiary Communities	The Communities are responsible for demanding, planning, contributing contribution towards land, and supporting operation and maintenance of the piped water supply and sanitation facilities. A Water and Sanitation Committee (WSC) should ideally be established for each Rural Growth Center or Town Council or Water Supply Area. Being the primary beneficiaries of the project, the community will be made to participate fully in all aspects of the program including project identification, preparation, implementation, operation and maintenance.

In order to successfully implement the ESMP, it is important to ensure that target groups and stakeholders who play a role in implementing it are provided with the appropriate and continuous Environmental and Social Safeguards capacity development.
The key institutions/group of people whose capacity needs to be enhanced to effectively implement and monitor the ESMP of this project are:

- Beneficiary Communities: There is a need to carry out awareness trainings for the key community members on the safeguard's aspects of the project. Further, they need to be facilitated to enable them effectively monitor the ESMP implementation process.
- Staff of the respective District Local Governments: The staff at the district level needs to be trained on key aspects of the project. They also need to be facilitated to enable them effectively monitor the ESMP implementation process.

There is a need for the project to foster inter institutional monitoring of the implementation of the project's ESMP. An inter-institutional monitoring committee should be formed, trained and their activities facilitated. A capacity building plan should be developed after instituting an inter-institutional monitoring committee.

9.5 Contractor Environmental and Social Management Plans

The contractor shall develop and implement the following, among others, specific E&S management plans (at bidding and improved before commencement of any constriction activities.

Table 9-2: Contractor ESMP

No.	Management Plan	Description
1	Waste management plan	Construction projects are accompanied by generation of wastes that include both biodegradable and non-biodegradable wastes, which will require disposal in an appropriate and environmentally acceptable manner. The plan should be developed to guide the management of this waste, and should emphasise the principles of reduce, reuse, recycle and recover. The entire waste management process should be anchored on active separation of wastes at point of generation. The essence of waste segregation at source is to enable re-use, recycling and the choice for the most appropriate disposal technology should the first two fail. Separation of wastes at source further reduces chances of cross contamination of waste streams by hazardous wastes hence making it safer for both the waste management team and the receiving environment. The plan should clearly indicate the strategies to be employed at each stage of; generation, storage, collection, transportation and final disposal.
2	COVID19 Management Plan	It is likely that the project will be implemented during the COVID19 pandemic and therefore the contractor should document measures to ensure prevention, rapid detection and effective response to COVID19. The COVID19 management plan shall include the following, among others; i. Physical distancing requirements ii. Workplace hygiene requirements iii. Monitoring and identifying COVID-19 symptoms iv. Responsibilities v. Employee Training and Wellness
3	Stakeholders Communication and Management Plan	The aim of this plan shall be to guide the contractor in ensuring that adequate and timely information is provided to project affected people and all stakeholders, that proper mechanisms for information, consultation, and involvement is established, and that this process will enable opportunities for dialogue, two-way discussion and active public participation. It can be expected that good implementation of stakeholder engagement will contribute in positive acceptance of the project activities and avoid as much as possible annoyance/dissatisfaction of the affected people that could be caused by the project activities.

No.	Management Plan	Description
4	Occupational Health and Safety management Plan	This plan shall guide the contractor in ensuring a safe and secure work environment through careful identification and management of hazards. It seeks to facilitate and empower workers and managers at all levels to participate in the avoidance, minimization and complete eradication of accidents and diseases associated with unsafe and insecure work places. It further seeks to enhance worker productivity through appropriate training and provision of tools that enhance performance, reduce lost time through accidents and limit material and financial losses arising from inappropriate equipment's, workers, methods and complacent personnel.
5	Human Resource and Labour Force Management Plan	This plan should contain guidelines on the required minimum standards for the human resource management function and ensure organizational effectiveness. Among others, the plan should be developed with the purpose of protecting the health, safety and wellbeing of the workforce, whilst also working to promote equal opportunity and non-discrimination in the long run, within the context of meeting national requirements and standards, including local content.
6	Child Protection management Plan	The contractor shall have and implement a Child Protection policy that will state commitment of the contractor and his/her employees to upholding the rights of children including prohibition of the employment of children below the age of 18 in construction activities. The plan shall also emphasize the need to induct and disseminate the policy to subcontractors, suppliers, visitors and all monitoring agencies who shall commit to the Child Protection Policy.
7	Grievance management plan	The plan will govern how the contractors will receive grievances pertaining to project activities. It will capture grievances arising from actual project impacts, as well as issues which are simply perceived to be related to the project, irrespective of whether they derive directly from Contractor's activities.
8	HIV and other STIs Prevention and Management Plan	This plan shall include measures that will be implemented in order to ensure control of the spread of HIV/AIDS and Sexually Transmitted Infections (STI) between the workers and the local community. The contractor shall have in place an HIV/AIDS and STIs Policy in which he shall show commitment to the protection of the rights of employees living with HIV/AIDS (in close consultation with Uganda AIDS Commission), Prevention through information, education and training of both the workers and the community and free screening and counselling policies for STI and HIV/AIDS cases among project staff.
9	Decommissioning / Restoration Plan	This plan should be prepared to serve as a guide during the implementation process to allow disturbed sites to regain their ecological functionality, connectivity and stability in the ecosystem through re-vegetation using indigenous plant species, with a long-term goal of stimulating biodiversity recovery to ensure it blends with that of the surrounding landscape.
10	Chance Finds Management Plan	During the construction phase, especially excavations, chance finds of physical cultural resources may be encountered. These are usually of significant importance to the community and should thus be handled well. The chance finds management plan will therefore guide the contractor on the proper handling of these resources in case of an encounter.

No.	Management Plan	Description
11	Traffic Management Plan	This should be developed and implemented with an aim of helping protect road users and workers and keep traffic delays to a minimum through proper and clear signage. It should cover text-based signs, layout of signs at intersections and other typical locations, and detailed information on the design and sighting of signs necessary at sections of construction activities.
12	Gender management plan	This should be developed to guide the contractor in enhancing gender mainstreaming and strengthening gender equality during the implementation of the water supply and sanitation project. The plan will guide the contractor on how to achieve gender equality through the following; i. Equal job opportunities for women and men. ii. Same personal freedoms for women and men, protection against all forms of aggression iii. Consideration of gender elements e.g separate accommodation rooms and sanitation facilities for both men and women workers. iv. Work with institutional players in achieving gender mainstreaming. v. Monitoring and reporting of project information aggregated by gender.

9.6 Environmental and Social Management and Monitoring Plan (ESMMP) Matrix

Impacts	Nature of Impact	Impact indicator/ KPI	Mitigation measure/ required Actions	Deadline of completion	Performance targets	Frequency of monitoring	Implementation responsibility	Estimated Cost
Positive impacts to be enhanced for all the three (3) phases								
Employment opportunities	Positive	No. of workers employed from the project area No. of women employed in the project Average salary/ wages paid to workers in comparison with salaries for similar jobs in the area. Number of grievances recorded from project workers. Number of incidents registered on site.	Give jobs to local community without discrimination of gender Involve Local leaders such as LC1 Chairpersons in recruitment of workers to avoid employment of children and persons with criminal records Publicize available work opportunities through the commonly used and easily accessible media using the local dialect Give all workers contracts and ensure that terms of employment are clear to all parties and adhered to. Ensure a safe working environment for all workers	End of contract as signed by either the worker or the contractor.	Local workers employed. Number of female workers employed	Monthly and Quarterly	Contractor	It shall depend on the cost of living and skills of a worker.
Income to material / equipment suppliers	Positive	NEMA approval in place; Extraction Agreements in place and with provisions for restoration of sites; Schedule for monitoring of extraction of establishment materials in place.	Establishment materials shall be sourced from areas/suppliers with proof of Environmental and Social Impact Assessments/ Audits compliance evidenced by available valid EIA Certificate of Approval OR Compliance Agreement with NEMA.	End of contract duration as per the MOU signed between the source of material and contractor.	Source of material that complies with both the national and international legal requirements.	Monthly and Quarterly	Contractor	Contract

Impacts	Nature of Impact	Impact indicator/ KPI	Mitigation measure/ required Actions	Deadline of completion	Performance targets	Frequency of monitoring	Implementation responsibility	Estimated Cost
			Where necessary Earth materials procurement contracts should be reviewed by competent legal practitioners under the overall supervision of MWE to avoid taking advantage of landowners where borrow pits and rock quarries are located.					
Creation of business opportunities	Positive	Evidence of payments made to land owners Number of community sensitization session on business opportunities Percentage of women employed on the project	Ensure adequate, fair, and prompt payments to local supplies Ensure equal opportunities to promote women participation Publicise available business opportunities	Throughout the project period.	All Business opportunities within the project corridor.	monthly	Contractor	N/A
Improved access to water	Positive	Improved socio-economic conditions in the area	Operation and maintenance records Changes in socio-economic conditions in the area	Throughout the project period	Clean water to all people supplied	Weekly and Monthly	Contractor	As per the adopted tariff
Clean water supply	Positive	Functionality reports of the system Provision of safe water Reports of sensitization workshops Formation of Water supply and Sanitation board Presence of women in key position of the Water and Sanitation board	Provision of water and sanitation services to the population without discrimination at affordable rates On-time billing and keeping users up to date on the status and functionality of the various project facilities. Construct yard taps within a radius of 500 m as recommended in the water supply design manual. Sensitize the community on the management of the water supply and sanitation system.	Through out	Uninterrupted supply of clean water supply.	Weekly and monthly	Contractor	Contract

Impacts	Nature of Impact	Impact indicator/ KPI	Mitigation measure/ required Actions	Deadline of completion	Performance targets	Frequency of monitoring	Implementation responsibility	Estimated Cost
			If a Community Based Management System will be adopted for the scheme management, presence of women in the Water Supply and Sanitation Board is highly recommended.					
Improved sanitation and hygiene	Positive	Sanitation improvement reports Sensitization workshops	Conduct sensitization and awareness campaigns to improve sanitation aimed at driving adoption of improved water borne toilet systems at their homes.	Though out	All people to access improved sanitation services	Quarterly	Contractor and MWE	UGX 40,000,000
Infrastructure improvement	Positive	No. of infrastructure constructed and improved	A steady maintenance system for the infrastructure. Skilled labour to maintain the infrastructure.	Throughout	Functional infrastructure system.	Weekly, and daily	Contractor, MWE and Operator	Contract
Establishment phase								
Risk of increased spread of COVID-19	Negative	No. of hand washing facilities provided No. of workers' sensitization meetings held on COVID19 prevention No. of workers issued with masks Presence and evidence of use of a temperature gun on site	Provide adequate soap and water at the site to ensure workers and visitors wash their hands frequently. Continuously sensitize the workers on ways of preventing the spread of COVID-19. Such communication shall form part of the daily tool box talks Provide washable masks to all workers and visitors and enforce wearing of the same at all times while at the worksites Screen all workers and visitors for signs of COVID-19 such as	Throughout	Zero cases of COVID-19;	Weekly	Contractor	UGX 10,000,000

Impacts	Nature of Impact	Impact indicator/ KPI	Mitigation measure/ required Actions	Deadline of completion	Performance targets	Frequency of monitoring	Implementation responsibility	Estimated Cost
			temperature before they access any work site. Adhere to all measures and guidance issued by the Ministry of Health and presidential directives					
Impact on Surface Waters	Negative	Evidence of management of waste water from sanitary facilities. Evidence of proper management of project waste Possession of spill kits to for cleaning up spillage No. of workers sensitizations conducted	Regularly maintain vehicles and equipment to avoid fuel leakages Prohibit washing of project vehicles and equipment in water courses Ensure proper management of generated waste In case of spillage of oil/lubricants, spilled product should be localized / cleaned Conduct regular training and sensitization of workers on pollution prevention	Throughout	Reduced or minimized wastes generation. Reduced or zero complaints from nearby households	Monthly Quarterly	Contractor	UGX 15,000,000
Air Pollution	Negative	Record of complaints from neighbors; Air quality records(such as PM2.5, PM10, CO2, CO, O2, H2S, and CH4) Visual observation of diffusing dust in air. Evidence of sprinkling of water along the access roads Presence of a Dust Management Plan and logistics plan Number of dust-related complaints.	Cover trucks with tarpaulin to reduce the risk of fugitive dust emissions Limit vegetation clearing to the demarcated boundaries of the site Sprinkle water along the access roads Sensitize drivers with emphasis on the need to stick to designated routes and speed limits. Use well-maintained vehicles and machines	Throughout	Air quality levels below the national and international standards.	Monthly	Contractor	Contract

Impacts	Nature of Impact	Impact indicator/ KPI	Mitigation measure/ required Actions	Deadline of completion	Performance targets	Frequency of monitoring	Implementation responsibility	Estimated Cost
		Evidence of covered material haulage trucks	Shut down equipment when not in use to minimize idle time; Regularly service the equipment and vehicles to optimum working conditions to minimize potential emissions					
Noise Pollution	Negative	Records of complaints from neighbors; Record of noise measurements	Limit marram extraction activities to daytime Regularly care for and maintain vehicles and equipment Provide protective equipment to workers Erect humps along the access road especially near the school; to reduce speed of material haulage trucks which may generate noise	Throughout	Noise levels below the national and international standards; No record of complaints from community	Monthly	Contractor	Contract
Vegetation loss	Negative	Bare land left; Number of removed trees; Extent of restoration works. Coverage of replanted vegetation or trees	Limit vegetation clearance to the demarcated boundary of the site Store top soil from site clearing on the site to be later used for restoration Restore the site after extraction of the required quantity of Use well-maintained vehicles and machines Shut down equipment when not in use to minimize idle time;	Throughout	Reviginate entire non-constructed area. Achieve at least same number of trees before excavation	Monthly	Contractor	Contract

Impacts	Nature of Impact	Impact indicator/ KPI	Mitigation measure/ required Actions	Deadline of completion	Performance targets	Frequency of monitoring	Implementation responsibility	Estimated Cost
			Regularly service the equipment and vehicles to optimum working conditions					
Occupational Health and Safety	Negative	First Aid Kits and PPEs procured and being used; OSH training program prepared and training reports in place; OHS provisions integrated in works Method Statements; NO SMOKING signs posted in no smoking zones in the project.	Contractor to have in place, an OHS Management Plan; Have in place, a First Aid kits in strategic work locations in the project; Design and conduct OSH trainings for project workforce; Provide for OHS in all Method Statements for works; Provision of workers with appropriate PPEs and enforce its effective usage; Provision of warning road signage at appropriate locations in the project area; Install "no smoking" signage in high fire risks installations such as fuel storage and outlets, public and communal areas. safe establishment plant, equipment and work methods safe handling, storage, transport and disposal of materials in a way that avoids risk to workers provision of protective gear hiring a full time qualified "Accident prevention officer" or safety officer conducting safety awareness among all workers and routine/daily toolbox meetings at all work fronts, led by section heads/ safety champions and supervised by the Environmental, Health and Safety Officers on	Throughout	Zero fatal accidents. Reduced incident occurrence.	Monthly	Contractor	UGX 8,000,000

Impacts	Nature of Impact	Impact indicator/ KPI	Mitigation measure/ required Actions	Deadline of completion	Performance targets	Frequency of monitoring	Implementation responsibility	Estimated Cost
			both the Contractor's and Supervision Consultant's teams. Control harmful insects/ vectors (including mosquitoes and houseflies) in this case tsetse flies shall be the major focus. reporting accidents to supervising engineer in a timely manner and police including maintaining an accident and incident log; Severe Accidents (fatalities) and Serious Accidents shall be reported to the RE immediately and to MWE within 12 hours within 24 hours of occurrence. control contagious diseases (e.g. Cholera) through proper sanitation and awareness control occupational hazards related to: physical hazards (noise, vibrations, high temperature) chemical hazards mechanical hazards (moving equipment) electrical/ explosion hazards ergonomic injuries (poor working postures, heavy loads, etc) poor sanitation in workplace or living environment of workers					
Poor management of generated waste	Negative	Presence of domestic wastes on site Records of complaints from the nearby households Record of wastes generated	Provision of appropriate coded waste bins at site; Segregation of waste generated; Provide mobile toilets; Training of workers and community on good waste management practices;	Throughout	Reduced or minimized wastes generation All wastes disposed-off in gazetted area Reduced or	Monthly	Contractor	UGX 4,000,000

