MINISTRY OF WATER AND ENVIRONMENT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED BEMBE MINI PIPED WATER SUPPLY AND SANITATION SYSTEM IN BEMBE PARISH, NAMAYUMBA SUB-COUNTY, WAKISO DISTRICT

ENVIRONMENTAL PROJECT BRIEF

Report

SUBMITTED BY:

Ministry of Water and Environment

PREPARED BY:

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March 2023

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WWS/03/23

THE REPUBLIC OF UGANDA

MINISTRY OF WATER AND ENVIRONMENT
P. O. BOX 20026
KAMPALA - UGANDA

3rd March, 2023

The Executive Director
National Environmental Management Authority
P. 0. Box 22255, Plot 17/ 19/21 Jinja Road,
KAMPALA.

Dear Sir,

SUBMISSION OF PROJECT BRIEF FOR BEMBE WATER SUPPLY AND SANITATION SYSTEM IN WAKISO DISTRICT.

The Government of Uganda is going to implement the Water Supply and Sanitation Program - Phase III (WSSP III) with support from the African Development Bank. The Project development objective is; to contribute to enhanced productivity and improved quality of life of the population, through provision of safe water and sanitation services in project areas. The project will also contribute to the achievement of National Development Plan III objectives, Vision 2040 and Sustainable Development Goals. Under the WSSPIII, funds have been provided to undertake Environmental and Social Impact Assessments (ESIAs).

Water Supply and Sanitation Program - Phase III (WSSP III) will support WSS infrastructure investments. Under the Rural Water Supply and Sanitation Component, the following will be undertaken: Nyabuhikye - Kyikyenkye Gravity Flow Scheme Phase II (Ibanda District), Shuuku-Matsyoro Gravity Flow Scheme Phase II (Sheema District), and Rehabilitation of Earth Dams in Kasensero (Mubende District) And Kotomol (Agago District), Katajula-Morikiswa-Soni (Tororo District), Cwero (Gulu District), Bembe (Wakiso District) and Orom, Phase II (Kitgum, Agago, Pader Districts).

In preparation for the above project and in fulfilment of donor requirements, the Ministry prepared a project brief for Bembe water supply and sanitation system(WSS) in Wakiso district. Bembe WSS project components are as summarized in the table below;

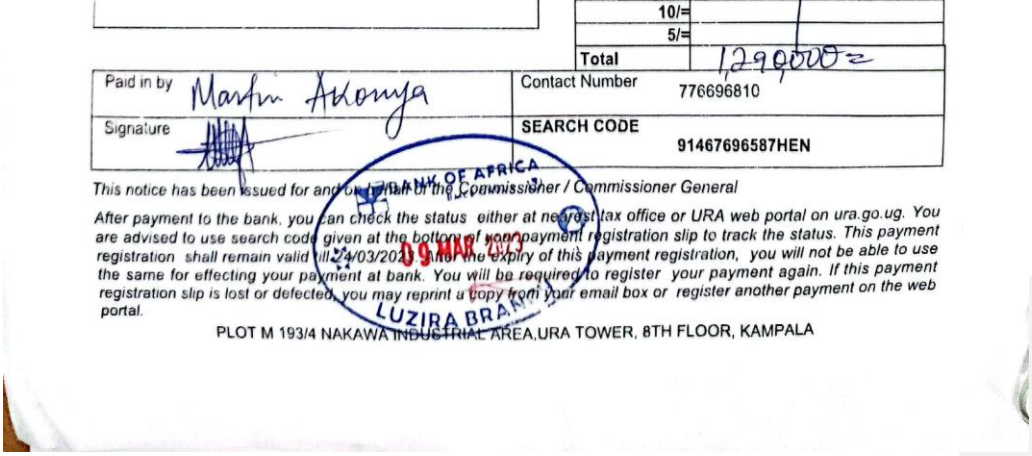
Features	Description
Total Population	12,447 (Future year 2029 population)
Water Demand	397.4 m^3/day (Future year 2029 demand)
Water Source borehole	Borehole at 15.0m^3/hr
Water Pump	Qmax=15.6 m^3/hr, H=190 m, 13kW, 29 Amps, 415 V/50 Hz
Inverter	18.5kW, 415V/50Hz, 39Amps
Solar Array	22.32 kWp/4x8.52A/650 Vmp, 4x18pcs rated 310Wp/ 36.38V/ 8.52A
Pumping Main to Reservoir	90mm HDPE PN-20 at length of 1.227km

Features	Description
Storage Reservoir	130 m^3 cold pressed steel tank elevated at 6meters
Distribution Mains	DN 50 HDPE PN 10 at length of 481m DN 63 HDPE PN-10 at length of 5068m DN 75 HDPE PN 10 at length of 32m GI DN 90 PN 10 at length of 7m HDPE DN 90 PN 10 at length of 373m
Public Stand Posts	Seven (7) with 4 taps each
Waterborne Toilet	At production borehole site

The investment cost of the proposed project is approximated at **UGX 904,902,819 (Nine Hundred Four Million Nine Hundred Two Thousand Eighty Hundred Nineteen Shillings only)**. Our Tax Identification Number (TIN) is **1000343951**

In compliance with the National Environment Act 2019 and the National Environment (Environmental and Social Assessment) Regulations 2020, the ministry hereby submits this project brief for your review and subsequent approval.

Eng. James Sseguya
FOR. PERMANENT SECRETARY



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BANK OF AFRICA
09 MAR 2023
LUZIRA BRANCH

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After payment to the bank, you can check the status either at nearest tax office or URA web portal on ura.go.ug. You are advised to use search code given at the bottom of your payment registration slip to track the status. This payment registration shall remain valid till 24/03/2023 after the expiry of this payment registration, you will not be able to use the same for effecting your payment at bank. You will be required to register your payment again. If this payment registration slip is lost or defected, you may reprint a copy from your email box or register another payment on the web portal.

PLOT M 193/4 NAKAWA INDUSTRIAL AREA,URA TOWER, 8TH FLOOR, KAMPALA

ESIA TEAM

This Environmental Project Brief for the Bembe Water Supply Systems was prepared by the following persons, in the following respective capacities:

Name	Position	Signature
Prof. Dr. Frank Kansiime (PhD) CC/EIA/173/19	Team Leader / Environmental Specialist	19/04/2023
Dr. David Were (PhD)	Climate Change / Water Resources Specialist	19/04/2023

Commented [MD1]: Provide the license registration number of the two key experts and their appended signatures

Commented [M2R1]: Signatures and dates included

The above worked together with by:

Mr. James Tayebwa (MSc)	Sociologist
Mr. Henry Kiryose (MSc)	Botanist
Mr. Charles Jjuuko (MSc)	GIS and Remote Sensing
Mr. Micheal Kibuule (MSc)	Birds Specialist

ACKNOWLEDGEMENTS

This Environmental Project Brief for the Proposed Water Supply System was developed through a consultative process involving different stakeholders. The Environmental and Social Impact Assessment Team acknowledges the efforts put in by the different stakeholders without whose help, this report would not have been successfully developed. The Team acknowledges the assistance accorded to them by the Wakiso District Local Government (WDLG) during the field visit. The District Water Officer-Wakiso is particularly acknowledged for assisting the ESIA Team during the reconnaissance survey to appreciate the project setting and boundaries. The Consultant is also grateful to the support provided by the leadership of Namayumba Sub-county and the Local Council 1 chairpersons of the project affected villages. The local community members are highly appreciated for the hospitality accorded to the ESIA team members and for providing the information that enabled the successful completion of this project.