Impacts	Nature of Impact	Impact indicator/ KPI	Mitigation measure/ required Actions	Deadline of completion	Performance targets	Frequency of monitoring	Implementation responsibility	Estimated Cost
			A licensed waste handler will be contracted to provide services		zero complaints from nearby households			
Insecurity and increased crime	Negative	Number of reported crimes to police. Number of criminals reported to police. Number of items stolen.	Having well trained security guards Having a security management plan. Fence around the site.	Though out.	Reduced crime rates within the area.	Monthly	Contractor	Contract
Impact on Public safety	Negative	Restoration plans for all borrow pits and rock quarries shall be produced and approved before commencement of operations Establishment safety signage shall be installed at all establishment sites A nominated service provider shall be hired	The contractor shall install access to properties; Restoration plans for all borrow pits shall be produced and approved before commencement of operations. Speed control structures shall be installed at such areas and towns. Establishment safety signage shall be installed at all establishment sites Installed culverts shall be properly backfilled, levelled and compacted to enable all community resident easy access including the disabled. A nominated service provider shall be hired to undertake community sensitizations and engagement on their health and safety during road establishment works, working closely with the traffic police and community leaders and District Officials as and when necessary. Maintain high visibility signage at all work sites All workers shall be required to wear high visibility vests	Throughout	Reduced disruption on access routes. Reduced incident occurrences.	Monthly	Contractor	UGX 6,500,000

Impacts	Nature of Impact	Impact indicator/ KPI	Mitigation measure/ required Actions	Deadline of completion	Performance targets	Frequency of monitoring	Implementation responsibility	Estimated Cost
			Community shall be involved in securing road safety signage. Establish a Grievance Redress Committee to receive and handle complaints from Public.					
Increase in Gender inequalities including Gender Based Violence and infringement on the rights of women and girls at the work	Negative	Record of complaints related to GBV, SEA and VAC Record of sensitization of workers and community	Sensitize all workers on Code of Conduct; Collaborate with local leadership to establish zero tolerance policies on GBV/SEA/SH; Provide code of conduct to workers and enforce it; Train all workers on laws against defilement and other sexual offences; Conduct gender sensitization and mainstreaming into the site works; Work closely with GBV and VAC Service Providers to effectively implement related activities; Deploy women as flag persons, and safety officers; Use gender-sensitive language like: "Go Slow, Work in Progress" instead of "Go Slow, Men at Work"; Conduct gender mainstreaming to create an enabling work-environment for women	Throughout	Reduced cases on the code of conduct. Reduced complaints.	Monthly	Contractor	UGX 20,000,000
Impact on Utilities	Negative	Number of utility lines within the project corridor. Number of utility lines to be disrupted.	Undertake a baseline survey with utility owners. Formulate a plan of rehabilitating a utility line in case it tis destroyed. Inform community members 3 days before a utility line is to be disrupted.	Throughout	Reduced disruption by utility lines destroyed.	Monthly	Contractor	UGX 10,000,000

Impacts	Nature of Impact	Impact indicator/ KPI	Mitigation measure/ required Actions	Deadline of completion	Performance targets	Frequency of monitoring	Implementation responsibility	Estimated Cost
Temporary loss of access to homes	Negative	Number of access routes along the project corridor. Number of access routes that can be diverted. Number of reinstated access routes.	Create diversion routes in collaboration with the community members. Install safety signs at disrupted and closed access routes.	Throughout	Reduced disruption due to affected accesses to homes	Monthly	Contractor	UGX 10,000,000
Operational phase								
Risk of increased spread of COVID-19	Negative	No. of hand washing facilities provided No. of workers' sensitization meetings held on COVID19 prevention No. of workers issued with masks Presence and evidence of use of a temperature gun on site	Provide adequate soap and water at the site to ensure workers and visitors wash their hands frequently. Continuously sensitize the workers on ways of preventing the spread of COVID-19. Such communication shall form part of the daily tool box talks Provide washable masks to all workers and visitors and enforce wearing of the same at all times while at the worksites Screen all workers and visitors for signs of COVID-19 such as temperature before they access any work site. Adhere to all measures and guidance issued by the Ministry of Health and presidential directives	Throughout	Zero cases of COVID-19;	Weekly	Operator	UGX 2,000,000
Noise Pollution	Negative	Records of complaints from neighbors; Record of noise measurements	Limit all operations to day-time hours; Regularly service equipment for efficiency Provision of PPEs to all workers	Throughout	Noise levels below the national standards; No record of complaints from community	Monthly	Operator	UGX 1,000,000

Impacts	Nature of Impact	Impact indicator/ KPI	Mitigation measure/ required Actions	Deadline of completion	Performance targets	Frequency of monitoring	Implementation responsibility	Estimated Cost
Occupational Health and Safety	Negative	First Aid Kits and PPEs procured and being used; OSH training program prepared and training reports in place; OHS provisions integrated in works Method Statements; NO SMOKING signs posted in no smoking zones in the project.	Have in place, a First Aid kits in strategic work locations in the project; Design and conduct OSH trainings for project workforce; Provide for OHS in all Method Statements for works; Provision of workers with appropriate PPEs and enforce its effective usage; Install "no smoking" signage in high fire risks installations such as fuel storage and outlets, public and communal areas. safe establishment plant, equipment and work methods safe handling, storage, transport and disposal of materials in a way that avoids risk to workers provision of protective gear conducting safety awareness among all workers and routine/daily toolbox meetings at all work fronts, led by section heads/ safety champions and supervised by the Environmental, Health and Safety Officers on both the Contractor's and Supervision Consultant's teams. Control harmful insects/ vectors (including mosquitoes and houseflies) in this case tsetse flies shall be the major focus. Maintaining an accident and incident log; Severe Accidents (fatalities) and Serious Accidents shall be reported to the plant manager immediately.	Throughout	Zero fatal accidents. Reduced incident occurrence.	Monthly	Operator	UGX 4,000,000

Impacts	Nature of Impact	Impact indicator/ KPI	Mitigation measure/ required Actions	Deadline of completion	Performance targets	Frequency of monitoring	Implementation responsibility	Estimated Cost
			control contagious diseases (e.g. Cholera) through proper sanitation and awareness control occupational hazards related to: physical hazards (noise, vibrations, high temperature) chemical hazards mechanical hazards (moving equipment) electrical/ explosion hazards ergonomic injuries (poor working postures, heavy loads, etc.) poor sanitation in workplace or living environment of workers					
Poor management of generated waste	Negative	Presence of domestic wastes on site	Provision of appropriate coded waste bins at site; Segregation of waste generated; Provide a sanitary facility for works. Training of workers and on good waste management practices; A licensed waste handler will be contracted to provide services	Throughout	Reduced or minimized wastes generation All wastes disposed-off in gazetted area Reduced or zero complaints from nearby households	Monthly	Operator	UGX 4,000,000
Insecurity and increased crime	Negative	Number of reported crimes to police. Number of criminals reported to police. Number of items stolen.	Having well trained security guards Having a security management plan.	Throughout.	Reduced crime rates within the area.	Weekly	Operator	N/A
Increase in Gender inequalities including Gender Based Violence and infringement on the rights of	Negative	Record of complaints related to GBV, SEA and VAC Record of sensitization of workers and community	Sensitize all workers on Code of Conduct; Collaborate with local leadership to establish zero tolerance policies on GBV/SEA/SH; Provide code of conduct to workers and enforce it; Train all workers on laws	Throughout	Zero GBV, SEA & VAC cases Increased awareness rising on GBV, SEA &VAC	Monthly	Operator	UGX 5,000,000

Impacts	Nature of Impact	Impact indicator/ KPI	Mitigation measure/ required Actions	Deadline of completion	Performance targets	Frequency of monitoring	Implementation responsibility	Estimated Cost
women and girls at the work			against defilement and other sexual offences; Conduct gender sensitization and mainstreaming into the site works; Work closely with GBV and VAC Service Providers to effectively implement related activities; Deploy women as flag persons, and safety officers; Use gender-sensitive language like: "Go Slow, Work in Progress" instead of "Go Slow, Men at Work"; Conduct gender mainstreaming to create an enabling work-environment for women.					
Decommissioning phase								
Air Pollution	Negative	Record of complaints from neighbors; Air quality records Visual observation of diffusing dust in air	Wet the access road to suppress dust generated; Provision of PPEs to workers Install speed limit of 20km/hour along the access	Throughout	Air quality levels below the national;	Monthly	Contractor	
Noise Pollution	Negative	Records of complaints from neighbors; Record of noise measurements	Limit all operations to day-time hours; Regularly service equipment for efficiency Provision of PPEs to all workers	Throughout	Noise levels below the national standards; No record of complaints from community	Quarterly	Contractor	UGX 3,000,000
Occupational Health and Safety	Negative	First Aid Kits and PPEs procured and being used; OSH training program prepared and training reports in place; OHS provisions integrated in works Method Statements; NO SMOKING signs posted in no smoking zones in the project.	Have in place, a First Aid kits in strategic work locations in the project; Design and conduct OSH trainings for project workforce; Provide for OHS in all Method Statements for works; Provision of workers with appropriate PPEs and enforce its effective usage;	Throughout	Zero fatal accidents. Reduced incident occurrence.	Quarterly	Contractor	UGX 5,000,000

Impacts	Nature of Impact	Impact indicator/ KPI	Mitigation measure/ required Actions	Deadline of completion	Performance targets	Frequency of monitoring	Implementation responsibility	Estimated Cost
			Install "no smoking" signage in high fire risks installations such as fuel storage and outlets, public and communal areas. safe establishment plant, equipment and work methods safe handling, storage, transport and disposal of materials in a way that avoids risk to workers provision of protective gear hiring a full time qualified "Accident prevention officer" or safety officer conducting safety awareness among all workers and routine/daily toolbox meetings at all work fronts, led by section heads/ safety champions and supervised by the Environmental, Health and Safety Officers on both the Contractor's and Supervision Consultant's teams. Control harmful insects/ vectors (including mosquitoes and houseflies) in this case tsetse flies shall be the major focus. Maintaining an accident and incident log; Severe Accidents (fatalities) and Serious Accidents shall be reported to the plant manager immediately. control contagious diseases (e.g., Cholera) through proper sanitation and awareness control occupational hazards related to: physical hazards (noise, vibrations, high temperature) chemical hazards					

Impacts	Nature of Impact	Impact indicator/ KPI	Mitigation measure/ required Actions	Deadline of completion	Performance targets	Frequency of monitoring	Implementation responsibility	Estimated Cost
			mechanical hazards (moving equipment) electrical/ explosion hazards ergonomic injuries (poor working postures, heavy loads, etc.) poor sanitation in workplace or living environment of workers					
Poor management of generated waste	Negative	Presence of domestic wastes on site Records of complaints from the nearby households Record of wastes generated	Provision of appropriate coded waste bins at site; Segregation of waste generated; Provide a sanitary facility for works. Training of workers and on good waste management practices; A licensed waste handler will be contracted to provide services	Throughout	Reduced or minimized wastes generation All wastes disposed-off in gazetted area Reduced or zero complaints from nearby households	Quarterly	Contractor	UGX 4,000,000
Spread of invasive species	Negative	Record of invasive species identified	Manually remove and appropriately destroy identified alien species before flowering to prevent the spread of its seeds.	Throughout	No introduction of invasive species	Monthly	Contractor	N/A

9.7 Implementation Schedule and Cost Estimate

The ESMP will be implemented in line with the overall project schedule, as all activities are integrated into the project design. The total cost of implementing the ESMP is estimated at **UGX 345,400,000** (Uganda Shillings Three Hundred Forty Five Million Four Hundred Thousand only)

Table 9-3: Summary of Implementation Cost of the ESMP

Item No.	Description	Unit	Estimated Quantity	Rate (UGX)	Amount (UGX)	Amount[4] (USD)
1	Environmental action plan, decommissioning plans and reporting	L.S.	1	10,000,000	10,000,000	2,632
2 (a)	Provide Consultant Environmental Manager	Month	7	1,000,000	7,000,000	1,842
2 (b)	Provide Consultant Social Manager	Month	5	1,000,000	5,000,000	1,316
2 (c)	Provide qualified Environmentalist for the contractor	Month	7	700,000	4,900,000	1,289
3	HIV/AIDS and STD prevention and counselling and COVID 19 Prevention					
3 (a)	Provide, maintain and operate STD and HIV/AIDS clinic or make alternative arrangements with existing local clinic	Lump sum	1	2,900,000	2,900,000	763
3 (b)	Maintenance of sexual health and first aid clinic	Month	7	800,000	5,600,000	1,474
3 (c)	COVID 19 interventions and Standard Operating Procedures	paid monthly	7	500,000	3,500,000	921
4	Safety Clothing and Equipment's					
4 (a)	Provision of safety clothing and equipment for the workforce. (Ushs 200,000 to be paid for each of the 80 people per year)	Person-Years	80	200,000	16,000,000	4,211
5	Institutional coordination and support during construction and monitoring i.e., Local NGO's, Local Government and lead Agencies Meetings	Lumpsum	1	2,000,000	2,000,000	526
6	Source protection measures					
6 (a)	Planting and establishing	Lumpsum	1	30,000,000	30,000,000	7,895
7 (a)	Reinstatements	Lumpsum	1	10,000,000	10,000,000	2,632
7 (b)	Sand pits	Lumpsum	1	2,000,000	2,000,000	526
7 ©	Quarry site	Lumpsum	1	4,500,000	4,500,000	1,184

[4] Exchange rate of 1USD = UGX 3,800 was adopted

Item No.	Description	Unit	Estimated Quantity	Rate (UGX)	Amount (UGX)	Amount[4] (USD)
8 (a)	Environmental Social Audit	Lumpsum	1	80,000,000	80,000,000	21,053
8 (b)	Waste management	Lumpsum	1	12,000,000	12,000,000	3,158
8 (c)	Stakeholder Engagements, Training & Awareness and Dissemination	Lumpsum	1	100,000,000	100,000,000	26,316
8 (d)	Information Products and Publicity	Lumpsum	1	50,000,000	50,000,000	13,158
Total					**345,400,000**	**90,895**

10 CONCLUSION

10.1 Conclusion

Findings of the environmental and social impact assessment conducted indicate that the construction and operation of the proposed water supply and sanitation system will have positive impacts to the people of Rakai district and neighboring areas. The long-term socio-environmental benefits of a reliable supply of potable water include, but not limited to, reduced morbidity, infrastructure development and increased productivity of households. Short term, during the construction phase, project communities shall directly benefit through employment creation for both skilled and unskilled labour and market for local produce.

Nevertheless, some negative impacts are envisaged and these include potential air and noise pollution, impact on surface water, risk of spread of COVID19 and other communicable diseases, poor management of waste and increase in gender inequalities and gender-based violence among others. These, however, can be mitigated using measures that are readily available as indicated in chapter 8.

The proposed project design has integrated mitigation measures with a view to ensuring compliance with all the applicable laws and procedures. In relation to the proposed mitigation measures that will be incorporated during construction and operational phases; the development's overall input to the society; the project is considered beneficial and important. Major concerns should nevertheless be focused towards minimizing the occurrence of impacts that would degrade the general environment. This will however be overcome through close adherence and implementation of the recommended measures.

10.2 Recommendations

The following measures are recommended in order to ensure compliance to environmental and social safeguards During Project implementation;

i. The construction contractor should be required, in the tender documents, to prepare standalone safeguards management plans such as occupational safety and health management plan, waste management plan, labour force management plan, grievance management plan, among others as indicated in section 9.4. These should be reviewed and approved by the client to guide implementation of environmental and social mitigation measures during the project implementation phase.
ii. The project supervising engineer and the Contractor should have teams of competent Environment, Social Development Specialists, Health and Safety Officer and a Community Liaison Officer, among other staff, who will monitor the implementation of the Environmental and Social Management Plan
iii. Individual environmental assessments should be carried out for the Construction camp and any other contractor's auxiliary facilities, before commencement of works.
iv. Reporting of the implementation of environmental and social safeguards should be incorporated in the monthly reporting of the project

v. Continuous sensitization of the project workers and surrounding communities should be undertaken during both the construction and operation phases to prevent the spread of diseases such as COVID19, HIV/AIDS and other STIs
vi. On completion of construction works, all sites disturbed by the project works should be restored to as near as possible to their original state as it was prior to commencement of the project works
vii. As required by the National Environment Audit Guidelines, Rakai district, with support from Water and Sanitation Development Facility – South West, should procure services of a NEMA registered auditor to undertake annual environmental audits of the Project.
viii. The total cost of UGX 345,400,000 (Uganda Shillings Three Hundred Forty Five Million Four Hundred Thousand only) should be provided for the ESMMP.
ix. As soon as a worker has been employed and during the induction, he/she should be availed with the code of conduct of the employer.

Bibliographies

1. Constitution of the Republic of Uganda, 1995
2. Detailed design report for the water supply and sanitation system in Kibaale and Kifamba RGCs in Rakai district local government (2021)
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APPENDIX I: NEMA APPROVED TORS

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY (NEMA)

NEMA House
Plot 17,19 & 21, Jinja Road.
P.O.Box 22255, 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

CENTRAL REGISTRY MINISTRY OF WATER AND ENVIRONMENT RECEIVED 03 FEB 2021 SIGN DIRECTORATE OF WATER DEVELOPMENT

NEMA/4.5

27th January 2021

The Branch Manager,
Water and Sanitation Development Facility,
South Western Branch,
Ministry of Water and Environment,
KAMPALA.

Tel: +256 41 4505942

RE: APPROVAL OF TERMS OF REFERENCE FOR UNDERTAKING THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED RWEMIKOMA RGC, NKUNGU RGC, KIFAMBA RGC AND BUREMBA TOWN COUNCIL WATER SUPPLY AND SANITATION SYSTEMS

This is in reference to the Terms of Reference (TOR) for carrying out an Environmental and Social Impact Assessment (ESIA) for the above-mentioned project, which was submitted to this Authority on 23rd December 2020, for consideration and approval. This Authority has finalized the review and grants formal **APPROVAL** of the said TOR.

Note that the scoping report and terms of reference do not provide adequate information and scope of potential impacts to be assessed in regard to the sanitation facilities, particularly, the Feacal Sludge Treatment Plant. In this regard therefore, **a separate Environmental and Social Impact Statement process shall be undertaken for the sanitation component** particularly, **the Feacal Sludge Treatment Plant**. This is to ensure that all relevant aspects relating to the construction and operation of the Facility are adequately assessed and any potential environmental impacts mitigated.

In addition to the scope of work for undertaking the ESIA for the Water Supply Systems, the key aspects below shall be taken into consideration during the conduct of the Environmental Impact Study and the preparation of the ESIA report.

(i) Provide accurate GPS coordinates for the proposed sites for different project infrastructure, including coordinates indicating boundaries of the water treatment plant. The report should include legible images of the proposed project sites.

(ii) Provide details of the different project components and a layout plan of the key project infrastructure such as the water treatment plant.

Page 1 of 2

(iii) Undertake comprehensive consultations with the Directorate of Water Resources Management and other relevant stakeholders.

(iv) Undertake hydrological and geotechnical studies of the proposed project areas, particularly, the proposed water abstraction points. Indicate in the report the alternatives assessed and rationale for the final water sources, siting and design of the project infrastructure, taking into account the information from the above-mentioned studies.

(v) Identify all the potential waste streams from the proposed water supply system during both construction and operation. Detail the measures that will be implemented to minimize potential impacts from such waste, including the handling and disposal of any sludge, backwash waters or other contaminated waste water and obsolete chemicals.

(vi) Make reference to relevant laws, regulations and standards, in particular, the National Environment Act, 2019 and relevant Regulations that have since been revised. Such Regulations can be accessed from the Authority's website.

(vii) Ensure that mechanisms to address social issues are detailed in the ESIS. This shall include measures to minimize impacts on existing public infrastructure and access to existing social services and livelihood activities.

(viii) Provide information on the land acquisition and compensation of project affected persons within the project area.

(ix) Consider any other critical environmental concerns that were not initially foreseen during the preparation of the Scoping Report and TOR, and include an evaluation of such concerns, in the EIA report

(x) Indicate the actual total project (investment) cost covering the project components.

This is therefore, to recommend that you proceed with carrying out the ESIA for the proposed Water Supply System in Rwemikoma RGC, Nkungu RGC, Buremba Town Council and Kifamba RGC in Kazo District.

Please note that the approval of the TORs DOES NOT constitute permission to start implementing any of the proposed project activities, as this is not a Certificate of approval.

We look forward to your cooperation and receipt of comprehensive copies of the ESIA report, for our further action.

27/1/2021
Patience Nsereko
FOR: EXECUTIVE DIRECTOR

Table: Compliance of the ESIA to the ToR Approval conditions by NEMA

No	NEMA cited key aspect	ESIA Consideration & Incorporation
General	Note that the scoping report and terms of reference do not provide adequate information and scope of potential impacts to be assessed in regard to the sanitation facilities, particularly, the Feacal Sludge Treatment Plant. In this regard therefore, **a separate Environmental and Social Impact Statement process shall be undertaken for the sanitation component** particularly, **the Feacal Sludge Treatment Plant.** This is to ensure that all relevant aspects relating to the construction and operation of the Facility are adequately assessed and any potential environmental impacts mitigated.	Proposed Project Feacal Sludge Treatment Plant has been excluded from this report. Separate studies shall be conducted for the feacal sludge treatment system and a separate ESIS shall be submitted to the authority for appropriate action.
Aspect (i)	Provide accurate GPS coordinates for the proposed sites for different project infrastructure, including coordinates indicating boundaries of the water treatment plant. The report should include legible images of the proposed project sites.	GPS Coordinates for the proposed sites for the water treatment plant and water reservoir and booster tanks have been presented under section 5.9 as **Table 2-4, Table 2-5, Table 2-6**
Aspect (ii)	Provide details of the different project components and a layout plan of the key project infrastructure such as the water treatment plant.	A detailed description of project components has been provided under chapter 2, subsection 2.5. A lay out of all components has also been included as Figure **2-9**: Water Supply System Configuration
Aspect (iii)	Undertake comprehensive consultations with the Directorate of Water Resources Management and other relevant stakeholders.	Consultations were undertaken with the Directorate of Water Resources Management, Water and Sanitation Development Facility – Southwest, Rakai district local government, and at subcounty and community levels. A summary of key concerns and recommendations from these consultations has been presented in Chapter 6, whereas details of these engagements are presented in Appendix III.
Aspect (iv)	Undertake hydrological and geotechnical studies of the proposed project areas, particularly, the proposed water abstraction points. Indicate in the report the alternatives assessed and rationale for the final water sources, siting and design of the project infrastructure, taking into account the information from the above-mentioned studies.	A Hydrological analysis of the water sources for the water supply system was undertaken. Findings of the analysis and the rationale for selecting the final water source have been presented under chapter 7.
Aspect (v)	Identify all the potential waste streams from the proposed water supply system during both construction and operation. Detail the measures that will be implemented to minimize potential impacts from such waste, including the handling and disposal of any sludge, backwash waters or other contaminated wastewater and obsolete chemicals.	All waste streams expected to be generated during project construction and operation, and measures to mitigate their impact on the environment have been presented under section 2.9. Additional measures have been presented in impact analysis under subsection 8.2.8
Aspect (vi)	Make reference to relevant laws, regulations and standards, in particular, the National Environment Act, 2019 and relevant Regulations that have since been revised. Such Regulations can be accessed from the Authority's website.	A review of the relevant policies, laws, regulations and guidelines and their implications to the implementation of the proposed water supply and sanitation project has been undertaken, as presented in chapter 3.
Aspect (vii)	Ensure that mechanisms to address social issues are detailed in the ESIS. This shall include measures to minimize impacts on existing public infrastructure and access to existing social services and livelihood activities.	An analysis of the likely social impacts that may ensue especially during the project construction phase has been conducted and mitigation measures proposed in chapter 8.

No	NEMA cited key aspect	ESIA Consideration & Incorporation
Aspect (viii)	Provide information on the land acquisition and compensation of project affected persons within the project area.	Details of land requirement and acquisition have been presented under section 2.9.2.
Aspect (ix)	Consider any other critical environmental concerns that were not initially foreseen during the preparation of the Scoping Report and TOR, and include an evaluation of such concerns, in the EIA report	A detailed analysis of the impacts associated with the proposed water supply and sanitation system construction has been conducted and mitigation measures proposed under Chapter 8. Chapter 9 presents an ESMP Matrix to guide and monitor implementation of the proposed measures.
Aspect (x)	Indicate the actual total project (investment) cost covering the project components.	The project cost has been indicated in chapter 1 under subsection 1.7.

APPENDIX II: MOU REGARDING LAND ACQUISITION FOR PROJECT FACILITIES

Kifamba RGC

The Republic of Uganda

MINISTRY OF WATER AND ENVIRONMENT

DIRECTORATE OF WATER DEVELOPMENT

WATER AND SANITATION DEVELOPMENT FACILITY-SOUTH WEST

MEMORANDUM OF UNDERSTANDING

BETWEEN
WATER AND SANITATION DEVELOPMENT FACILITY - SW

AND

KIFAMBA RGC COMMUNITY

November 2019

LIST OF ACRONYMS

MWE	Ministry of Water and Environment
DWD	Directorate of Water Development
MoU	Memorandum of Understanding
GoU	Government of Uganda
SC	Sub County
TC	Town Council
STs	Small Towns
RGCs	Rural Growth Centre
PC	Performance Contract
PO	Private Operator
SO	Scheme Operator
O & M	Operation and Maintenance
WSC	Water and Sanitation Committee
WSSB	Water Supply & Sanitation Board
WSSA	Water Supply & Sanitation Authority
WSDF – SW	Water and Sanitation Development Facility – South Western
SWUWS	South Western Umbrella of Water and Sanitation
MWUWS	Mid-Western Umbrella of Water and Sanitation
CUWS	Central Umbrella of Water and Sanitation.

This Memorandum of Understanding is made on this ..15TH.. day of ..NOVEMBER.. 2019

Between

The Water and Sanitation Development Facility South West of the Directorate of Water Development, Ministry of Water and Environment in Partnership with **Rakai** District Local Government

And

Kifamba Water and Sanitation Committee (WSC) on behalf of the Ccommunity in partnership with

Kifamba Sub County .

NOW THIS AGREEMENT WITNESSES AS FOLLOWS:-

WHEREAS the Water and Sanitation Development Facility is established to finance water and sanitation implementation in STs / RGCs in Uganda with Funding from the Government of Uganda and its Development Partners and

WHEREAS the WSDF-SWB Facility is to benefit STs / RGCs in the Districts of Sembabule, Rakai, Kyotera, Kyenjojo, Kamwenge, Kitagwenda, Ibanda, Buyangabu, Kasese, Ibanda, Kiruhura, Kazo, Mbarara, Rwampara, Isingiro, Bushenyi, Ntungamo, Kabale, Rubanda, Rukiga, Kisoro, Kanungu, Lyantonde, Rukungiri, Rubirizi, Mitooma, Buhweju, Sheema, Bundibugyo, Ntoroko, and Kyegegwa.

WHEREAS District Local Governments have the mandate for provision and Sustainability of Water and Sanitation Services and

WHEREAS District Local Governments may source for funding for Water and Sanitation Services for their communities and assist communities to plan and optimally utilize, manage and sustain the facilities availed; and

WHEREAS The **Kifamba RGC** Community in partnership with the respective **Kifamba Sub County** applied to the Facility for assistance to implement water and sanitation facilities and the Facility has agreed to finance the implementation of the water and sanitation project for the Community,

NOW THEREFORE, this MoU establishes a general framework for cooperation and participation between the WSDF - SW in partnership with the District Local Government and the Community in partnership with the **Sub County** (herein after referred to as parties) as follows:

PART I PARTICIPANTS AND REPRESENTATIVES

This MoU is between The Water and Sanitation Development Facility-South Western Branch of the Directorate of Water Development, Ministry of Water and Environment in Partnership with **Kifamba** District Local Government. WSDF-SW is represented by **Eng. Enoch Mwanje** FACILITY MANAGER, WSDF-SWB

And

Kifamba RGC Community in partnership with **Kifamba Sub County.**

Represented by ...KAHAWA BAKER... the Chairperson, WSC.

PART II COLLABORATIVE ACTIVITIES

For the purpose of the present MoU, the partners have agreed to collaborate in extending Water and Sanitation facilities for **Kifamba RGC.**

PART III RESPONSIBILITIES

A. The community agrees to;

1. Apply for Water and Sanitation services
2. Form (elect) a gender balanced water and sanitation committee for implementation of water supply and sanitation system. The committee must represent and reflect the future users.
3. Describe the water and sanitation situation prior to the intervention of the project and keep records of the changes there after following instructions from WSDF-SW.
4. Open up a bank account in a Commercial Bank for implementation.
5. Assist the Project staff, consultants and extension staff with the execution of the base line survey and concurrent surveys (source identification, topographic survey, sanitation surveys etc) in the development of the water scheme.
6. Contribute UGX 100,000/= for every public kiosk provided for in the design. This money should be collected from the entire community to raise a sense of ownership.
7. Each approved institution and household applicant for private connection shall pay UGX 100,000 as connection fees before connection.
8. Provide all land for infrastructural development in the dimensions and locations provided at the time of design presentation to stakeholders. All land provided SHALL NOT have any conditionalities attached and should be free of any conflicts.
9. Organize regular water and sanitation meetings with the population and participate in planning meetings for the development of the water and sanitation scheme.
10. Forward all complaints, issues and concerns pertaining to water and sanitation system implementation to the facility and other relevant authorities for redress.
11. In case of any existing water supply system, the community shall accept that the District relocates it to serve the un-served areas outside the new water supply area.
12. Select artisans for training according to the provided criteria.
13. Ensure 100% coverage of safe excreta disposal facilities (Latrine/Toilet) within the water supply area.
14. Ensure that each excreta disposal facility has a functional hand washing facility with water and soap.

15. Undertake to promote general hygiene and sanitation practices at household level (Compost pit, kitchen, drying rack, clean and covered water containers, animal shelter, bath shelter, clean compound, boiling drinking water etc).
16. Fulfill community obligations and apply for construction within six months from the day of design presentation.
17. Mobilise and sensitise the community to permit pipeline passage.
18. Undertake to shoulder 100% O & M costs through payment of user fees.
19. Jealously guard and maintain scheme structures sustainably.

B Kifamba agrees to:

1. Undertake to give political support to the Project.
2. Assist communities to identify projects and formulate applications.
3. Monitor progress of community contributions especially on Land acquisition.
4. Resolve any land wrangles and any other conflicts that may arise that are related to the intervention being put in place.
5. Organize the community to elect suitable members of the Water and Sanitation Committee that will run the programme on behalf of the water users according to the provided guidelines.
6. Monitor WSS construction work done in the Sub County and bring to the attention of the WSDF-SWB any irregularities
7. Assist the community with the execution of the sanitation baseline survey and the concurrent surveys.
8. Assist the community in making a sanitation work plan and its implementation using the Sub County extension staff (health staff and community development staff) in the Project area.
9. To enact and enforce byelaws necessary to implement the water and sanitation Project.
10. Pass a resolution empowering WSC to operate autonomously.
11. Secure lease offers for acquired pieces of land.
12. Where an Umbrella Water Authority is appointed as the Water Authority, form a Water and Sanitation Board that will represent the community to manage the water and sanitation scheme.

13. Provide support to the appointed Water Supply and Sanitation Board in following up and ensuring proper Operation and maintenance of constructed water supply systems.

14. In case of any existing water supply system, mobilize the community to accept that the District relocates it to serve the un-served areas outside the new water supply area.

15. Avail established structures to ensure that sanitation improvements achieved during implementation are sustained.

16. Ensure that scheme assets are properly maintained according to the provided manuals and guidelines.

C Rakai District agrees to:

1 Sign an MOU with WSDF-SWB which defines the respective roles and responsibilities of both parties and funding criteria and procedures, procurement, modalities of joint supervision of contractors and consultants.

2 Undertake to give political support to the projects being implemented within the District.

3 Encourage water stressed STs / RGCs to apply for water and sanitation services. In doing so the District shall within a timely manner receive, verify data, endorse and forward these applications at no salary or fringe benefit cost to the Facility.

4 Co-funding where this is possible.

5 Provide technical personnel who shall together with the Facility engage in planning for, supervise and monitor implementation of the water and sanitation activities.

6 Assist, facilitate and mobilize STs / RGCs to fulfill their obligations in a realistically anticipated time period (6-9 months) for successful implementation of the program.