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LIST OF ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
APHA	American Public Health Association
CDO	Community Development Officer
DN	Norminal Diameter
DWD	Directorate of Water Development
ESIA	Environmental and Social Impact Assessment
ESMMP	Environmental and Social Management and Monitoring Plan
EPB	Environmental Project Brief
FGD	Focus Group Discussion
GoU	Government of Uganda
HIV	Human Immunodeficiency Virus
HDPE	High Density Polyethylene
IFC	International Finance Corporation
ISO	International Standard Organisation
IUCN	International Union for Conservation of Nature
LC	Local Council
MWE	Ministry of Water and Environment
WDLG	Wakiso District Local Government
WUC	Water Use Committee
NEMA	National Environment Management Authority
NDPIII	Third National Development Plan
NEA	National Environment Act
PPE	Personal Protective Equipment
RGC	Rural Growth Center
TDS	Total Dissolved Solids
WASH	Water Sanitation and Hygiene

EXECUTIVE SUMMARY

Project Overview: The Government of Uganda (GoU), through the Ministry of Water and Environment (MWE) has embarked on improving safe water supply and sanitation coverage in rural areas, small towns and rural growth centers. Wakiso District is one of the areas that currently have limited access to safe water and sanitation services. As a result, the MWE together with Wakiso District Local Government (WDLG) are proposing construction of Bembe Water Supply and Sanitation System, in line with the third National Development Plan (NDP III), and the Uganda's Vision 2040 with funding from the African Development Bank. The objective of the project is to improve the health and living standards of the community of Bembe through increased access to safe water and sanitation services. The total cost of the project is estimated at nine hundred four million nine hundred two thousand eight hundred nineteen Uganda Shillings and eighty-seven cents (UGX 904,902,819.87), inclusive of taxes.

The objective this study was to undertake an Environmental and Social Impact Assessment for the proposed project.

The specific objectives were to:

I. Survey of all the identified sites including preparing a map/sketch of each site showing important existing features in the surrounding areas in relation to the sites,
II. II. Assess the baseline environmental conditions for monitoring future project components,
III. Evaluate the relevant policy and legal framework pertaining the proposed project.
IV. Consult with the relevant stakeholders and incorporate their comments into impact identification and mitigation
V. Identify all potential impacts and propose feasible mitigation impacts
VI. Prepare an Environmental and Social Management and Monitoring Plan (ESMMP) for the implementation of the proposed project. The ESMMP should outline: i) potential environmental and social impacts resulting from project activities; ii) proposed mitigation measures; iii) monitoring indicators; iv) responsibilities for implementation of the mitigation measures; v) responsibilities for monitoring the implementation of the mitigation measures

Project Description and description of project area: Bembe Rural Growth Center is located in Namayumba Sub- County, Wakiso District. Wakiso District lies in the Central Region of the country, bordering with Nakaseke and Luweero District to the north, Mukono District to the east, Kalangala District in Lake Victoria to the south, Mpigi District to the southwest and Mityana District to the Northwest. Wakiso, where the district headquarters are located, lies approximately 20 kilometres by road, northwest of Kampala, the capital of Uganda. Bembe Parish is located about 13 km from Wakiso district headquarters along Mityana road 32 km from Kampala through the Jembe junction. The project area is a parish in Namayumba Sub- County with has seven villages (Bembe- Nansiti, Bbigo- Mpanga, Kibujjo, Bulyana, Kiggugu, Kidugala and Kagoma-

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EXECUTIVE SUMMARY
1. Overview of the project (Goal, specific objectives, components and main activities), including the alternatives to the project;
2. Brief description of the project site and the major environmental and social stakes/challenges of the project site and influence area, including the valued environment and social compounds – in the project context (baseline conditions and trends), including landcover and construction sites maps;
3. Institutional and legal framework for implementation of the project (roles and responsibilities of the project implementation entity (PIE), implementing agencies and other stakeholders, legislative and regulatory requirements for the implementation of the ESMP);
4. Enumeration (in bullets) of the major and moderate impacts (be the more quantitative and precise as possible), for example: pollution/nuisance levels (exceeding thresholds or standards) and risks (levels) of disease related, area of forest/natural vegetation lost (number and/or percentage), specific (endemic, rare, endangered) species threatened with extinction, protected, etc. of flora or fauna whose habitat is affected number of households/shops/dealers to move expropriated cropland area, the number useful tree species (NTFP) lost, etc.;
5. Consultations (locations, dates, stakeholders who participated, risks/impacts presented, the main concerns raised by participants, responses and commitments of the developer).
6. Environmental and social management plan (ESMP):
• Enumeration (in bullets) of the risks/impacts management measures including:
(a) the specific measures addressing each significant/moderate impact (physical activities including programs like reforestation, biological offset; proposed system and management unit, management criteria, etc.);
(b) specific EHS clauses to insert in works contracts including: (i) the General rules of Hygiene health and safety on construction sites (ii) the STD - HIV awareness (iii) the management of the relationship between employees and the communities in the project area, with the emphasis on the protection of minors and other vulnerable (iv) the consideration of gender equity and gender-based-violence (GBV) as well as sexual exploitation and abuse, whenever relevant (v) management of "chance finds";

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Nsanvu. However, the project is mainly meant to serve the villages of Bembe-Nansiti, Bbigo-Mpanga, Kibujjo and Kidugala. The vegetation around the proposed project sites is characteristic of semi-urban and agricultural landscapes, dominated by grasses, shrubs, weeds, crops and a few trees. The abstraction and reservoir sites are already converted into agricultural use, while the transmission lines follow existing roads and will be restricted within the road reserves. Generally, all the project affected sites are already modified and not representative of the natural conditions. There are no sensitive ecosystems such as forests, wetlands and water sources which will be impacted by the project activities. The people in the project area currently mainly dependent of groundwater sources, accessing water through hand pump boreholes. However, the boreholes are not enough, where communities reported spending between 30-60 minutes to fetch water.

The main components of the project include a motorized borehole (DWD 67039) located at Kibujjo Village at 36N418858 Me 49216 mE with a yield 15m3/hr. Others include a transmission of 1.227km, a reservoir tank of 130m3 located at Bembe Nansiti Village which will be elevated on a 6m tower, a water office and public/ institutional sanitation facilities. The pipeline network will be restricted to the road reserves and permission for access from both the Uganda National Roads Authority (UNRA) and the Wakiso District Local Government (WDLG) was obtained. It is anticipated that the project will not result in any physical and economic displacement except the temporary inconveniences caused by trenching within the trading centres. However, mitigation measures like the use of warning tapes and immediate backfilling will be emphasized during the construction phase. During construction activities like trenching of the pipeline networks, the contractor will be responsible for any damages arising from his work and will duly compensate for these as indicated in the Bill of Quantities (BoQs) during procurement.

Policy, Legal and Institutional Framework: For the project to achieve its intended objectives, it will operate under various policies, legal and administrative frameworks. These include laws and policies of Uganda, as well as international treaties and conventions, environmental laws and guidelines with the aim of promoting the positive impacts of the proposed project while minimizing the negative effects. In particular, this environmental and social project brief has been carried out in accordance with National Environmental Act (NO.5 of 2019) and other relevant policies and guidelines like the National Environment Management Policy of 2014, Employment Act, National Land Policy of 2013, National Gender Policy of 2007, National HIV/AIDS policy of 2004 among others. A comprehensive stakeholder engagement was carried out during preparation of the project brief specifically with Wakiso District Local Government Officials, Namayumba sub county leaders and Local Community Representatives and Community Members (both interested and affected stakeholders) among others.

The proposed project has potential to significantly improve quality of life in the Barr sub county and the neighbouring towns both during construction and operation phases. Like in other areas, the long-term socio-environmental benefits of a reliable supply of potable water and access to sanitary facilities include reduced morbidity and increased productivity of households along with increased enrolment of children in educational institutions. In addition, project development and operation in the project area will

provide considerable economic opportunity and attraction of other services. However, development of the project can also bring with it negative impacts. The key significant negative impacts will arise from construction phase of the intake and water treatment plant. Reason for the ESIA thus to assess, identify and suggest ways to reduce and / or avoid occurrence of such adverse effects during construction and operation of the system component facilities.

Anticipated impacts/risks and mitigation measures: The stakeholders consulted welcomed the project and hoped it will improve access to safe and affordable water in their area and also provide jobs to the locals. To that effect, positive impacts and adverse impacts were identified and these must be enhanced or mitigated accordingly. The positive impacts of the project include increased access to safe water and sanitation services and employment opportunities among others. Some key adverse impacts identified include among others: solid waste generation, loss of vegetation cover and associated habitats, high water charges that may make water unaffordable especially by the poor people, and issues related to health and safety of project workers and the general public.

The mitigation measures proposed for the identified negative impacts include: putting in place a waste management system to ensure that wastes are properly managed at the sites, minimizing vegetation clearance/restoring cleared areas at the end of construction activities, subsidizing water/ connection charges for the poor people, providing personal protective equipment to project workers, and informing members of the public about planned project activities, including putting in place signage at all dangerous areas close to public places/passages.

Environment and Social Management and Monitoring Plan: An environmental and social management and monitoring plan (ESMMP) has been prepared following the identified impacts. Mitigation measures, monitoring indicators and institutions to monitor the environmental performance of the project by the Developer and/or Contractor where applicable or any party delegated by the Developer are outlined. This will ensure tracking project progress right from the pre-construction, through construction, operation and maintenance to decommissioning phases and ensure environmental sustainability. The total cost of implementation of the ESMMP is estimated at UGX 155,300,000 (One hundred and fifty-five million three hundred thousand shillings only).

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Stakeholder Consultations: Consultation meetings were held with the Wakiso District local government staff, Namayumba Sub-County staff and the local communities where the proposed project is to be located. Stakeholder engagement constituted an important part of the ESIA process, in light of the Project's commitment to adhering to national requirements, as well as a best practice approach to public consultation, that is, an approach that encourages open and transparent dialogue, with as broad a range

of stakeholder groups as possible. A summary of the key findings from the stakeholder consultations is presented as follows:

No.	Stakeholder	Concerns/Comments	Response
1	District Water Officer-Wakiso District	• The existing water supply system in Bembe is unreliable. They generally depend on boreholes and shallow hand-dug wells which are overwhelmed by demand and an ever-growing population. • Mass community sensitization is necessary as well as a catchment management plan including water source and water reservoir protection activities that integrate agriculture, environment, and production. • The water project should harmonize with the community over where the reservoir should be located. • The water project is envisaged to substantially improve water supply in Namayumba sub-county and particularly Bembe Parish	• The proposed project will increase access to safe water, reduce walking distances to the sources as well as queueing time. • As part of the project, stakeholder engagement activities will be undertaken including community consultations about critical aspects of the project, community sensitization and grievance redress. • Risks and impacts of the project will be identified and appropriate mitigation measures undertaken including catchment management and source protection measures.
2	District Environmental Officer_Wakiso District	• Extensive community sensitization is critical • The district is constrained with funding, the project is big for a district, it had started with Wakiso Bumyuka, Busi, Masurita and Namayumba, Busi, and Bumyuka were finalized in the other financial year of 2022 now they are embarking on this one.	
3	Sub-County Chairperson Namayumba Sub-County	• The water engineers estimated that the quantity of water in the ground has the capacity to supply water in the whole sub-county, the challenge is that households are scattered in these villages which cripples accessibility, it is estimated to serve Bembe trading center where there is Nansiti and Kidugala, Bbigompaga, Buryana and Kibujo	The design of the water supply and sanitation system will be reviewed to supply as many villages, institutions and people to the extent possible. • Appropriate stakeholder engagement and consultations will be conducted throughout the project life cycle.

No.	Stakeholder	Concerns/Comments	Response
		• The only challenge is that distance between villages is big, but the capacity of the water in the ground can serve between 25000 to 30000 which is almost equivalent to the population of the sub-county which was about 21600 and is now approximated to be 25000 due to new settlements • • There are institutions and work places that have huge populations which increase the demand for water	
4.	Sub-County Chief Namayumba Sub-County	• The budget for the project is big and beyond what the district can afford hence the need for support from central government.	• The project has been identified and is being proposed for funding under the African Development
5	FGD with the members of Bembe-Nansiti Cell	• They are aware and were told about the project about 6 years ago but need more details. The demand for accessible and safe water is high to reduce the current expenditure on safe water which can be as high as 700 shillings for 20 - litre jerrycan moreover the safe source is located in a great distance. The nearby spring is seasonal while the shallow well is dirty. • The community lacks a proper drainage systems and wastewater ends up in the same stream where they fetch water exposing them to diseases like Bilharzia. • These communities live in squeezed plots of land and they wonder if the passage of water	• The proposed project is going to bring safe, piped water closer to the people at affordable rates. Appropriate engagements with all the stakeholders will be conducted at the various stages of the project to provide as much information as possible and also answer any queries that may exist in the community. • The project will have a hygiene and sanitation component that will include construction of public/institutional sanitation facilities as well as hygiene and sanitation promotional activities. The community will also be guided on waste water management, safe water chain, solid waste management among others. • Due consideration will be made

No.	Stakeholder	Concerns/Comments	Response
		pipes is not likely to affect people's plots. • The project of piped water will save the community from sharing the same water source with animals and reduce on solve the issue of children drowning from open wells.	to minimize land take by following road reserves especially for the large pipes. Appropriate procedures that are in line with the land laws will be used in case of any compensations. The community will be engaged and prepared to receive the Piped water system so that the work can move smoothly and water starts to flow.
6	FGD with the members of Bembe-Bbigo-Mpanga Cell.	• The project will reduce the burden of walking 1.5km to access the boreholes and waiting time of at least 2 hours.	