7 Propose an appropriate piece of land suitable for construction and management of a sludge treatment plant.

8 Ensure that Environmental concerns are addressed.

7

9 Fully own projects in their Districts, but without compromising the operational autonomy of WSC / WSSB.

10 In case of any existing water supply system, the District shall relocate it to serve the un-served areas outside the new water supply area.

11 Provide support to established Water Authorities in following up and ensuring proper Operation and Maintenance of constructed water supply systems.

12 Avail her established structures to ensure the sanitation improvements achieved during implementation are sustained.

13 Undertake to give technical support towards Operation and Maintenance of the constructed water supply and sanitation systems.

D **WSDF-SW agrees to:**

1. Define and control funding regulations and conditions.
2. Conduct advocacy and promotional campaigns to advertise on the availability of the facility, funding conditions and eligibility criteria.
3. Meet the costs of designing and implementing water and sanitation activities in the selected STs / RGCs within the District.
4. Prepare, evaluate and manage call for proposals according to the guidelines of the WSDF.
5. Check the appropriateness, correctness and financial viability of technical designs provided by the community at application stage and provide the community with a project proposal and give an explanation of the proposal.
6. Spearhead production of appropriate and financially viable technical design proposals for discussion with the stakeholders at all levels.
7. Carry out mobilization and sensitization activities throughout the implementation period.
8. Procure Works, Supplies and Services required in the implementation of water and sanitation activities in the District using the delegated Facility Contracts Committee.
9. Enter into contracts with the private sector to execute the construction activities and procure materials.
10. Monitor and supervise the quality of construction works and vetting of payments.

11. Ensure proper financial and administrative management of WSDF-SW.
12. Drawing operational plans and budgets to the WSDF-SW Steering Committee for guidance and approval.
13. Support the community in running the environmental, hygiene and sanitation programmes.
14. Promote appropriate toilet technologies in the project communities.
15. Assist the community in establishing O & M structures and training the actors.
16. Provide technical backstopping throughout the implementation of the programme.
17. Prepare an overview of expected maintenance costs as well as assist the community in preparing an Operation and Maintenance manual.
18. Assist the community to acquire land titles for all the acquired pieces of land.
19. Protection of water sources and assisting in afforesting them.
20. Promote agro-forestry in the catchment area of the water sources.

PART IV DURATION OF THE AGREEMENT

The parties to this MoU shall remain in partnership as stated in the present MoU until completion and handover of the constructed water and sanitation facilities is done, except if any party fails to honor their obligations.

PART V EFFECTIVITY

This Memorandum of Understanding (MoU) shall take effect upon the signing by all parties.1

IN WITNESS WHEREOF, the parties have hereunto affixed their signatures

The Chairperson, WSC..... KALUZI BAKER .....

Signature: .....

The Sub County Chief ..... NAKYANZI DOROTHY KIRABO .....

Signature: .....

SENIOR ASSISTANT SECRETARY
KIFAMBA SUB-COUNTY
RAKAI DISTRICT

The LCIII Chairperson: LUBEGA PIUS

Signature: [signature]

CHAIRPERSON L.C. III DATE 15/11/19 KIFAMBA SUB-COUNTY

WSDF - SW Representative: Eng. Moses Lugoole [signature]

WATER AND SANITATION DEVELOPMENT FACILITY SW P.O. BOX 575 MBARARA

Signature:

Witnessed by:

The District Water Officer: MUWANGA FRANCIS

Signature: [signature]

The Chief Administrative Officer: KAMYA EDWARD

Chief Administrative Officer RAKAI DISTRICT LOCAL GOVT

Signature: [signature]

The District Chairperson: Baron MUKABI

District Chairperson

Signature: [signature]

OFFICE OF THE RESIDENT DISTRICT COMMISSIONER P.O. BOX 1, RAK

The Resident District Commissioner: 30th/11/2019

Signature: [signature]

1. KALEMA GERALD District Councilor [signature]
2. NAMUGERA PROSSCOVIA Councillor Namuge
3. LUBEGA HILLARY COUNCELLOR [signature]
4. [illegible] c/o LC2 [illegible] [signature]

Signed at: KIFAMBA SUB COUNTY **Date:** 15TH/11/2019

10

Kibaale RGC

The Republic of Uganda

MINISTRY OF WATER AND ENVIRONMENT

DIRECTORATE OF WATER DEVELOPMENT

WATER AND SANITATION DEVELOPMENT FACILITY-SOUTH WEST

MEMORANDUM OF UNDERSTANDING

BETWEEN

WATER AND SANITATION DEVELOPMENT FACILITY - SW

AND

KIBAALE WATER SUPPLY AREA COMMUNITY.

MAY 2021

LIST OF ACRONYMS

MWE	Ministry Of Water and Environment
DWD	Directorate of Water Development
MoU	Memorandum of Understanding
GoU	Government of Uganda
SC	Sub County
TC	Town Council
STs	Small Towns
RGCs	Rural Growth Centre
PC	Performance Contract
PO	Private Operator
SO	Scheme Operator
O & M	Operation and Maintenance
WSC	Water and Sanitation Committee
WSSB	Water Supply & Sanitation Board
WSSA	Water Supply & Sanitation Authority
WSDF – SW	Water and Sanitation Development Facility – South Western
SWUWS	South Western Umbrella of Water and Sanitation
MWUWS	Mid-Western Umbrella of Water and Sanitation
CUWS	Central Umbrella of Water and Sanitation.

This Memorandum of Understanding is made on this 27th day of May 2021

Between

The Water and Sanitation Development Facility-South West of the Directorate of Water Development, Ministry of Water and Environment in Partnership with **Rakai** District Local Government.

And

Kibaale Water and Sanitation Committee (WSC) on behalf of the community in partnership with

Kibaale Town Council, Byakabanda Sub County, Kyalulangira Sub County, and Kiziba Sub County.

NOW THIS AGREEMENT WITNESSES AS FOLLOWS:-

WHEREAS the Water and Sanitation Development Facility is established to finance water and sanitation implementation in STs / RGCs in Uganda with Funding from the Government of Uganda and its Development Partners and

WHEREAS the WSDF-SWB Facility is to benefit STs / RGCs in the Districts of Sembabule, **Rakai**, Kyotera, Kyenjojo, Kamwenge, Kitagwenda, Ibanda, Buyangabu, Kasese, Ibanda, Kiruhura, Kazo, Mbarara, Rwampara, Isingiro, Bushenyi, Ntungamo, Kabale, Rubanda, Rukiga, Kisoro, Kanungu, Lyantonde, Rukungiri, Rubirizi, Mitooma, Buhweju, Sheema, Bundibugyo, Ntoroko, and Kyegegwa.

WHEREAS District Local Governments have the mandate for provision and Sustainability of Water and Sanitation Services and

WHEREAS District Local Governments may source for funding for Water and Sanitation Services for their communities and assist communities to plan and optimally utilize, manage and sustain the facilities availed; and

WHEREAS The **Kibaale Community** in partnership with the Kyalulangira Sub County applied to the Facility for assistance to implement water and sanitation facilities and the Facility has agreed to finance the implementation of the water and sanitation project for the community.

NOW THEREFORE, this MoU establishes a general framework for cooperation and participation between the WSDF - SW in partnership with the District Local Government and the community in partnership with the respective administrative units (herein after referred to as parties) as follows:

PART I PARTICIPANTS AND REPRESENTATIVES

This MoU is between The Water and Sanitation Development Facility-South West of the Directorate of Water Development, Ministry of Water and Environment in Partnership with **Rakai District Local** Government. WSDF-SW is represented by **Eng. Mwanje Enoch** Branch Manager, WSDF-SWB

And

Kibaale, Byakabanda, Kiziba, Kyalungira Communities in partnership with **Kibaale Town Council, Byakabanda Sub County, Kiziba Sub County, Kyalungira Sub County.**

Represented by ...Mugema Christopher..... the Chairperson, WSC.

PART II COLLABORATIVE ACTIVITIES

For the purpose of the present MoU, the partners have agreed to collaborate in extending Water and Sanitation facilities for **Kibaale.**

PART III RESPONSIBILITIES

A. The communities of Kibaale, Kyalulangira, Byakabanda and Kiziba agree to;

1. Apply for Water and Sanitation services
2. Form (elect) a gender balanced water and sanitation committee for implementation of water supply and sanitation system. The committee must represent and reflect the future users.
3. Describe the water and sanitation situation prior to the intervention of the project and keep records of the changes there after following instructions from WSDF-SW.
4. Open up a bank account in a Commercial Bank for implementation.
5. Assist the Project staff, consultants and extension staff with the execution of the base line survey and concurrent surveys (source identification, topographic survey, sanitation surveys etc) in the development of the water scheme.
6. Contribute UGX 100,000/= for every public kiosk provided for in the design. This money should be collected from the entire community to raise a sense of ownership.
7. Each approved institution and household applicant for private connection shall pay UGX 100,000 as connection fees before connection.
8. Provide all land for infrastructural development in the dimensions and locations provided at the time of design presentation to stakeholders. All land provided SHALL NOT have any conditionalities attached and should be free of any conflicts.
9. Organize regular water and sanitation meetings with the population and participate in planning meetings for the development of the water and sanitation scheme.
10. Forward all complaints, issues and concerns pertaining to water and sanitation system implementation to the facility and other relevant authorities for redress.
11. In case of any existing water supply system, the community shall accept that the District relocates it to serve the un-served areas outside the new water supply area.
12. Select artisans for training according to the provided criteria.
13. Ensure 100% coverage of safe excreta disposal facilities (Latrine/Toilet) within the water supply area.
14. Ensure that each excreta disposal facility has a functional hand washing facility with water and soap.

15. Undertake to promote general hygiene and sanitation practices at household level (Compost pit, kitchen, drying rack, clean and covered water containers, animal shelter, bath shelter, clean compound, boiling drinking water etc).
16. Fulfill community obligations and apply for construction within six months from the day of design presentation.
17. Mobilise and sensitise the community to permit pipeline passage.
18. Undertake to shoulder 100% O & M costs using collections from user fees.
19. Jealously guard and maintain scheme structures sustainably.

B **Kibaale Town Council, Byakabanda, Kiziba, Kyalulangira Sub Counties agree** to:

1. Undertake to give political support to the Project.
2. Monitor progress of community contributions especially on Land acquisition.
3. Resolve any land wrangles and any other conflicts that may arise that are related to the intervention being put in place.
4. Organize the community to elect suitable members of the Water and Sanitation Committee that will run the programme on behalf of the water users according to the provided guidelines.
5. Monitor WSS construction work done in the RGCs/STand bring to the attention of the WSDF-SWB any irregularities
6. Assist the community with the execution of the sanitation baseline survey and the concurrent surveys.
7. Assist the community in making a sanitation work plan and its implementation using the Town Council and Sub County extension staff (health staff and community development staff) in the Project area.
8. To enact and enforce byelaws necessary to implement the water and sanitation Project.
9. Pass a resolution empowering WSC to operate autonomously.
10. Secure lease offers for acquired pieces of land.
11. Where an Umbrella Water Authority is appointed as the Water Authority, form a Water and Sanitation Board that will represent the community to manage the water and sanitation scheme.

12. In case of any existing water supply system, mobilize the community to accept that the District relocates it to serve the un-served areas outside the new water supply area.

13. Provide support to the appointed WSSB in following up and ensuring proper Operation and maintenance of constructed water supply systems.

14. Avail established structures to ensure that sanitation improvements achieved during implementation are sustained.

15. Ensure that scheme assets are properly maintained according to the provided manuals and guidelines.

C **Rakai District agrees to:**

1 Sign an MOU with WSDF-SWB which defines the respective roles and responsibilities of both parties and funding criteria and procedures, procurement, modalities of joint supervision of contractors and consultants.

2 Undertake to give political support to the projects being implemented within the District.

3 Encourage water stressed STs / RGCs to apply for water and sanitation services. In doing so the District shall within a timely manner receive, verify data, endorse and forward these applications at no salary or fringe benefit cost to the Facility.

4 Co-funding where this is possible.

5 Provide technical personnel who shall together with the Facility engage in planning for, supervise and monitor implementation of the water and sanitation activities.

6 Assist, facilitate and mobilize STs / RGCs to fulfill their obligations in a realistically anticipated time period (6-9 months) for successful implementation of the program.

7 Propose an appropriate piece of land suitable for construction and management of a sludge treatment plant.

8 Ensure that Environmental concerns are addressed.

9 Fully own projects in their Districts, but without compromising the operational autonomy of WSC / WSSB.

7

10 In case of any existing water supply system, the District shall relocate it to serve the un-served areas outside the new water supply area.

11 Provide support to established Water Authorities in following up and ensuring proper Operation and Maintenance of constructed water supply systems.

12 Avail her established structures to ensure the sanitation improvements achieved during implementation are sustained.

13 Undertake to give technical support towards Operation and Maintenance of the constructed water supply and sanitation systems.

D **WSDF-SW agrees to:**

1. Define and control funding regulations and conditions.
2. Conduct advocacy and promotional campaigns to advertise on the availability of the facility, funding conditions and eligibility criteria.
3. Meet the costs of designing and implementing water and sanitation activities in the selected STs / RGCs within the District.
4. Prepare, evaluate and manage call for proposals according to the guidelines of the WSDF.
5. Check the appropriateness, correctness and financial viability of technical designs provided by the community at application stage and provide the community with a project proposal and give an explanation of the proposal.
6. Spearhead production of appropriate and financially viable technical design proposals for discussion with the stakeholders at all levels.
7. Carry out mobilization and sensitization activities throughout the implementation period.
8. Procure Works, Supplies and Services required in the implementation of water and sanitation activities in the District using the delegated Facility Contracts Committee.
9. Enter into contracts with the private sector to execute the construction activities and procure materials.
10. Monitor and supervise the quality of construction works and vetting of payments.
11. Ensure proper financial and administrative management of WSDF-SW.

12. Drawing operational plans and budgets to the WSDF-SW Steering Committee for guidance and approval.
13. Support the community in running the environmental, hygiene and sanitation programmes.
14. Promote appropriate toilet technologies in the project communities.
15. Assist the community in establishing O & M structures and training the actors.
16. Provide technical backstopping throughout the implementation of the programme.
17. Prepare an overview of expected maintenance costs as well as assist the community in preparing an Operation and Maintenance manual.
18. Assist the community to acquire land titles for all the acquired pieces of land.
19. Protection of water sources and assisting in afforesting them.
20. Promote agro-forestry in the catchment area of the water sources.

PART IV DURATION OF THE AGREEMENT

The parties to this MoU shall remain in partnership as stated in the present MoU until completion and handover of the constructed water and sanitation facilities is done, except if any party fails to honor their obligations.

PART V EFFECTIVITY

This Memorandum of Understanding (MoU) shall take effect upon the signing by all parties.

IN WITNESS WHEREOF, the parties have hereunto affixed their signatures

The Chairperson, WSC..... Mugema Christopher .....

Signature: .....

The Town Clerk-Kibaale Town Council: .....

TOWN CLERK
KIBAALE TOWN COUNCIL
RAKAI DISTRICT
Date:.....

Signature: .....

The LCIII Chairperson-Kibaale Town Council: ..... Lubega Aaron .....

CHAIRPERSON L.C.III
KIBAALE TOWN COUNCIL
RAKAI DISTRICT
Date: 16/03/2022

Signature: .....

The Senior Assistant Secretary-Kyalulangira Sub County: .....

Signature: .....

The LCIII Chairperson-Byakabanda Sub County: ISAAC GEORGE BUSH

Signature .....

The Senior Assistant Secretary-Byakabanda Sub County: SAMULA JOHN

Signature: .....

The LCIII Chairperson-Kyalulangira Sub County: Kamushana alex

Signature Kamushana alex

WSDF - SW Representative: .....

Signature: .....

Witnessed by:

The District Water Officer: MUWANGA FRANCIS

Signature: .....

The Chief Administrative Officer: KAMUYA EDWARD

Signature: .....

The District Chairperson: SEKAMWA KAGIMA SAMUEL

Signature: .....

The Resident District Commissioner: .....

Signature: .....