No.	Stakeholder	Concerns/Comments	Response
		• • It will reduce domestic violence where the husbands quarrel with women and children when they delay bringing the water home. •	
7	FGD with the members of Bembe-Kibujjo Cell	• The water project will save the huge population in their village from dirty water from unsafe sources, reduce expenses on water bought from vendors, and also the long queues at the boreholes • The owner of the land where water will be pumped from gave it to the community officially and it is known, it was the late Ssekandi in 2017. The owner died but there is no wrangle. •	• The project is here and all members of the community should embrace it. Offering land for the project is a noble action and the project is grateful for the kindness. Appropriate measures will be taken to formalize ownership of the land that was offered to ensure its availability for the project.
8	FGD with members of Bembe Kidugala Cell.	• The community has waited for long for the project to help them access clean and safe water, save their children from the risks associated with fetching water in the dark. • The cost implication of accessing the water should be made clear so that communities prepare adequately in time. •	• The water project is here to solve water problems and should be embraced and supported by all stakeholders. The piped water will be paid for at an affordable tariff that will be generated in consultation with the community. It is important to note that people will only pay for they have consumed.
9	School Head Teacher, Bembe Primary School and Priest Bembe C.O.U	• The water project is welcome and will save the school from burdening learners to fetch water during class hours, shorten queuing time, minimize unnecessary students' interaction with community members which exposes them to risks and also enable meals to be prepared in time. • There was a concern on the sustainability and reliability of the water system. •	• The project is here to solve water problems and minimize associated risks like losing valuable time to fetching water, gender based violence, exposure of children to Violence against children, sexual exploitation and abuse/ sexual harassment among others. It is anticipated that the project will be sustainable and measures will be taken at the design stage, construction phase, operation and maintenance phase to ensure that all

No.	Stakeholder	Concerns/Comments	Response
			stakeholders play their respective roles and the water supply system continues to serve the area.

Conclusion: The positive impacts of this project are more sustainable and outweigh the negative impacts. Based on the level of detail and depth of the study, it is the view of the Developer that all envisaged environmental and socio-economic impacts have been adequately addressed within the limits of the current state of knowledge and reasonable practice. In conclusion, therefore, if the mitigation measures for adverse impacts identified in this ESIA are implemented, as presented in the Environmental and Social Management and Monitoring Plan (ESMMP), the project will meet its intended objective of improving access to safe and affordable water and sanitation services in Wakiso District. It is recommended that the project Developer/Contractor engages all stakeholders during project implementation to create a sense of ownership, transparency and accountability.

1 INTRODUCTION

1.1 Project Background

According to the Water and Environment Sector Performance Report, 2019, 44.3% and 10.9% of the population depend on boreholes and piped water respectively to access clean water in rural areas. In small towns and rural growth centers, only 55.9% of the population had access to improved water sources by 2019.

Wakiso is the most populated district in Uganda, yet with inadequate water supply both urban areas and rural growth centers (RGC). The gap between the total population and the population with access to safe water is significant and increases annually thus creating high water demands. Extending safe water to the unserved population in the district, therefore, can be a stimulus to the district's productivity, and improvement to the quality of life.

The Government of Uganda has embarked on improving safe water coverage and supply in across the entire country. The Water and Environment Sector Development Plan of Uganda prioritizes the construction of piped water supply systems in Rural Growth Centres to replace the currently overstretched hand-pumped borehole service technology.

As a result, the GoU, through the MWE and Wakiso District Local Government, secured funding to establish a mini solar powered piped water supply project in Bembe Parish, Namayumba Sub-county, Wakiso District. The proposed water supply project shall ensure sustainable access to safe water in Bembe RGC. This will contribute to creating a more stable socio-economic environment and hence boost commercial development of in the area. The project will also contribute to improvement of Water Sanitation and Hygiene (WASH) services, which are critical for health and socio-economic development. The project shall also reduce walking distances to access water, thereby saving time for the education of the children.

In recognition of the need for sustainable development, and in compliance with the National Environment Act of 2019 and regulations there under, the MWE initiated an Environmental and Social Impact Assessment (ESIA) process for the proposed project to identify and assess potentially negative and positive environmental and social impacts associated with the project and devise mitigation measures to avoid, minimize or mitigate the negative environmental and social impacts while enhancing the positive environmental and social impacts or benefits of the project.

From the initial environmental project screening that was undertaken, the proposed project was identified as one among those that require a Project Brief as per Section 112 of the National Environment Act. The proposed project is listed under Schedule 4 (*Projects for which Project Briefs are required*) of the National Environment Act, 2019 under Category 4, "Utilisation of water resources and water supply", Part (b) "Abstraction or utilisation of ground water of less than 1,000 m^3 per day."

This Environmental Project Brief presents the findings of the Environmental and Social Impact Assessment that was conducted for the proposed project.

1.2 Project Objectives

1.2.1 Project Development Objectives

The overall objective of the project is to establish a mini solar-powered piped water supply system in Bembe Parish, Namayumba Sub-county, Wakiso District.

1.2.2 Objectives of the Environmental Project Brief

This report covers all the contents of a Project Brief as required under Schedule 2 of the National Environment (Environmental and Social Assessment) Regulations, 2020.

The main objectives of this Environmental Project Brief include the following:

a) Survey of all the identified sites including preparing a map/sketch of each site showing important existing features in the surrounding areas in relation to the sites,

b) Assessment baseline environmental conditions for monitoring future project components,

c) Evaluation of the relevant policy and legal framework pertaining the proposed project.

d) Consultation with the relevant stakeholders and incorporate their comments into impact identification and mitigation,

e) Identification of all potential impacts and propose feasible mitigation impacts

f) Preparation of an Environmental and Social Management and Monitoring Plan (ESMP) for the implementation of the proposed project. The ESMMP should outline: *i)* potential environmental and social impacts resulting from project activities; *ii)* proposed mitigation measures; *iii)* monitoring indicators; iv) responsibilities for implementation of the mitigation measures; *v)* responsibilities for monitoring the implementation of the mitigation measures

The purpose of this report is to provide NEMA and the Lead Agency with sufficient and relevant information on the proposed project that can allow them establish whether or not the project is likely to have significant impact on the environment, and thus act as a basis for approval.

1.3 Justification of the Proposed Project

1.3.1 Demand for Better Water Supply Services

The project area has some of the existing water sources as either non-functional or inadequate to meet the demand of rapidly growing population. The most common water source in the project area is ground water and hand pumps are the most common technology. Hand pumps are less efficient in the provision of water to large populations spread over distant places. A socio-economic survey of the project area showed that only 55.0% had access to safe drinking water.

The impact of inadequate safe water supply falls primarily on the poor. Every year, thousands of Uganda's poor citizens die from preventable diseases caused by inadequate / unsafe water supply services. Hundreds of thousands more suffer from regular bouts of diarrhea or parasitic worm infections as a result of unsafe water and/or poor sanitation practices that ruin their lives; women and children are the main victims. Further, poor sanitation (also associated with

inadequate water supply) costs Uganda 389 billion Ugandan Shillings each year, equivalent to US$177 million, according to a desk study carried out by The Water and Sanitation Program (WSP). This sum is the equivalent of US$ 5.50 per person in Uganda per year or 1.1% of the National GDP. The costs of poor sanitation are inequitably distributed with the highest economic burden falling disproportionately on the poorest. For the poorest therefore, poverty is a double-edged sword; not only are poor people more likely to have poor sanitation, but also, they have to pay proportionately more for the negative effects it has.

1.3.2 Consistency of the Project with National Priorities / Plans

The main factor motivating the implementation of the proposed project is the increasing demand for safe water supplies in the local communities in Wakiso District and Uganda at large. Hence, the project addresses the national priority of increasing access to safe water by making efficient use of the available sources. This, in addition to the country's firm commitment to eradicate poverty, ensures that the project is firmly embedded within the country's national priorities. The NDPIII highlights pollution as the major problem with water resources caused by bacterial and chemical contamination of both ground and surface water resource. This has led to inadequate sanitation facilities, unsafe disposal of municipal and industrial waste in urban and rural areas. To this effect, the GoU, through the MWE has set a target of increasing safe water supply from 70% to 85% in rural areas and 74% to 100% in urban areas (NDPIII). This is also in line with the Vision 2040 target of having 100% of the population having safe water supply. The proposed project will contribute towards the extension of clean water to 12,447 people by 2029.

1.4 Details of the Developer and Investment Cost

1.4.1 Details of the Developer

Project Title:	Proposed Mini Solar Powered Water Supply System in villages of Bembe-Nansiti, Bbigo-Mpanga, Kibujjo and Kidugala Villages, Bembe Parish, Namayumba Sub-county, Wakiso District
Developer:	Ministry of Water and Environment / Wakiso District Local Government
Address:	Plot 21/28 Port Bell Road, Luzira, P.O. Box 20026 Kampala, Uganda
Tel:	+256-772-453-395
Email:	llolweny@yahoo.co.uk
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1.4.2 Investment Cost

The cost estimate was based on the design assumptions and the preliminary engineering design. The total cost of the project is estimated at nine hundred four million nine hundred two thousand eight hundred nineteen Uganda Shillings and eighty-seven cents (UGX 904,902,819.87), **inclusive of taxes**. The detailed cost for each of the proposed project infrastructure are indicated in Annex I.

1.5 Study Methodology

The study was undertaken by NEMA Certified Environmental Practitioners in accordance with the National Environment (Environmental and Social Assessment) Regulations, 2020, and other relevant legislation of Uganda. The Consultants undertook the task of preparing an Environmental Project Brief (EPB) for the proposed project by clearly defining the assignment into a number of discrete activities. These activities facilitated development of a workable framework for the speedy and timely execution of the assignment. They included but were not limited to the following;

1.5.1 Environmental Screening

This is the stage at which the project was identified as among those that require a Project Brief as per Section 112 of the Act. The proposed project falls under Schedule 4 of the National Environment Act, 2019. The proposed project is listed in ***Category 4 - Utilization of water resources and water supply (b) Abstraction or utilization of groundwater of less than 1000 m³/day.*** The project does not warrant a full Environmental and Social Impact Assessment (ESIA) to be done as it will have an output of 207 m³/day at the ultimate year of 2042. Only projects for which more than 1000 m³/day of water is to be abstracted from ground water (Category 4 (b) under Schedule Five), are required to under a full ESIA.

1.5.3 Field Visits and Inspections

Field visits and inspections were carried out by the study/assessment team so as to get acquainted with the project activities in the study area, and also map out sampling sites. The areas that were visited include Bembe-Nansiti, Bbigo-Mpanga, Kibujjo and Kidugala villages Villages in Bembe Parish, Namayumba Sub- County, Wakiso District, including the proposed water source (borehole) area and reservoir locations as well as the corridors for transmission and distribution

1.5.3 Literature Review

Key documents pertinent to the study were reviewed and these include;

i. The Engineering Design report for Bembe Mini Water Supply System;
ii. The Feasibility report for Bembe Mini Water Supply System;
iii. The relevant development and environmental legislation of Uganda;
iv. International, regional, provincial or communal environmental related guidelines;
v. International Finance Cooperation (IFC) Performance Standards;
vi. Third Uganda National Development Plan (NDPIII);
vii. Uganda Vision 2040;
viii. Water and Environment Sector Development Plan 2015/16-2019/20.
ix. Wakiso District Physical Development Plan 2018-2040

1.5.4 Community and Stakeholder Consultations

The success of a project depends on its acceptability by the members of the public and other stakeholders who it's intended to benefit. As a result, stakeholder consultations formed a very important part of this assessment.

The objectives of the consultation were:

- To provide information about the project and its potential impacts or benefits to those interested in or affected by the project, and solicit their opinions in this regard;
- To provide opportunities to stakeholders to discuss their opinions and concerns;
- To manage expectations and misconceptions regarding the project; and
- To inform the process of assessing significance of impacts and developing appropriate mitigation measures.

The aim of this consultation was to enable affected parties and other stakeholders present their views and concerns that would contribute to the formulation and refinement of the project design.

The assessment team consulted the relevant project stakeholders (Plate 1). Mobilization of all social groups including men, women, youth, water user committee members, local leaders, and other community opinion leaders in the project area, with focus on the 4 villages of Kibujjo, Bbigo-Mpanga, Bembe-Nansiti, and Kidugala that will host the project. Necessary consultation tools and aides, such as area maps indicating the project design, location of project components, and project information briefs were displayed and shared during community consultations and other stakeholder consultative meetings.

A two-level stakeholder consultative procedure was adopted. At the first level were community members who live along the proposed alignment of the water transmission/ distribution lines and in proximity to the areas proposed for other project components. These consultations took place in the villages through participatory community dialogues. The second level were the sub-county and district stakeholder consultations. Relevant and adequate project information was provided to stakeholders to enable them to understand project risks, impacts, and opportunities.

These views and concerns were taken into consideration during impact identification and proposing of mitigation measures. Stakeholders' views and concerns are given in Section Five (5) of this report.

Plate 1: Conducting focus group discussions in the project area

1.5.5 Flora Assessment

It is important to understand the vegetation of the project area as this will play an important role in re-vegetation of places that will be excavated/laid bare during the project activities. It will be necessary that sites are restored to as much as practically possible to conditions they were in before project activities. During the field visits, observation and identification of flora species at the sites for water abstraction and reservoir, and along the transmission lines were done. Flora species which could not be identified in the field were picked, kept in properly labelled plant press and transported to the Makerere University Herbarium for identification.

1.5.6 Fauna Assessment

Fauna assessment involved a survey of birds in the project area, using Timed Species Counts (TSCs) (Freeman et al., 2003). This method generates estimates of relative abundance by scoring 6 for species recorded in the first ten minutes, down to one for the last ten minutes of a one-hour count. The argument is that the common species are recorded in most counts, usually with a score of six, whilst rare species only score an occasional one. In addition, for a series of counts, the commonest species are recorded most times and usually with a high score.

Transect walks were made with the help of local guides, recording all species in order of their being encountered, whether by site or sound. Birds were identified with the help of a pair of binoculars and where there was doubt about identification, we referred to the field guide (Stevenson and Fanshawe, 2002).

An analysis of birds of conservation concern was conducted based on various categories as listed below.

Global, Regional and National Red-listed species

The bird lists were classified globally based on the Red-listed (IUCN, 2019) and nationally/ regionally based on Wildlife Conservation Society (WCS, 2016). These categories are indicated as:

- CR Critical (Globally or Regionally or Nationally)
- EN Endangered (Globally or Regionally or Nationally)
- VU Vulnerable (Globally or Regionally or Nationally)
- NT Near-threatened (Globally or Regionally or Nationally)

RR Regional Responsibility (Globally or Regionally or Nationally)

1.5.7 Water Quality Measurements and Analysis

The physico-chemical quality of water in the project was analysed in terms of pH, turbidity, conductivity, total dissolved solids (TDS), total alkalinity, nitrogen, phosphorus, total hardness and chloride following procedures certified by the International Organization of Standardization – ISO and standard methods according to APHA/AWWA/WEF (1998). Because the proposed water abstraction borehole was not yet installed, water samples from an existing borehole in the project area (at coordinates 36N 0419061 UTM 0048952) were taken and used as a representation of water quality in the project area (Plate 2). Preliminary results of the hydrological report indicate that the borehole has a yield of 15m3/hr, static water level of 5.01m, dynamic water level of 46.06m and a recovery rate of 95% after 2 hours. The results

of water quality analysis indicate that all the parameters are withing acceptable ranges as per the drinking water standards. Details are presented in Section 3.4.2.