CONCERNS FROM MINISTRY OF WATER AND ENVIRONMENT OFFICIAL CONSULTATIONS – KIFAMBA WSSS

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PLOT 1, KABALE ROAD
MBARARA CITY

THE REPUBLIC OF UGANDA

MINISTRY OF WATER AND ENVIRONMENT
DIRECTORATE OF WATER DEVELOPMENT
WATER AND SANITATION DEVELOPMENT FACILITY – SOUTH WESTERN BRANCH
P.O.BOX 575, MBARARA

MINUTES OF THE DRAFT DETAILED DESIGN PRESENTATION FOR KIFAMBA WSSS-RAKAI DISTRICT HELD ON 27TH MAY 2021 STARTING AT 2:00PM AT THE SUB COUNTY HEADQUARTERS.

Program

1. Opening Prayer
2. Self-Introductions
3. Welcome remarks from the Town Clerk-Kifamba Sub County
4. Remarks from Water and Sanitation Committee Chairperson- Kifamba WSSS
5. Remarks from the LC III Chairperson-Kifamba Sub County
6. Communication from the Manager, WSDF-SW
7. Presentation of the draft detailed design report by the Consultant
8. Discussions and Way forward
9. Remarks from Rakai District Local Government Officials
10. Closing remarks from the RDC- Rakai DLG

Attendance list is attached.

Minute No.	Deliberation	Responsible person
Min 1/05/2021	**Opening prayer** The opening prayer was led by one of the participants.	
Min 2/05/2021	**Self-Introductions** Self-Introductions were made by all the participants and their respective dignitaries.	
Min 3/05/2021	**Welcome remarks from the Senior Assistant Secretary (SAS)** The SAS-Kifamba SC, Ms. Nakyanzi Dorothy Kirabo, thanked all for attending the design presentation. She elaborated that a lot of mobilization and sensitization activities were held therefore the community was conversant with the project under design. She noted that the design process has taken a while because of the COVID19 pandemic and other challenges but glad that the consultant was presenting the design for the project.	All to note
Min 4/05/2021	**Remarks from the Chairperson Water and Sanitation Committee** Mr. Kyaluzi Baker, the Chairperson WSC, apologized for coming in late for the design presentation saying he was engaged in another meeting. He thanked the Government of Uganda for the support rendered and the project progress so far. He noted that all the water challenges in the Sub County will be solved once the system is	All to note

9. Project implementation duration

10. Project cost (estimate)

A copy of the presentation is attached.

- Having presented the draft detailed design for Kifamba RGC WSSS, the participants were asked to forward their inputs, comments for consideration.
- Kifamba RGC WSSS covers 4No. Parishes of; Kabala, Kifamba, Kisaasa, Kawunguli and 19No. Villages; Kalongo, Mbirizi, Kabala, Kiteredde, Kifamba, Kitente, Nabunga, Lutemi, Lwemisege, Kijumba, Nseese, Kisaasa, Kiruuli, Nyanga-Kentale, Kasaasa, Mannya, Lulaala, Kagongero and Lwemiwulu. — All to note
- Lake Kijjanibarola was the preferred water source after a detailed water resource assessment was carried out.
- The participants were informed that it's a community obligation to acquire all the pieces of land needed for the development of the project. The following pieces of land are required; — The Community

	Land	Dimension
1.	Office block	30x25 m
2.	Water source land in Lukondo Village	100x100 m
3.	500m^3 Command reservoir tank in Lugongo Village	50x50 m
4.	50m^3 reservoir tank in Nabunga Village	30x25 m
5.	200m3 reservoir tank in Kasaasa village	30x25 m

- It was also mentioned that Kibaale and Kifamba WSSS will use the same water source and command reservoir tank. The Administrative units should work hand in hand when acquiring the land. He reminded the participants that community obligation should be fulfilled within six months. — The Community
- The participants were told that the Socio-Economic survey data showed that some households lacked EDFs, and most components of a good home. Therefore, community was urged to improve on their household sanitation, hygiene status by having all the components of a good home. Sanitation and hygiene are a requirement for a household to be approved for a private connection. — The Community
- The consultant encouraged the community to construct emptiable toilets saying they are easily emptied, don't contaminate ground water and cost effective. They were told that WSDF-SW constructed a Faecal Sludge Treatment Plant was in Kasaali Town Council - Kyotera District and was under the management of the Umbrella of Water and Sanitation Authority-Central. — All to note
- In order to improve the sanitation situation at institutional level, WSDF-SW promote Water Sanitation and Hygiene (WASH) activities in a school (model School) by constructing a 5No.stances Lined VIP latrines for boys and girls respectively, constructing a rain water harvesting tank to promote hand washing

	with clean water and soap, shower room, incinerator and garbage skips for proper waste management. Selection criteria for the model school will be submitted to the Sub - County for action. This is done to promote sanitation and hygiene and for other institutions to replicate. ❖ There are 1450 private connections and 30 public stand posts proposed under the project.	WSDF-SW
Min 8/05/2021	**Discussion and way forward** WSDF-SW will conduct an assessment to find out whether a public water borne toilet is feasible in the RGC. The sanitation facility is usually constructed in a busy area like taxi park or market. The community proposed that an appropriate public sanitation facility be considered for the community at the water intake point as it's a landing site. It was mentioned that WSDF-SW conducts radio talk shows as a mobilization and sensitization strategy. The DRDC was requested to always inform and give WSDF-SW an opportunity to utilise the minutes given to the RDC on specific radio stations. The minutes will be used to sensitize the community on the projects under design in the District and about the WSDF-SW. It was mentioned that it's a community obligation to acquire land. However the WSC will spear head the community in fulfilling the obligations. The consultant together with WSDF-SW will identify and peg off all the pieces of land, the surveyor will survey all the land and land valuer engaged for land valuation. Once the land is pegged, the community should start negotiations with the owners. It was highlighted that a Contractor will be engaged to construct the WSS and as required by law 30% of the labour force must be local content. WSDF- SW usually recommends that for manual work the priority should be given to the beneficiary community who are willing to work. The participants were informed that WSDF-SW would conduct more trainings and meetings to share information, address challenges and also make resolutions on issues pertaining to the project. The new political leaders will be sensitised during these meetings and trainings. On sanitation, the Health Assistants was tasked to put more efforts and emphasis on sanitation improvement. It was noted that Rakai District sanitation coverage was low, with most households lacking EDFs and hand washing facilities. They participants were told that sanitation was key for a household to get a private connection a case in point was in Buyamba RGC where some households missed getting connections due to poor sanitation. The Health Assistant was tasked to enforce, apprehend all the EDF defaulters. The community leaders were asked to support the Sub County Technical team to improve the sanitation status of the RGC. It was noted that Religious Leaders were not part of the meeting and yet they are key mobilizers and stakeholders in project implementation. The WSC and Sub County were tasked to invite all relevant key stakeholders especially Heads of institutions for such	Health Assistant Health Assistant WSC and Sub County

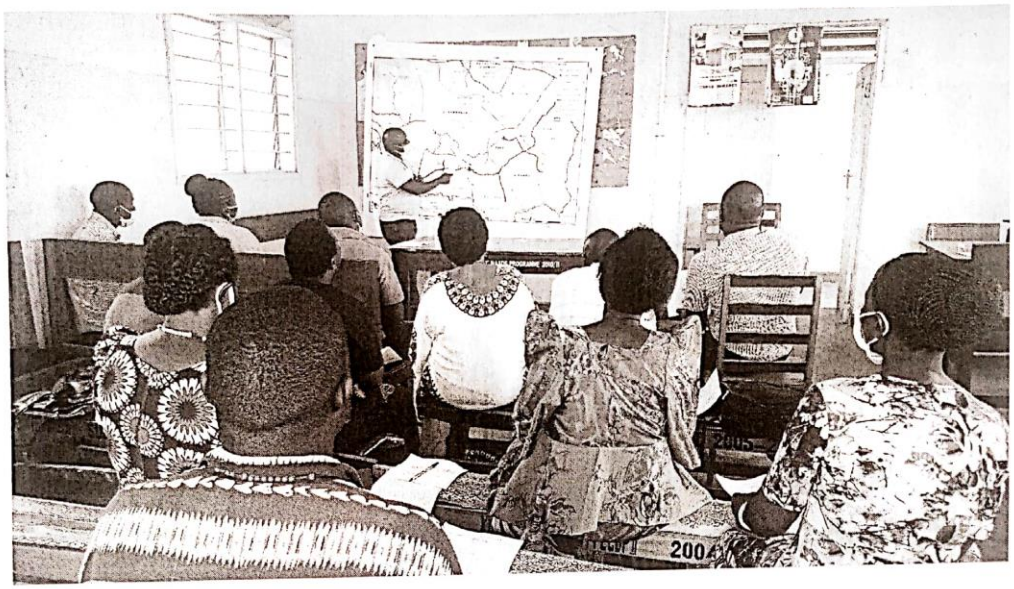
	meetings and trainings. It was clearly mentioned that there will be no compensation for pipeline passage and other pieces of land. The WSC and Sub – County were tasked to sensitize the community	All to note
Min 9/05/2021	**Remarks from District Water Officer** The DWO, Mr. Muwanga Francis, appreciated WSDF-SW for the service delivery of extending water to Kifamba and Kibaale communities. He asked the community to support and also embrace the project. He said once the project is constructed, the water borne diseases, walking distance would reduce hence economic development. He pledged to support and cooperate with the WSDF-SW throughout the implementation process.	All to note
Min 10/05/2021	**Closing Remarks from the Resident District Commissioner** The RDC was represented by the Deputy RDC, Mrs. Muhindo Justine Mutabazi, who informed the meeting that the RDC was away for other official duties. She appreciated the Ministry of Water and Environment through WSDF-SW for considering and supporting Rakai District by designing a Water and Sanitation project. She applauded the WSDF-SW for the good work exhibited in Buyamba RGC and called for project ownership by the community. She asked the Health Assistant to sensitize the community on safe water chain which involved protecting, keeping water sources clean, use of clean, covered water collection containers among others. This will help in the reduction of water related diseases. She noted that the community has only 6 months to fulfil their obligations thus called for team work and more efforts. The stakeholders were asked to perform their roles and responsibilities as this will smoothen the implementation process. She urged the community to desist from politics and bring all issues pertaining to the project to the relevant authorities for redress. She asked WSDF-SW to improve on communication by sharing information on the implementation progress with all stakeholders. She called for coordination, team work by all. WSDF-SW officials were asked to always make courtesy calls to the different offices noting they are vital for information sharing. She also said the RDC was ready to work and support the President's manifesto. WSDF-SW was asked to work hand in hand with the District Technical staff like the Engineer, DWO and Environment Officers among others. She urged the Leaders to encourage the people join saving groups to enable them pay connection fees using their savings once construction starts. She concluded by telling the participants that COVID19 was real, therefore should observe social distance, wear masks, wash hands, sanitize and stay home.	All to note Health Assistant Community All to note WSDF-SW All to note

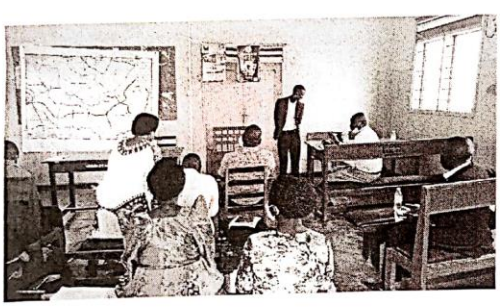
	Minute Secretary	Chairperson
Signature:	.....	..... 24/8/21.
Name:	Eng. Barbara Nanyombi	Eng. Mwanje Enoch
Title:	Engineer	Branch Manager

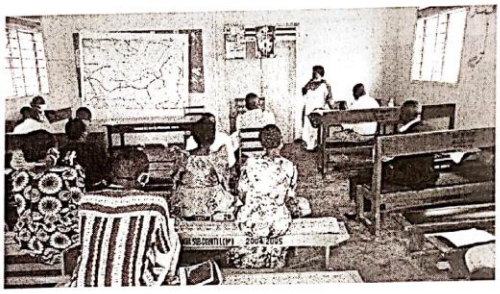
ACTION REPORT

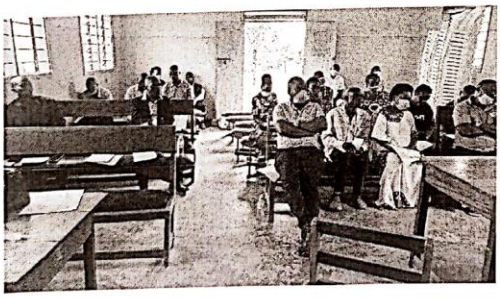
NO.	DELIBERATION	RESPONSIBLE PERSON	ACTION TAKEN
1	Identifying and Pegging all the required pieces of land.	WSDF-SW	The Lock down affected the activity
2	Acquisition of all the required pieces of land	WSC and Town Council, Sub County	
3	Submitting selection criteria for the model school to the WSC and Town Clerk	WSDF-SW	
4	Incorporating the comments from stakeholders' in the design and submitting the design for approval	Consultant	On going

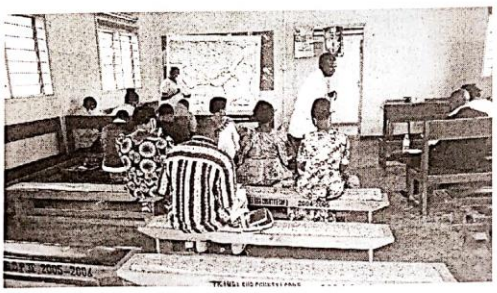
PHOTOS











Page 7

CONCERNS FROM MINISTRY OF WATER AND ENVIRONMENT OFFICIAL CONSULTATIONS – KIBAALE WSSS

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THE REPUBLIC OF UGANDA

MINISTRY OF WATER AND ENVIRONMENT
DIRECTORATE OF WATER DEVELOPMENT
WATER AND SANITATION DEVELOPMENT FACILITY – SOUTH WESTERN BRANCH
P.O.BOX 575, MBARARA

MINUTES OF THE DRAFT DETAILED DESIGN PRESENTATION FOR KIBAALE TC WSSS-RAKAI DISTRICT HELD ON 27TH MAY 2021 STARTING AT 10:00AM AT KYALULANGIRA SUB COUNTY HEADQUARTERS.

Program

1. Opening Prayer
2. Self-Introductions
3. Welcome remarks from the Town Clerk-Kibaale Town Council
4. Remarks from Water and Sanitation Committee Chairperson-Kibaale WSSS
5. Communication from the Manager, WSDF-SW
6. Presentation of the draft detailed design report by the Consultant
7. Discussions and Way forward
8. Signing of the MOU
9. Remarks from Rakai District Local Government Officials
10. Closing remarks from the RDC- Rakai DLG

Attendance list is attached.