Plate 2: Obtaining a water sample from the existing borehole

1.5.8 Noise measurements

Baseline noise measurements in the project area were carried using a Benetech GM1356 digital sound level meter with a range of 30—130 dB (Plate 3). The noise assessment was carried out at proposed abstraction and reservoir sites. The noise assessment was done during day time hours. The noise results were compared to permissible limits (Table 1), according to the National Environment (Noise standards and Control) Regulations, 2003. The results of noise measurement are presented in section 3.3. The proposed project area can be categorized as a mixed land use area, consisting of both residential and commercial setting.

Table 1: Maximum Permissible Noise Levels for Construction sites

Noise at Receptor	Maximum noise level permitted in dB (A)	
	Day*	Night*
Residential	60	40
Commercial	75	50
Industrial	85	65
*Day is 6.00 a.m -10.00 p.m. and Night 10.00 p.m. - 6.00 a.m.		

Plate 3: Noise level meter used for noise assessment

1.6 Structure of the Environmental Project Brief Report

The structure of this report is in conformity with NEMA guidelines and the different sections are outlined below: -

An executive summary providing a brief overview of the proposed project and its anticipated positive and negative impacts among others.

Chapter 1: Background information on the project, project objectives, methodology and report structure.

Chapter 2: A review of policies, laws, regulations and standards in relation to the development of the proposed project.

Chapter 3: Site baseline bio-physical and sociological information, area infrastructure and activities.

Chapter 4: Description of the proposed project components, preparation, construction and operations phase activities.

Chapter 5: Public consultations and disclosure, mentioning stakeholder concerns and measures to address them.

Chapter 6: An analysis of alternatives, including the Project alternative, No Project option and comparison of the two options.

Chapter 7: Evaluation of the identified environmental and social impacts and recommendation of appropriate mitigation measures for all significant negative environmental impacts predicted.

Chapter 8: An Environmental, Social Management and Monitoring Plan for addressing negative impacts and assessing effectiveness of mitigation measures, scheduling monitoring frequency and assigning responsibility.

Chapter 9: Conclusions and recommendations arising from the ESIA.

2 POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

2.1 Introduction

The water and sanitation sector in Uganda has evolved over the past 10 -15 years through several reforms and national instruments all geared towards increasing efficiency in implementation and effectiveness in delivery of services to the unserved. This continuous change process has enabled appropriate adaptation of sector policies and strategies to be incorporated into emerging national and international development agenda including the country's National Development Plan (NDP), Uganda Vision 2040 and also aligned towards the achievement of the United Nations Sustainable Development Goals (SDGs). This section provides an overview of national and international policies, laws and regulations/standards relevant to the proposed project as well as the national institutions responsible for water and environmental protection and conservation as well as health, safety and social safeguards.

2.2 Policies Relevant to the Proposed Project

The policies relevant to the proposed Bembe Mini Piped Water Supply System are presented in Table 2.

Table 2: Review of the Policy Framework

Policy Title	Policy Goal	Relevance to Bembe Mini Water Supply System
The National Environment Management Policy for Uganda (2014)	The overall policy goal is to ensure sustainable development which maintains and promotes environmental quality and resource productivity for socio-economic transformation. The policy sets out in one of its key objectives to integrate, in a participatory manner, environmental concerns in all development policies, plans, activities and budgets at national, district and local levels.	Environment and Social Impact Assessment (ESIA) by way of a Project brief has been conducted for the proposed the Construction of Bembe Mini Water Supply System (this Report). If the proposed impact mitigation measures are put in place, the project will promote economic and social development in a sustainable way. These have been developed in consultation with different stakeholders of the proposed project.
The National Water Policy, 1999	To promote an integrated approach to manage the water resources in ways that are sustainable and most beneficial to the people of Uganda	The proposed project seeks to increase on the amount of safe water supply in Bembe RGC in Wakiso District.
The National Gender Policy, 1997	Provides a framework and mandate for all stakeholders to address the gender imbalances within their respective sectors.	The gender policy recommends that integration of gender issues in national policies and projects will improve national welfare, contribute towards sustainable development, and improve the work of government ministries. The project will consider gender aspects during the different phases of its implementation.

Policy Title	Policy Goal	Relevance to Bembe Mini Water Supply System
The National Health Policy (1999)	To prevent transmission of diseases through Primary Health Care (PHC) including Sanitation and Hygiene.	The proposed project will help to improve the sanitation through improved provision and access to safe water to the communities.
The National Land Policy (2013)	The Policy was developed to ensure efficient, equitable and optimal utilisation and management of Uganda's land resources for poverty reduction, wealth creation and overall socio-economic development.	Some project infrastructure like transmission lines, reservoirs and boreholes will be located on people's land. Unless where the land is given freely by the community, affected land should be compensated following provision of Uganda's Land laws
The National Land-Use Policy (2007)	The Policy has an overall goal of achieving sustainable and equitable socio-economic development through optimal land management and utilization in Uganda	The location of the project components are of a small scale and will not compromise the existing land use plan
The National Employment Policy for Uganda (2011)	The overall goal is to promote productive and decent employment for all women and men in conditions of freedom, equity, security and human dignity	The proposed Bembe Mini Water Supply System will employ many people who will include casual and technical personnel, including those from the affected community.
The Environment and Social Safeguards Policy (2018)	The Policy was formulated to ensure that environmental and social concerns are integrated 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	The proposed project has developed an EBP (this report) in line with the principles outlined in the Policy.

2.3 Legal Framework Relevant to the Proposed Project

The Ugandan laws and regulations, and the AfDB Operational Safeguards applicable to the proposed project are presented in Table 3 and 4, respectively.

Table 3: Ugandan Laws and Regulations Relevant to the Proposed Bembe Mini Water Supply System

Legal Framework	Provision(s)	Proposed actions/comments
The Constitution of the Republic of Uganda; 1995; amended as at 15th February 2006,	The State shall 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.	The developer observes the Constitutional provisions. This is why the Developer commissioned the ESIA process prior to implementation of the project. The waterworks, as well as distribution

Legal Framework	Provision(s)	Proposed actions/comments
Government of Uganda.	Chapter 15, Article 237, Clauses (1) (2) (a) & (b) gives the Government the powers as guided by the Parliament to acquire land anywhere within the country and place it to the best use to benefit the citizens of the country, where deemed necessary.	to neighbouring areas will be done while following mitigation measures. All land acquisitions will adhere to provisions of the 1995 National Constitution.
The National Environment no. 5 2019	Section 19 (3), requires a developer of a project to submit an acceptable EIA/EPB Report in accordance with the guidelines in the Forth Schedule of this Act.	An EPB has been conducted for proposed Project so that it promotes economic and social development in a sustainable way.
The Water Act, Cap 152 and The Water Resources Regulations, 1998	Under section 18 (2), a person wishing to construct any works or take and use water may apply to the Director of Water Development Directorate in a prescribed form for a permit to do so. Under Section 31 (1) of the Act, a person commits an offence who, unless authorized under this Part of the Act, causes or allows wastes to come in contact with, or be discharged into water or allows water to be polluted	The Developer will ensure that waste generated during project implementation does not negatively impact water resources in the project area.
The Land Act, Cap 227	Section 42 states that Government or Local Government may acquire land in accordance with the provisions of Article 26 and clause 237 of the constitution. Section 74 (i) states that where it is necessary to execute public works on any land (for example construction of road), an authorized undertaker shall enter into mutual agreement with occupier or owner of the land in accordance with this act, and where no agreement is reached, the Minister may; compulsorily acquire land in accordance with Section 43 of the Act.	All the required land for the proposed project will be acquired in accordance with this Act.
The Occupational Safety and Health Act, 2006	The Act aims at ensuring the existence of safety and health at all work places and work environment.	The project shall adhere to occupational safety and health rules according to the mitigation measures suggested in this report.
The Workers' Compensation Act (2000)	This requires compensation to be paid to a worker injured or acquired an occupational disease or has been harmed in any way in the course of his/her work.	The Developer shall ensure that all contractors and sub-contractors provide personal protective equipment (PPE) to employees to minimize accidents and injuries. Additionally, compensation will be paid to those affected.

Legal Framework	Provision(s)	Proposed actions/comments
The Town and Country Planning Act, 2014	The Town and Country Planning Act govern land use and land planning in urban and rural areas.	The Developer shall use established guidelines for planning schemes, to acquire land as well as safeguarding the natural environment.
The Public Health Act Cap 281	Section 7 provides local authorities with administrative powers to take all lawful, necessary and reasonable practicable measures for preventing the occurrence of, or for dealing with any outbreak or prevalence of, any Infectious, communicable or preventable disease, to safeguard and promote the public health.	The Developer/ Contractor shall provide for adequate sanitary facilities, proper solid and liquid waste management and provide and operate first Aid services especially in public places; and shall ensure that such facilities are available in all other privately allocated and developed areas requiring such to possess them. Anybody falling sick and needing services beyond the first Aid shall be referred to the nearest health centre. The developer /Contractor will implement HIV/AIDS prevention and control plan as part of the mitigation measures.
The Local Governments Act Cap 243	Provides for the system of local governments based on the decentralization of district for the enforcement of environmental law. The functions of the Municipal Councils include: land surveying and administration, physical planning, environmental protection (forests and wetlands, streams and so forth and ensuring proper sanitation	The Developer shall work closely with Wakiso District and Namayumba Sub-County officials, including other lower local government leaders in carrying out activities related to the project for example monitoring the implementation of the Environment and Social Management and Monitoring Plan (ESMMP) for the project.
The National Environment (Environmental and Social Assessment) Regulations, 2020	Regulation 12(1) requires the developer of a project under section 113 of the Act and set out in Schedule 5 of the Act to undertake scoping and an environmental and social impact study in accordance with these Regulations. Regulation 16(1) requires the developer to carry out consultations with relevant stakeholders, communities likely to be affected by the project and the public while	The study has been conducted in line to the provisions of the Regulations. Various stakeholders in the project area were consulted to find out their views on the proposed project.

Legal Framework	Provision(s)	Proposed actions/comments
	undertaking the environmental and social impact study.	
The National Environment (Wetlands, River Banks and Lake Shores Management) Regulations, 2000	Regulation 12(1) prohibits any person from carrying out an activity in a wetland without a permit issued by the Executive Director of NEMA. Under regulation 34(1), a developer desiring to conduct a project which may have significant impact on a wetland (for example dredging), river bank or lake shore, shall be required to carry out an environmental impact assessment in accordance with sections 20, 21, and 22 of the NES.	The proposed project activities shall not be carried out in or near any wetland.
National Environment (Conduct and Certificate of Environment Practitioners Regulations (2003)	Regulation 176 (1) states that no person shall conduct an EIA or carry out any activity relating to the conduct of an environmental impact study, or environmental audit as provided under the Act, unless the person has been duly certified and registered in accordance with the regulations	The Consultants who carried out this assessment are certified practitioners by NEMA.
The National Environment (Waste Management) Regulations (2020)	Regulations outline the requirements for the management of hazardous and non-hazardous waste including transport, storage, treatment, and disposal and licensing of waste contractors. Regulations require waste disposal in a way that would not contaminate water, soil, and air or impact public health.	The Project Developer should be aware of regulation requirements and legal standards when designing waste storage facilitates, likely avoiding wetland and riverine areas.
The Water (Waste Discharge) Regulations, 1998	The water (Waste Discharge) Regulations of 1998, are aimed at regulating the effluent or discharge of wastes on to land or into water. Under regulation 5(1), a waste discharge permit is required for a person who owns a facility which discharges or will discharge effluent or waste into the aquatic environment or on land. The alum sludge and backwash water from the water treatment works will have to be discharged responsibly.	In case of any waste discharged, a waste discharge permit shall be acquired from the relevant authorities.
The National Environment (Control of Smoking in Public Places) Regulations, 2004.	Section 3 entitles every person to a healthy environment, free from second-hand smoke. It further obliges all persons to safeguard the health of non-smokers. Sections 4 & 5 prohibit smoking in public places.	The Developer/Contractor shall enforce a no-smoking ban in all public work places during construction and operation phases of the project and will ensure that there are clear signs indicating that

Legal Framework	Provision(s)	Proposed actions/comments
		smoking is restricted and prohibited in such areas.
The National Environment (Noise Standards and Control) Regulations, 2003.	Regulations 6 & 7 (II) sets permissible noise levels, Part III (Regulations 8, 9, 10 & 11) calls for the control and mitigation of noise; Regulation 9 specifically prohibits the generation of noise by place and time. Part IV instructs for a license for noise in excess of permissible levels.	Contractor and Developer must enforce noise standards and working hours at the site allocated for development, both during the construction stage, as well as during operation and maintenance.
National Air Quality Standards, 2006 (Draft)	The Standards provides for permissible limits air quality parameters such as carbon dioxide, Nitrogen oxides, Sulphur oxides, Volatile Organic Compounds and particulates	The Developer and Contractor must implement and enforce mitigation measures for air pollution during the entire lifecycle of the project

Table 4: The AFDB Safeguard policies and Performance Standards relevant to the Project

Operational Safeguard/ Performance Standard	Key Issues	Relevance/Applicability
OS 1: Environmental and social assessment	Mainstream environmental and social considerations, including those related to climate change vulnerability and thereby contribute to sustainable development in the region. It governs the process of determining a project's environmental and social category and the resulting environmental and social assessment requirements	An environmental and Social project brief has been conducted for this project where potential impacts have been identified and mitigation measures proposed. This will ensure that the project is implemented in a sustainable way.
OS 2: Involuntary resettlement, land acquisition, population displacement and compensation	Mainstream resettlement considerations in AfDB operations. It consolidates the policy commitments and requirements set out in the Bank's policy on involuntary resettlement, and incorporates a number of refinements designed to improve the operational effectiveness of those requirements	The land for the major project infrastructure like the pump stations, reservoir, office and the institutional; public toilet was secured by the DLG and it has no any encumbrances. Therefore, no compensation and resettlement issues are anticipated. However, during the construction like trenching of the pipeline networks, any damages done by the contractor, he will be responsible for any compensation and this will be clearly indicated in the Bill of Quantities (BoQs) when procuring the contractor.