Minute No.	Deliberation	Responsible person
Min 1/05/2021	**Opening prayer** Ms. Nalubowa Caroline, a member of Water and Sanitation Committee led the opening prayer.	
Min 2/05/2021	**Self-Introductions** Self-Introductions were made by all the participants and their respective dignitaries.	
Min 3/05/2021	**Welcome remarks from the Town Clerk-Kibaale Town Council** The Acting Town Clerk-Kibaale Town Council, Mr. Ssemakula John, highlighted that implementation of the project commenced in 2014 with a few villages considered. He called for combined efforts, participation, unity and teamwork by all stakeholders when fulfilling community obligations. He highlighted that being on the Water and Sanitation Committee was voluntary with no financial benefits attached however, they were will to play their roles and responsibilities. He requested WSDF-SW engage or bring on board the Natural Resource officer or Environmentalists to deal with environmental concerns that may come up. He also informed the participants that during the stakeholders' meeting held on 14th	All to note WSDF-SW

	May 2021, it was agreed that the MOU be adjusted to include all the administrative units of; Byakabanda S/C, Kiziba S/C, Kyalulangira S/C, and Kibaale Town Council. This involved all Leaders appending their signature on the document that they agree to play their roles, create a sense of ownership and participation in all water and sanitation activities. He reminded all that the community has only six months to fulfill the community obligations mainly land acquisition.	Community
Min 4/05/2021	**Remarks from the Chairperson Water and Sanitation Committee** The WSC Chairperson, Mr. Mugema Christopher, welcomed and thanked all for attending the design presentation meeting. The Chairperson highlighted that the WSC leads the community into fulfilling community obligations. They also have the role and responsibility of mobilizing and sensitizing the community about the water and sanitation project. He requested WSDF-SW to conduct more mobilization and sensitization trainings and meeting on water, sanitation, WSDF-SW approach and principles among others. He said the WSC was committed to serve and also play their roles and responsibilities as stipulated. He asked the participants to submit missing villages for consideration.	All to note WSDF-SW All to note
Min 5/05/2021	**Communication from the Branch Manager - WSDF-SW** The design presentation meeting was chaired by the Branch Manager WSDF-SW, Eng. Enoch Mwanje, who welcomed and thanked all for attending. He said the consultant was presenting the draft design for Kibaale Town Council Piped Water Supply and Sanitation System. Therefore, urged the participants to forward comments before a final design is submitted. He called for active participant and attention during the design presentation. He cautioned the Leaders to ensure that all the villages in the water supply area were included.	All to note
Min 6/05/2021	**Presentation of the draft detailed design report by the Consultant** The draft detail design for Kibaale RGC WSSS was presented by Eng. Dan Otwane Etiange. The following aspects were tackled during the presentation; 1. Kibaale Project area coverage (Administrative units) 2. Water supply area coverage and design population to served 3. Existing water supply system used 4. Existing sanitation facilities used and situation 5. Projected water demand 6. Proposed water source to be used 7. Designed system components 8. Land requirements 9. Project implementation duration 10. Project cost (estimate)	

	A copy of the presentation is attached. ❖ After presenting the detailed design for Kibaale WSSS, the community was called upon to submit their comments for consideration and redress. ❖ Kibaale project area covers 5No. Administrative units of Kibaale Town Council, Byakabanda S/C, Kyalulangira S/C, Kiziba S/C, Kibanda S/C and 55 Villages, these include; **1. Kyalulangira Sub County** Sanje A&B, Kigolomola, Kayago A&B, Kyamumba , Kalugu, Kasula A&B, Ntovu, Kamoma A&B, Ntebezaddungu, Kawenda, Kizinga A, B &C, Kyalulangira **2. Kibaale Town Council.** Kabingo, Kyakasenene A&B, Rwantende, Bitusi, Kaliiro, Kalungi, Kangombe A&B, Byenkende, Kibaale, Kyambulugu, Tolera, Kigumba, Lumumba. **3. Kiziba Sub County** Ndaga A&B, Kyamigongo, Kamicola, Katunga **4. Kibanda Sub County:** Bulanga **5. Byakabanda Sub County:** Byakabanda, Lugongo, Kiyooza, Kamukalo A&B, Lukyamu, Bbuba, Kisomole, Kyawanyana, Bumogolo, Kaami, Kibinda, Kikakata, Lukondo, Kyampewo. ❖ Lake Kijjanibarola was the preferred water source after detailed water resources assessment. Investigations revealed that Kibaale and Rakai at large have ground water challenges i.e. low water table and water being salty. The volume of water in River Kibaale reduces drastically in the dry spell. ❖ The Consultant informed the participants it's a community obligation to acquire all the pieces of land needed for the development of the project. The following pieces of land are required; **Land** — **dimension** 1. Office block — 30x25 m 2. Water source in Lukondo Village — 100x100 m 3. 500m³ Command reservoir tank in Lugongo Village — 50x50 m 4. 550m³ reservoir tank in Toleero Village — 30x25 m The Community was reminded that they had only 6 months to fulfil their obligations. . ❖ More still, according to the household Socio-Economic survey carried out in the water supply area, the findings revealed that the sanitation and hygiene situation was still wanting. Some households lacked Excreta Disposal	All to note Community All to note

	Facilities, majority shared the facilities, some were in a poor state, filled up, dirty with no hand washing containers and privacy. ❖ He advised the community to construct EDFs as this was a requirement for a household to be approved for a private connection. ❖ He also elaborated that WSDF-SW constructed a Faecal Sludge Treatment Plant in Kasaali Town Council-Kyotera District and was under the management of the Umbrella of Water and Sanitation Authority-Central. He therefore, encouraged the community to construct emptiable toilets saying they are easily emptied, don't contaminate ground water sources and cost effective. ❖ In order to improve the sanitation and hygiene situation at institutional level, Water Sanitation and Hygiene Project (WASH) will be promoted in the model school identified. This includes construction of 5No.stances-Lined VIP latrines for boys and girls respectively, construction of a rain water harvesting tank to promote hand washing with clean water and soap, shower room, incinerator and garbage skips for waste management. The selection criteria for the model school will be submitted to the Town Council and WSC for action. ❖ There are 1450 private connections and 30 public stand posts in the project area.	All to note WSDF-SW
Min 7/05/2021	**Discussion and way forward** **The following issues were discussed;** The WSDF-SW together with the Consultant will identify and peg off all the required pieces of land. The surveyor will survey the land and the Chief Government Valuer will be engaged to value the land. It's a Government directive not to construct projects when land is not fully acquired. In order to improve the sanitation status of the town, WSDF-SW constructs a public sanitation facility in an appropriate location like taxi parks, markets etc which are busy. However, this was not mandatory and an assessment will be conducted to ascertain the feasibility of the facility in the town. Aspects such as location, population to be served, Operation and Maintenance issues will also be looked at. The Community was tasked to improve their household sanitation by having all the components of a good home as that is a pre-requisite for a household to be approved for a private connection. According to the MOU, water will not be commissioned for use unless 100% basic sanitation coverage is achieved. The meeting was informed that the major role of the Umbrella Authority is to operate and maintain constructed Piped Water Supply and Sanitation Systems. It was highlighted that a Contractor will be engaged to construct the WSS and as required by law 30% of the labour force must be local content. WSDF- SW usually recommends that for manual work the priority should be given to the beneficiary community who are willing to work.	WSDF-SW All to note

Min 7/05/2021	The participants were informed that only the areas that had been agreed upon and were missing in the design will be incorporate before completion. However, the design will be reviewed once construction starts and an assessment will be made on the other proposed areas of Kakumbiro, Kasiika, Kyalulaala and Lwanamboga in Byakabanda Sub - County. It was also noted that the distribution line to Villages of; Sanje A & B, Kigolomola, Lwantende, Ntebezaddungu, Ntovu, Kalugu, Kazinga B, Kyamumba, Ndaga A&B, Kyamigongo, Kamicola, Katunga, Kigolomola, Kamoma A&B were not surveyed and not reflected in the layout; The Consultant was tasked to engage the surveyor to survey the distribution lines to the above mentioned villages. They Consultant confirmed that the survey exercise wouldl start on 31st May 2021. The Parish Chief was tasked to work hand in hand with the surveyor. It was agreed that WSDF-SW would avail the Leaders with a land agreement template that will be used during the land acquisition process. The Health Inspector was request to elaborate on the recommended EDF as per the Public Health Act and he stated that the EDF must have a structure, depth of 15fts, door for privacy, washable floor, cover/roof etc. The community was told that no compensation would be made for pipeline passage and land titles will not be processed for pipeline passage. Road reserves will be used as much as possible and people's plots will be used where inevitable. The pipes are to be laid three feet down, the owner can continue with other activities like cultivation but not construction. The participants were informed that the land titling process will be handled by WSDF-SW. They were reminded that it is a community obligation to acquire all the required land. More still the land agreements or negotiation process should not have any conditions attached.	All to note Consultant WSDF-SW Community All to note
Min 8/05/2021	**Signing of the MOU** The participants were taken through the roles and responsibilities of all key actors during the implementation of the project that is the Community, District, Town Council/Sub County and WSDF-SW. The participants clearly understood and agreed to perform their roles and responsibilities to enable the success implementation of the project. The MOU between Kibaale community and WSDF-SW was signed successfully.	
Min 9/05/2021	**Remarks from District Water Officer** The DWO, Mr. Muwanga Francis, thanked all for attending the design presentation. He thanked WSDF-SW for the project of extending water for domestic use to the people. He asked all to embrace the project and guard it jealously.	Community

Min 10/05/2021	**Closing Remarks from the Resident District Commissioner** The RDC was represented by the Deputy RDC, Mrs. Muhindo Justine Mutabazi, who informed that participants that the RDC was away for other official duties. She appreciated the Ministry of Water and Environment through WSDF-SW for considering and supporting Rakai District by designing a water and sanitation project. She called upon the community to own and embrace the project right from the start. She further thanked the Government of Uganda for funding the design process. The DRDC highlighted that water was a basic need and very scarce in Rakai District. With the implementation of the safe Piped Water Supply and Sanitation system, the disease burden and walking distance will reduce hence increased productivity and engagement in developmental activities. She urged the Sub Counties, Town Council, District to stick to their roles and responsibilities. She reminded all that the political season was over therefore, Leaders should focus on development activities in their areas. She also asked WSDF-SW to engage the Natural Resources and Environmental Officers throughout the implementation process to avoid environment issues that might come up. The community was asked to protect the available water sources to avoid contamination. WSDF-SW was requested to always make formal communication once project activities are not implemented as planned. And in case of any challenges encountered the relevant stakeholders should be informed. She noted that cooperation by all was vital in the implementation process, noting the Leaders should be aware of the project progress for proper monitoring and quality assurance. She requested that the local community should be prioritized during the construction of the project. They should be involved in both technical and none technical work. She informed the participants that WSDF-SW team is so cooperative, supportive and hand working this was witnessed in Buyamba RGC. She pledged total support and coordination and called for information flow from top to bottom and bottom to top to ensure sustainability of the scheme. WSDF-SW was tasked to have a sustainability plan for the project. She said without access to safe water productivity was low.	All to note WSDF-SW WSDF-SW All to note WSDF-SW

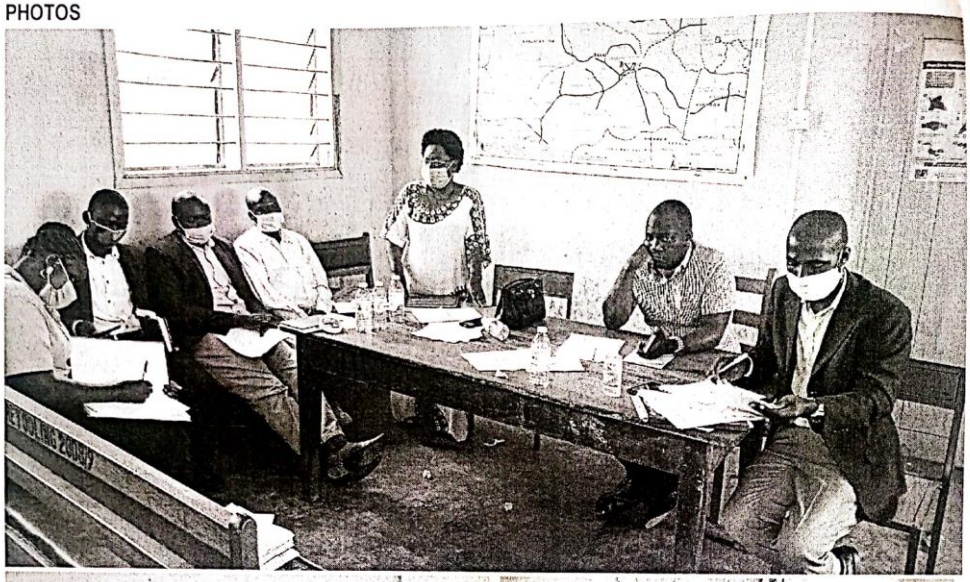
	Minute Secretary	Chairperson
Signature:	.....	..... 24/8/21.
Name:	Eng. Barbara Nanyombi	Eng. Mwanje Enoch
Title:	Engineer	Branch Manager

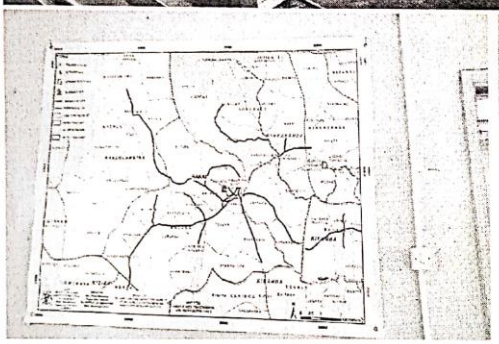
Page 6

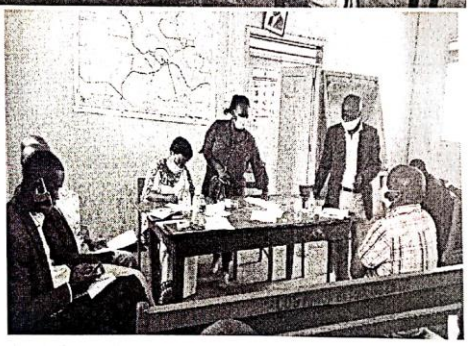
ACTION REPORT

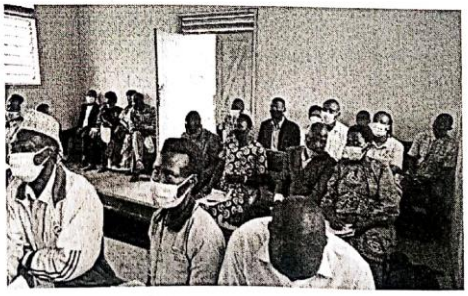
NO.	DELIBERATION	RESPONSIBLE PERSON	ACTION TAKEN
1	Identifying and Pegging all the required pieces of land.	WSDF-SW	The Lock down affected the activity
2	Acquisition of all the required pieces of land	WSC and Town Council, Sub County	
3	Submitting selection criteria for the model school to the WSC and Town Clerk	WSDF-SW	
4	Incorporating the comments from stakeholders' in the design and submitting the design for approval	Consultant	On going
5	Giving the WSC and Town Clerk a land agreement template to be used during the land acquisition process.	WSDF-SW	
6	Surveying the distribution lines to Villages of; Sanje A&B, Kigolomola, Lwantende, Ntebezaddungu, Ntovu, Kalugu, Kazinga B, Kyamumba, Ndaga A&B, Kyamigongo, Kamicola, Katunga, Kigolomola, Kamoma A&B.	Consultant	To commence on 31st May 2021

PHOTOS









CONCERNS FROM RAKAI DISTRICT OFFICIAL CONSULTATIONS

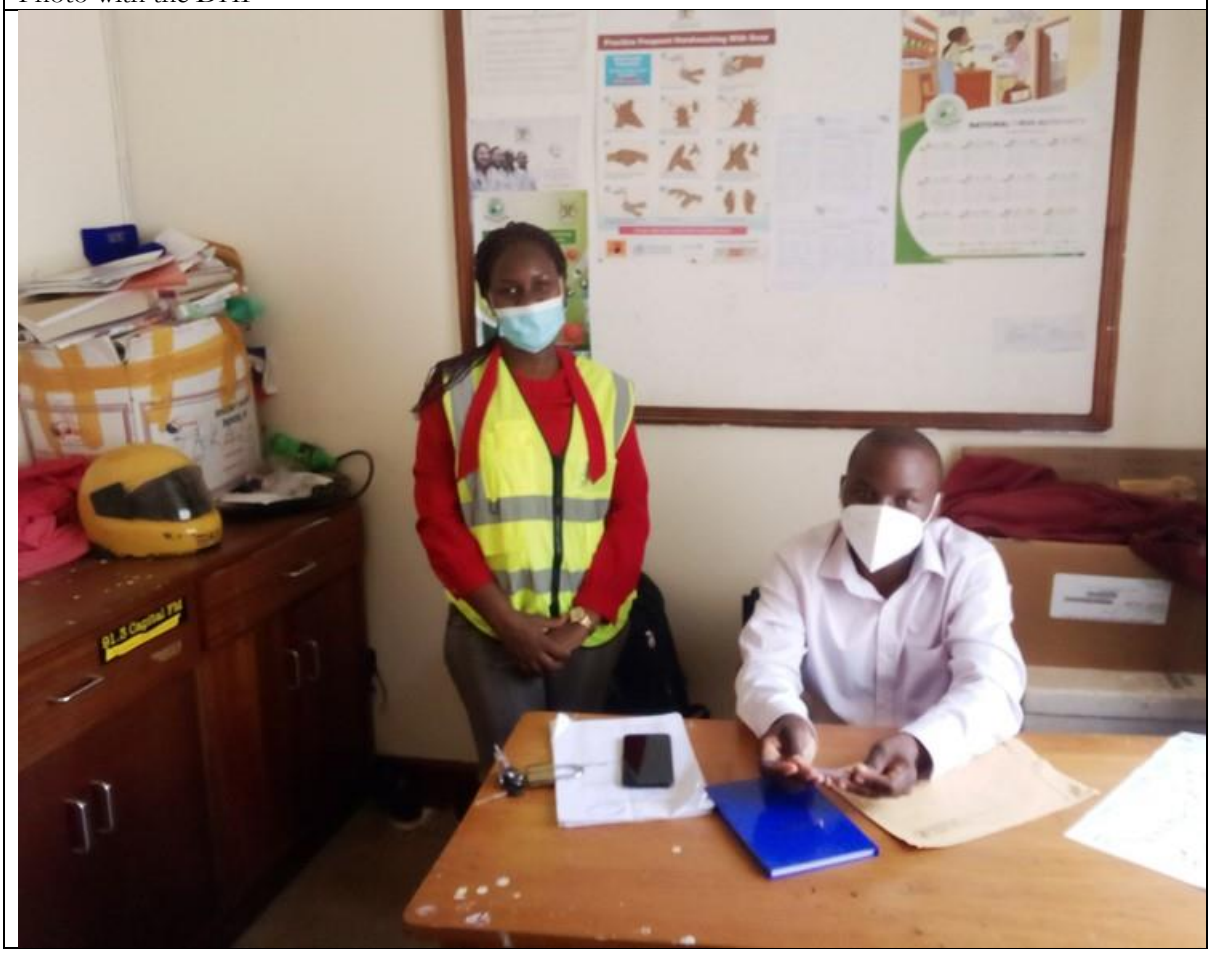
Stakeholder	**Deputy Chief Administrative Officer**
Name	**Mr. Kamya Edwards**
Date	**13/12/2021**
Aspect	**Concern/View/Suggestion**
Land acquisition for project facilities	The deputy CAO appreciated the government's effort in extending clean water in the selected sub counties of Rakai district. He advised that the land sensitization process should be handled with a lot of openness to avoid conflict which might affect the project in the course of operation.
Stakeholder involvement	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.
Domestic and gender-based violence	He anticipated a lot of domestic violence cases to rise due to new people mixing with the communities which might lead to marriage breakups, rape, diseases and also domestic violence. He suggested that precaution measures should be put in place by the contractor to tame the projector workers.
Environmental degradation	He expressed a lot of concern on environment destruction through land excavation, encroachment on the water levels and aqua life while laying the pipes and pumping water from the lake, He advises that effective measures should be put in place to protect the environment.
Employment of local community	Local labor should be prioritized both skilled and unskilled, this will help in reducing unemployment cases in the community but the contractor should equally avoid child labor, delayed payment or defaulting payments to avoid conflict.
High maintenance costs of the system	Rakai as a district is facing a challenge of accessing proper sanitation points; however, he was worried on the maintenance costs, like cleaning the toilets, water for washing hands, soap amongst others which might create more health problems in a long run

Photo with the DCAO

Stakeholder	District Water Officer
Name	**Mr. Muwanga Francis**
Date	**13/12/2021**
Aspect	**Concern/View/Suggestion**
Destruction of intake structure by hippos	Concern was on the hippos in the lake that may destroy the intake pipes which might affect the pumping process in a long run, he advises the designer and contactor to take this into consideration.
Cost of water	Anticipates that the project might be too costly to implement which might affect the completion process because the water from the lake has high iron levels hence high treatment costs.
Photo with the Assistant District Water Officer	

Stakeholder	District Health Inspector
Name	Mr. Bwire William
Date	13/12/2021
Aspect	**Concern/View/Suggestion**
District officials' involvement on the project	Complaints on land may come up when laying pipes and the tanks, this can be solved by engaging the owners early enough and also sensitizing and engaging the community in time and above all bring on board the different opinion leaders like local council leaders, cultural leaders amongst others in the sensitization process.
Increase in spread of COVID19, STDs and other diseases	The DHI expects an increase in disease spread out like the STD's, COVID due to the influx of new people in the community, the ministry of health should be on alert of the possible break out of diseases in the community and the contractor should also caution the workers on the appropriate code of conduct when on duty.

Photo with the DHI



Stakeholder	**District Health Officer**
Name	**Dr. Sakor Moses**
Date	**13/12/2021**
Aspect	**Concern/View/Suggestion**
Spread of COVID19	His main concern was on the COVID 19 pandemic cases which are being managed in the respective sub counties where the project is going to be set up, he pointed out that due to high levels of sensitization, there has been positive attitude by the masses towards vaccination, in Kibanda about 3500 people have received the 1st vaccination shot, over 3000 people in Kibaale have also received their 2nd vaccination doze. The DHO recommended that testing facilities should be set up for all the new masses settling into the respective places for work for the safety of the communities and also the contractor should set up a policy of only employing COVID free people and only those who have been vaccinated.

Photo with the DHO

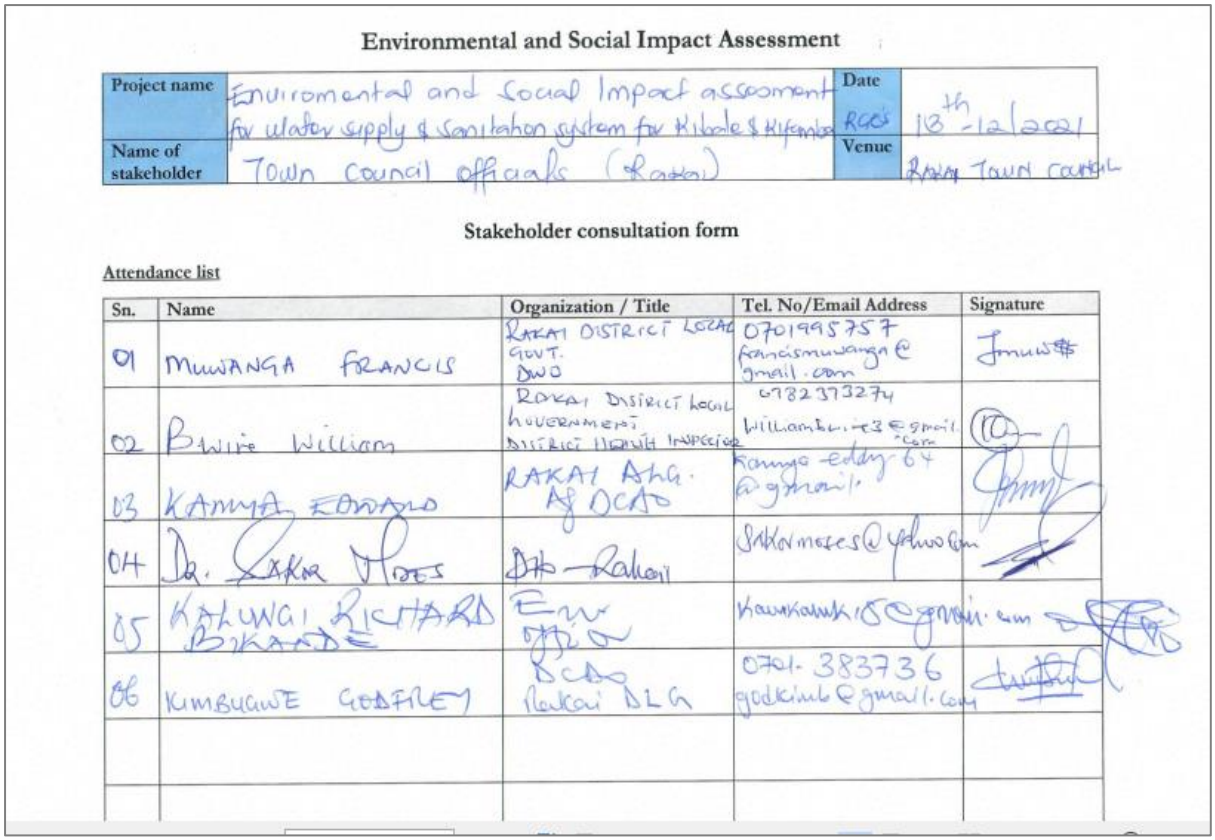
Stakeholder	District Environment Officer
Name	Mr Kalungi Richard
Date	13/12/2021
Aspect	Concern/View/Suggestion
Changing water levels in Lake Kijanebalola	Unstable water levels from the lake brought about by weather conditions might lead to poor water distribution hence project unsustainability.
Stakeholder involvement	Key consideration should be put on stakeholders; they should be involved and consulted at all project levels for effective project implementation.

Photo with the DEO

Stakeholder	District Community Development Officer
Name	Mr Kimbugwe Godfrey
Date	13/12/2021
Aspect	Concern/View/Suggestion
Employment opportunities for local community	Labor discrimination in cases where the contractor decides to bring in foreign labor, he advised that the contractor should first give chance to the community when hiring unskilled labor.
Community empowerment	The water project will empower the community economically through employment opportunities, reduced expenditure on health due to the provision of clean water and some businesses will be boosted like restaurants and housing hence economic growth.
Reduction in the spread of water related diseases	Diseases associated with drinking dirty water, such as Typhoid disease, etc. will be reduced.

Photo with the DCDO

Attendance Lists



Environmental and Social Impact Assessment

Project name	Environmental and Social Impact assessment for water supply & sanitation system for Kibale & Kiruhura	Date	13th-12-2021
Name of stakeholder	Town council officials (Rakai)	Venue	Rakai Town council

Stakeholder consultation form

Attendance list

Sn.	Name	Organization / Title	Tel. No/Email Address	Signature
01	MUWANGA FRANCIS	RAKAI DISTRICT LOCAL GOVT. DWO	0701995757 francismuwanga@gmail.com	
02	Bwire William	RAKAI DISTRICT LOCAL GOVERNMENT DISTRICT HEALTH INSPECTOR	0782373274 williambwire3@gmail.com	
03	KAMYA EDWARD	RAKAI Ag. Ag DCAO	kamya eddy 64 @gmail.	
04	Dr. SAKA MOSES	DHO - Rakai	Sakamoses@yahoo.com	
05	KALWAI RICHARD BYAMBE	ENV OFFICER	kawakawa15@gmail.com	
06	KIMBUGWE GODFREY	DCDO Rakai DLG	0701-383736 godkimb@gmail.com	

Concerns from consultations with Kifamba Subcounty

Name of stakeholder:	Kifamba Sub county
Date:	14th Dec 2021
Venue	Subcounty headquarters
Agenda:	1. Prayers/introductions 2. Welcome remarks by the LC III 3. Communication from the chairman LC III. 4. Discussions and way forward 5. A.O.B and closure

MN 1: Prayer;

The meeting started off with an opening prayer which was led by the CDO Kifamba sub county. This was followed by self-introductions by the present stakeholders from different parishes within Kifamba Sub county.

MN 2: Welcome remarks by: the LC III

The chairperson LC III welcomed all the present stakeholders and expressed his excitement about the project, he took us through the water challenges within the sub county and he encouraged the present stake holders to be very supportive and spread the good news within their respective areas of representation.

He informed the meeting that the public sanitation points to be built in the different communities will help prevent diseases like cholera, typhoid and dysentery, he urged the stakeholders to continue educating the community of the effects of an unhealthy environment contaminated by human waste.

MN 3: Communication from the Chairman LC III:

The LC III informed the meeting that the water project is already known in the community however, though the community need the clean water, they are not willing to give out their land for the project, another major challenge arising is that some land owners where the tanks are to be placed haven't been contacted yet which needs urgent attention

The CDO equally pointed out that a lot of sensitizations (dialogue meeting) should be conducted in the different sub counties for people to be very supportive of the project

Anticipated impacts

i. High costs of accessing the water which might fail the project objective due to the economic status of the community.
ii. High risk of disease outbreak like COVID 19 and STD's due to the increased population in the respective areas.
iii. Employment opportunities to the youths thus enhancing their incomes
iv. Increased crime rates like theft, rape due to increased number of new people in the community
v. Early marriages, inter marriages and domestic violence brought up by the mixing of the new people with the community
vi. Poor pay or untimely payment of the local laborers by the contractor which might lead to conflicts in the community.

Recommendations:

i. Priority should be given to the community youths willing to work.
ii. The water tanks should be provided with security to avoid theft and destruction.
iii. The contactor should only employ vaccinated workers to reduce the risk of COVID 19 spread
iv. For the project to succeed, the water user committee should be involved at all stages.
v. The water access fees should be made affordable for a successful project
vi. The contactor should create a good working relationship with the workers, pay the workers on time and some stakeholders should be present to act as point of reference when the workers are signing contracts to avoid conflicts.

MN 5: Closing remarks by Health Assistant

The health assistant appreciated the present stakeholders for attending the meeting and suggested that also the sanitation facilities at the sub county headquarters should be given top priority, he stated that the health facility at the sub county has no proper supply of water and the sanitation points are in a bad state which puts the patients at a high health risk.

Photo of the meeting

Attendance List

Environmental and Social Impact Assessment

Project name	Environmental and Social Impact assessment for water supply and sanitation system for Kibale & Kifamba RGCs	Date	14th - 12 - 2021
Name of stakeholder	Kifamba Sub - County	Venue	KIFAMBA STAFF HEAD QUARTERS

Stakeholder consultation form

Attendance list

Sn.	Name	Organization / Title	Tel. No/Email Address	Signature
1	NASSOLO SYLVIA	KIFAMBA / C.D.O	0782488506 nassolosylvia1@gmail.com	
2	Nakato winnie	Parish Chief Kifamba	0774127853 0701188997	
3	NAZIMUNI CISSY	parish chief/Kisaasa	0755300367	cissy
4	MUGANGA Robert	Parish chief Kawungubi	0754910118	Robert
5	Ssekulta Ganzaga	Kifamba	0753491202	Ganzaga
6	KAHUKAGWA CHARLES	Kifamba HCIII	0751621661 akolyomaggwacharron@gmail.com	
7	SSENGENYE-BERNON	C/P LC III KIFAMBA	0778344340	
8	NAMIGADDE GRACE	Parish chief	0704905215	

Concerns from consultations with Kyalulangira Subcounty

Name of stakeholder:	Kyalulangira Sub County
Date:	14th Dec 2021
Venue	Subcounty headquarters
Agenda:	1. Prayers/introductions 2. Welcome remarks by the CDO 3. Communication from the chairman LC III. 4. Discussions and way forward 5. A.O.B and closure

MN 1: Prayer;

The opening prayer was led by Mugema Christopher the chairperson water user committee. This was followed by self-introductions.

MN 2: Welcome remarks by: the CDO

The CDO welcomed all the present leaders and welcomed the water project with gratitude, he emphasized the role of the present stakeholders in the piped water project at hand, he advised them to act as ambassadors of the good news in their communities.

He added that the public toilets to be constructed are necessary and will help promote health by reducing the spread of diseases in the different communities within Kyalulangira sub county

He urged the present leaders the need for sensitization of the communities about the project and requested them to offer support to the project activities to ensure that it is implemented timely and successfully

MN 3: Communication from the Chairman LC III:

The chairman LC III welcomed all the present leaders and appreciated their effort in supporting government activities/projects including the water project on table. He briefed the meeting about the water project, the problems the communities have been facing due to the poor water supply and also the stakeholders' role in this water project. He urged them to keep spreading the water news in their respective areas of leadership for effective and timely implementation of the piped water project

Anticipated impacts

i. The water committee chairperson was concerned about the land issue since people are still reluctant on offering their land for free.
ii. Improved standards of living due to increased incomes of those employed.
iii. Disease outbreak like AIDS, COVID 19 due to the influx of new people in the community,
iv. Increased risk of accidents caused by the over speeding of trucks in the course of operations.
v. Economic boost like restaurants, housing and agricultural due to provision of water for irrigation.
vi. High costs of accessing the water which might not favor many people
vii. Environment destruction when laying the pipes and setting up the tanks

Recommendations:

i. A lot of sensitizations regarding the land issues should be conducted to avoid conflict this can be done by facilitating the stakeholders with transport to effectively conduct the sensitization process.
ii. Top priority should be given to the youths when hiring unskilled labor.
iii. The cost of accessing the water should be made affordable and the water user committees should be involved and consulted at all project stages
iv. The land compensation process should be made timely and very considerate.
v. The contractor should try and sub contract local groups for timely delivery.
vi. The contractor should plant trees along the pipe lines for easy identification, this will equally enhance environment conservation

MN 5: Closing remarks by the CDO

The CDO thanked the fellow leaders for attending and urged the government to provide facilitation for the sensitization process for an effective project implementation.

Photo of the meeting

Attendance List

Environmental and Social Impact Assessment

Project name	Environmental and social impact assessment for water supply and sanitation system for Kibale and Kitemba Rgls	Date	14th - 12 - 2021
Name of stakeholder	Kyalulangira Sub County	Venue	Kyalulangira S/cty HQtrs

Stakeholder consultation form

Attendance list

Sn.	Name	Organization / Title	Tel. No/Email Address	Signature
	H Songeye Benon	CDO-Kyalulangira	0772 665245 slonsogeye7@gmail.com	[signature]
	MUTAGUBYA JOSEPH	CDO KIBAALE TC	0782577056	[signature]
	Muhanguzi Robert	H/A - Kyalulangira	0782609695	[signature]
	OKEK ROBINAH OKAKA	Kyalulangira HC III In charge HC	0774105596	Okeo
	Jalamba Kayumbu Ali	Planner Kalangi	0752539777	[signature]
	Mugema Christopher	Cperson water-	0778616296	[signature]
	BYAKATONDA JUDE	Kasula Parish Chief	0775902026	[signature]
	Ssemakula John	SAS	0772310901	[signature]

Concerns from consultations with Byakabanda Subcounty

Name of stakeholder:	Byakabanda Sub county
Date:	15th Dec 2021
Venue	Subcounty headquarters
Agenda:	1. Prayers/introductions 2. Welcome remarks by the chairman water user committee 3. Communication from the LC111 4. Discussions and way forward 5. A.O.B and closure

MN 1: Prayer;

The meeting started off with an opening prayer which was led by Mr. Samula John the sub county chief Byakabanda sub county. This was followed by self-introductions by the present stakeholders.

MN 2: Welcome remarks by : the chairman water user committee

The chairman thanked the present stakeholders for turning up for the meeting to discuss issues pertaining piped water distribution by the government of Uganda to improve water supply in Byakabanda sub county. He appreciated the effort put in this initiative by the government, he promised to offer the necessary support towards the success of the water project through informing the community of any development or issues pertaining the water project.

MN 3: Communication from the Chairman LC 111:

The chairman welcomed all the leaders in attendance for turning up for the meeting, he urged the stakeholders present to be messengers of the good news in their respective places of leadership and also offer the needed support for the good of the project at all levels.

He added that he hopes and prays that the piped water will be well distributed amongst all villages in the sub county and made affordable to help reduce the water problem but expressed his worry of the water being unreliable which he expects to be avoided.

Anticipated impacts

i. Behavior change caused by the mixing of new people in the community, like use of bad language.
ii. Intermarriages that in a long run might cause family breakups and increase numbers of fatherless children
iii. High chances of people's farm land being taken in the course of the project by the contractors when setting up the water pipes with no compensation.
iv. Dust accumulation that may lead to accidents caused by the over speeding of project cars.
v. High risk of increased crime rate like theft, rape due to the arrival of new people in the community
vi. High costs of accessing the water
vii. Employment opportunities like the casual laborers
viii. Business will be boosted like restaurants
ix. Disease spread like AIDS

Recommendations:

i. Measures should be put in place by the contractor to avoid crimes by the workers like cancelling contracts if one is found using bad language, theft e.t.c
ii. For the project to succeed, the stakeholders should be involved at all stages right from the district up to the local council leaders and opinion leaders
iii. A lot of sensitizations should be conducted ahead of the project to avoid conflict mostly on land matters this can be done through facilitating the stakeholders to conduct dialogue meetings.
iv. While hiring workers, the youths in the community should be given first priority.
v. Road safety measures should be put in place to avoid accidents.
vi. Health campaigns should be conducted to help in curbing down the spread of diseases
vii. The water connection fees should be affordable.

MN 5: Closing remarks by the Health Assistant

The health assistant was excited about the water news but informed us that out of 10 homes in Byakabanda sub county, only 4 have toilets, however much the water problem is being solved, a lot of support and sensitization should be shifted towards the need for sanitation points in the communities to curb down the spread of diseases like bilharzia, dysentery and cholera which are a threat to people's lives.

Photo of the meeting

Attendance List

Environmental and Social Impact Assessment

Project name	Environmental and Social Impact assessment for water supply and Sanitation system for Kifamba and Kibale RGCs	Date	15th - 12 - 2021
Name of stakeholder	Byakabanda Sub county	Venue	BYAKABANDA S/CTY H/QUARTERS.

Stakeholder consultation form

Attendance list

Sn.	Name	Organization / Title	Tel. No/Email Address	Signature
1-	SSAMULA JOHN	SUB-COUNTY CHIEF BYAKABANDA S/C	0774-864850 Johnssamula1990@gmail.com	
2-	Ihaweesi Geoffrey	LC5 Byakabanda	0701938593 Ihaweesigeoffrey@yahoo.com	
3	Mugema Christopher	Kibaale-Kifamba water c/person	0778618396 mugemachristopher@gmail.com	
4.	BBAALE GEORGE BUSH	Chman LCIII Byakabanda S/C	georgebushbbaale@gmail.com 0744080628/0703267884	
5	NAMUGEMA HARRIET	VICE C/P WATER & SANITATION BYAK-KIBALE	0754721034 0785512412	
6	Ikweewa James	Staff member	0782365653	
7	KASIBANTE KICKY BEA	KITARA PARISH CHIEF	0750673693 0782580086	
8	MWESIGA GERSHOM	HEALTH INSPECTOR BYAKABANDA	0789066663 gershonmwesiga@gmail.com	

Environmental and Social Impact Assessment

Project name	Environmental and Social Impact assessment for water supply and Sanitation system for Kifamba & Kibale RGCs	Date	15th - 12 - 2021
Name of stakeholder	Byakabanda Sub County	Venue	S-County H/Quarters

Stakeholder consultation form

Attendance list

Sn.	Name	Organization / Title	Tel. No/Email Address	Signature
	MBALIRE CAESAR	PARISH CHIEF BYAKABANDA PARISH	0701058665/ 0789 414 031	
	NAMAGEMBE GLADYS	PARISH CHIEF KAMUKALO	0780446692 0708195181	

APPENDIX IV: WATER QUALITY CERTIFICATES

MAKERERE UNIVERSITY
DEPARTMENT OF CIVIL ENGINEERING
PUBLIC HEALTH AND ENVIRONMENTAL ENGINEERING LABORATORY
Tel: 041-4543152 E-mail: rkulaba@cedat.mak.ac.ug

CERTIFICATE OF ANALYSIS-WATER QUALITY

CLIENT: Eng. Dan Otwane **PROJECT**: Lake Kijanibarora, Rakai

Sampling date: 14th February 2020 **Analysis dates**: 14th – 21st February 2020

Parameter	1	WHO Drinking water standards*
pH	7.65	**ns**
Electrical conductivity (µS/cm)	454	**ns**
Apparent colour (PtCo)	330	**ns**
Turbidity (FAU)	49	**5**
Total Dissolved solids (TDS) (mg/l)	372	**1000†**
Total alkalinity (mg/l)	150	**ns**
Bicarbonate (mg/l)	0	**ns**
Ammonia (mg/l)	nd	**ns**
Nitrates (mg/l)	12.8	**50**
Ortho phosphates (mg/l)	0.12	**ns**
Sulphates (mg/l)	21.3	**250†**
Chlorides (mg/l)	15.2	**250†**
Fluorides (mg/l)	0.70	**1.5**
Total Iron (mg/l)	0.03	**0.3†**
Manganese (mg/l)	0.23	**0.4**
Calcium (mg/l)	31.1	**100-300†**
Magnesium (mg/l)	16.8	**<100-300**
Sodium (mg/l)	32	**200†**
Potassium (mg/l)	9.7	**ns**
BOD_5 (mg/l)	57	**ns**
Faecal coliforms (cfu/100ml)	770	**0**
E.Coli (cfu/100ml)	485	**0**

* World Health Organization (WHO) drinking water standards 2017; ns-not specified; nd-not detected; detection limit for Ammonia is 0.01 mg/l †*For aesthetic reasons. No health based guideline value given.*

Commentary

WHO drinking water standards are used to assess the potability of the sampled water source. All the tested parameters of the sampled water source (except turbidity, faecal coliforms and E.Coli, cells in grey highlight) comply with the WHO drinking water standards where specified. This compliance implies that no health risks or aesthetic problems are envisaged with the water with regard to these parameters when used for drinking. The turbidity of the water is high (>5 FAU) and is likely due to presence of colloidal and or dissolved organic material given that on observation the water is not clear and is without any visible suspended solids. Though WHO does not specify guideline values for pH, it suffices to note that the pH of the water sources lies within values reported in fresh water sources (6.5-8.5) and stipulated national guideline values (5.5-9.5) and hence is not too low to effect solubility and thus bioavailability of other substances especially heavy metals which are deleterious to humans. The sampled water source exhibits high alkalinity values (>40mg/l) implying that it is with high buffering capacity such that any acidic inputs into the water source are not likely to effect wide pH variations and hence the water may not be corrosive to water pipes. The levels of BOD_5 in the sampled source are indicative of presence of oxygen demanding substances (organic matter) in this water source. The measured BOD_5 levels in the sampled water source are high (>50mg/l, the national effluent discharge guideline value) indicating that these may have an effect on certain unit processes if this water is to be treated prior to consumption (for example the disinfection process).

The sampled source was with high levels of faecal coliforms and E. Coli. The detected levels of these bacteria (101-1000cfu/100ml) point to a high risk of causing water borne disease when ingested for drinking. The presence of E. Coli points to recent contamination of the water source by faecal material. It suffices to point out that this water is not safe for drinking and it should be treated such that the parameters in grey cells comply with the stipulated drinking water standards. However, it can be used for other purposes like laundry and cleaning activities.

Checked by: Robinah N. Kulabako (PhD)
In-charge PHEE lab

CIVIL AND ENVIRONMENTAL ENGINEERING DEPARTMENT
Environmental Engineering
06 MAR 2020
Laboratory
MAKERERE UNIVERSITY
P.O.BOX 7062, KAMPALA

WATER AND SANITATION DEVELOPMENT FACILITY– SOUTH WEST

INDIVIDUAL CONSULTANCY SERVICES FEASIBILITY STUDIES AND DETAILED DESIGNS OF PIPED WATER SUPPLY AND SANITATION SYSTEMS FOR RWEMIKOMA RGC, NKUNGU RGC, BUREMBA TOWN COUNCIL AND KIFAMBA RGC (LOT 2)

SURVEY QUESTIONNAIRE

(*This page is to be filled in by Enumerator*)

HOUSEHOLD SOCIO-ECONOMIC CHARACTERISTICS

Questionnaire **No**:

Date: / **/2019**

INTRODUCTION

(*This statement to be read by the enumerator***)**

As part of the overall goal of providing clean and safe drinking water and promotion of healthy hygiene, the GOU is interested in knowing the current water supply and sanitation situation in your home and community. The information generated will help in promoting planning the water and sanitation services in this township. The information you intend to volunteer will be regarded as extremely confidential and will be used only for planning purposes.

If there is anything you wish to ask, be free to do so and we will discuss it.

Thank You.

0. Location/Identification:

0.1 **District:** _____ **Rural Growth Centre:** _____

0.2 **County**: _____**Sub-County**: _____

0.3 **Parish(Ward)** _____

Village/LCI/(Cell) _____

0.4 **Fringe**_____ **-Core(***Commercial town area***)** _____

0.5 **Household ID No.** _____

0.6 **Remarks**

SECTION ONE: GENERAL INFORMATION ON HOUSEHOLD DATA

Would you be willing to respond to this interview?

a) Yes..... **b)** No ……

IF NO STOP THE INTERVIEW

1.1 What is your Age: .....

1.2 Gender of respondent

a) Male .....**b)** Female..…....

1.3 Marital Status

a) Never married

b) Married/Cohabiting (Monogamy)
c) Married/Cohabiting (Polygamous)
d) Separated/Divorced
e) Widowed/Widower
f) Other (Specify) _____

1.4. Who heads this household?

a) Husband...b) Wife...c) Single headed male...D) Single headed female.....

1.5. Age composition of household

Age Group	**Number of People**
Below 5 years	

6-17 years
18-35 years
36-45 years
46-65
Over 65 years

Total

1.6. Number of people in the household including yourself?

Household size	#	√
1-2	**1**	
3-4	**2**	
5-6	**3**	
7-8	**4**	
9-10	**5**	
11-12	**6**	
13+	**7**	

(Household Size***)***

1.7. At what level did the (household head) leave school?

a) Not at all .....e) University/College .....
b) Primary ..... f) Others (specify) .....
c) Secondary .....
d) Post-secondary .....

SECTION TWO: MIGRATION AND HOUSING CONDITIONS OF HOUSEHOLD

2.1. How long have you and your family lived in this town/district?

Season	Migration status				
	< 1 year	1-2 years	3-5 years	5-10 years	> 15 years
District					
Sub County					

2.2. Is the place where you are now, the place where you were born? a) Yes ..b) No...

2.3. If no, provide places where your family has lived before and period

Place of origin/place of birth		Year you left	Reasons for leaving	
This village	1		To look for work	1
This parish	2		Other economic reasons	2

This sub-county	3		Drought	3
This district	4		Other Land problems	4
Central Uganda	5		Illness, injury	5
Eastern Uganda	6		Disability	6
Northern Uganda	7		Education	7
Western Uganda	8		Marriage	8
Abroad, DRC/Zaire	9		Divorce	9
Abroad, Rwanda	10		Insecurity _ _ _ _ _	10
Abroad, Sudan	11		Return home	11
Abroad, Tanzania	12		In search of pasture	12
Abroad, Kenya	13		In search of land for cultivation	13
Abroad, Others (specify)	14		Others (specify)	14

2.4 What material was used for building your main house?
Wall: (1) Mud & wattle... (2) Burnt bricks... (3.)
Blocks...
Floor: (1) Earth...(2) Cement...
Roof: (1) Grass... (2) Iron sheets... (3)
Tiles...

2.5 Is this a rented house or own house?

a) Rented.....
b) Own... .....
c) Other.....

2.6 If own do you own the land as well?

a) Yes...b) No.....

2.7 If yes how did you acquire the land?

a) Customary.....
b) Lease from central government.....
c) Bought from individual.....
d) Other (specify) .....

SECTION THREE: HOUSEHOLD SOCIO-ECONOMIC PROFILE

3.1. How many rooms does your household occupy in this building?

3.2. Are there any other households living in this building?

a) Yes ---------- b) No ----------

3.3. If yes, how many other households live in this building? -------

3.4 What type of energy do you use for lighting in your house?

a) UDCL ---------- **b)** Candle --------

c) Paraffin lantern-------- **d)** others (specify)

3.5. What is the major source of fuel for cooking in your house?

(**a)** Charcoal ---------- (**b)** Firewood ----------

(**c)** Paraffin ---------- (**d)** Gas _____ (**e)** Electricity

3.6. Do you or any of the household members own any of the following assets in town and state the numbers?

(**a)** Electric fan ----------No. ----------(**b)** Radio -- No.

(**c)** Bicycle ----------No. ----------(**d)** TV -- No.

(**e)** Sewing machine--- No. ----------(**f)** Motorcycle-- No--

(**g)** Automobile/Car ------- No. ---------- (**h)** Land (Plots)--- No.----

(**i)** Others (specify) ----------No.

3.7. What is the profession of the household head?

3.8. Does the household head have any other added skills **a**) Yes .....**b**) No.....

3.9. If yes, list them 1) .....2) ..... 3) .....4) .....

5) …… 6) ……

3.10. What employment does the household head primarily undertake at the moment?

(**a)** Large scale Farmer---- **(b)** Subsistence/small scale Farmer

(c) Informal trader ---------- **(d)** Boda boda transporter ----------

(e) Formal trader/Wholesaler ---------- **(f) Salon** operator ----------

(g) Casual laborer ---------- **(h)** Salesperson/shop attendant---

(k) Others (specify).....

3.11. How many income earning people are in your household?

3.12. How much does your family spend on a monthly basis on the fallowing household basic necessities?

(*Do no read out. The expenditure amount should be equal or less than the total income)*

a) Household Expenditure	b) Frequency of expenditure 1. Daily 2. Weekly 3. Monthly Enter Code into the Cell	c) Amount spent (Ushs)
1. Food		
2. Water		
3. Fuel		
4. Toiletry		
5. House rent		
6. Electricity		
0. Scholastic material		