OS 3: Biodiversity and ecosystem services	Identify and implement opportunities to conserve and sustainably use biodiversity and natural habitats as well as observe, implement, and respond to requirements for the conservation and sustainable management of priority ecosystem services.	Mitigation measures have been proposed in this Report to minimize probable impacts of this project on biodiversity, including water resources so that their ability to provide ecosystem services to people are not compromised.
OS 4: Pollution prevention and control, hazardous materials and resource efficiency	Manage and reduce pollution in AfDB funded projects. It covers a range of key impacts including pollution, waste, and hazardous materials for which there are agreed international conventions, as well as comprehensive industry specific and regional standards, to be followed to safeguard the environment and humans from being polluted as a result of the development activities	The project proponent and contractor will set up a waste management plan to handle liquid and solid wastes, including those of hazardous nature.
OS 5: Labor conditions, health and safety	Protection of workers' rights and provision of their basic needs. It establishes the Bank's requirements for its borrowers or clients concerning workers' conditions, rights and protection from abuse or exploitation of the laborers	The project will abide by the labor laws to protect the interests of workers. This will include for example: providing contracts to all hired workers, providing workers with personal protective equipment, setting up a grievance handling mechanism to enable workers voice their complaints, among others.
IFC Performance Standards		
PS1: Social & environmental assessment and management systems	It establishes the importance of: (i) integrated assessment to identify the environmental and social impacts, risks, and opportunities of projects; (ii) effective community engagement through disclosure of project-related information and consultation with local communities on matters that directly affect them; and (iii) the client's management of environmental and social	An ESIA has been carried out. Potential impacts of the project have been identified and their mitigation measures proposed. Stakeholder involvement was a major component of the ESIA.

	performance throughout the life of the project.	
PS 2: Labour and working conditions	This performance standard is concerned with management of labour risks such as lack of contracts, insufficient wages, exploitation of minors, discriminatory hiring, unsafe and un hygienic living conditions, internal grievance handling, excessive over-time and handling of casual labourers.	A grievance handling mechanism will be put in place where workers can lodge their complaints. The project will employ workers following the relevant labour laws of Uganda.
PS3: Resource efficiency and pollution prevention	Requires project to efficiently use resources and to minimize or avoid pollution to the environment	The Developer shall ensure that pollution control measures are in place and only the required resources are utilized.
PS4: **Community health, safety and security**	This performance standard looks at aspects that can expose the public to accidents, excessive noise, traffic congestion, diseases, insecurity, among others	An ESMMP has been put in place detailing the management of impacts related to community health, safety and security.
PS5: Land acquisition and involuntary resettlement	Establishes requirements for efficient and timely compensation and/resettlement of project affected persons	All the required for project activities will be obtained following the laws of Uganda, and all people whose land is affected will be compensated prior to the start of project activities
PS6: Biodiversity conservation and sustainable management of living natural resources.	Requires that projects put up necessary measures to conserve biodiversity and natural habitats	An ESMMP has been put in place with measures to ensure biodiversity is not adversely impacted by the implementation of the project.
PS7: Indigenous peoples	Promotes the protection of indigenous people	No indigenous peoples as defined under this standard are considered to be resident in the project area.
PS8: Cultural heritage	Requires that all resources of cultural importance are identified and protected	No cultural resources were identified during this assessment. However, any cultural resource that may be identified at any stage of project operation will be protected and relocated according to the established laws of Uganda. A chance finds procedure will guide handling and management of any PCRs that may be found during civil/earth works.

2.6 Institutional Framework

2.6.1 Ministry of Water and Environment

Ministry of Water and Environment (MWE) is responsible for ensuring sound environmental management that in turn ensures that there is sufficient water for domestic, agricultural and industrial uses. MWE has the responsibility for setting national policies and standards, managing and regulating water resources and determining priorities for water development and management.

2.6.1.1 The Directorate of Water Resources Management (DWRM)

The directorate is part of the Ministry of Water and Environment and 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.

2.6.1.2 The Directorate of Water Development (DWD)

The Directorate of Water Development (DWD) under MWE is the lead agency responsible for coordinating and regulating all water supply and sanitation activities. It provides technical support services and capacity development to local governments and other service providers. DWD comprises three Departments; Rural Water Supply and Sanitation; Urban Water Supply and Sanitation and Water for Production.

2.6.2 National Environment Management Authority (NEMA)

The National Environment Management Authority (NEMA) is a semi-autonomous institution, established under the National Environment Act, Cap. 153, in 1995, as the principal agency in Uganda, charged with the responsibility of coordinating, monitoring, regulating and supervising environmental management in the country. NEMA spearheads the development of environmental policies, laws, regulations, standards and guidelines; and guides Government on sound environmental management in Uganda. Air quality, effluent and noise standards issued by NEMA are key to project implementation.

2.6.3 Ministry of Gender Labour & Social Development

This ministry promotes issues of social protection, gender equality, equity, human rights, culture, decent work conditions and empowerment for different groups such as women, children, the unemployed youth, internally displaced persons, the older persons and persons with disabilities. The Ministry works with institutional structures at district levels including probation offices, community development offices, and labour offices.

The Department of Occupational safety and health of this ministry administers and enforces the Occupational Safety and Health Act, No.9, 2006, the Laws of Uganda and its subsidiary Legislation. Mandated to Evaluate and Control the Physical, Chemical, Physiological, Social and Technical factors that affect persons at Work and the Working Environment. As such it is a requirement for the project to obtain a Workplace registration certificate and certificates of examination of lifting equipment

from this department during the contractor mobilisation phase. Additionally, it is mandatory to report fatal accidents and any lost time injuries of three days or more to this department.

2.6.4 Local Administration Structures

The proposed project falls within jurisdiction of Wakiso District. Technical District personnel directly involved on the project include the District Water Officer, Natural resources officer, and the Environment Officer.

3 ENVIRONMENTAL AND SOCIO-ECONOMIC BASELINE CONDITIONS

3.1 Project Location and its Environs

Bembe Rural Growth Center is located in Namayumba Sub-county, Wakiso District. Wakiso District lies in the Central Region of the country, bordering with Nakaseke District and Luweero District to the north, Mukono District to the east, Kalangala District in Lake Victoria to the south, Mpigi District to the southwest and Mityana District to the Northwest. Wakiso, where the district headquarters are located, lies approximately 20 kilometres by road, northwest of Kampala, the capital of Uganda and the largest city in the country. Bembe Parish is located about 13 km from Wakiso district headquarters along Mityana road 32 km from Kampala through Jembe junction.

The project area is a parish in Namayumba Sub-county with has seven villages (Bembe- Nansiti, Bbigo-Mpanga, Kibujjo, Bulyana, Kiggugu, Kidugala and Kagoma-Nsanvu. However, the project is mainly meant to serve the villages of Bembe-Nansiti, Bbigo-Mpanga, Kibujjo and Kidugala. The location of the project area is shown in Figure 1.

Figure 1: Google Earth Image of Bembe RGC showing the location of the project area

3.2 Biophysical Environment

3.2.1 Geology and Soils

Wakiso District is underlain by both old and recent rock systems, which include Precambrian, Cainozoic and Laterites. All the three major divisions of rocks i.e., sedimentary, igneous and metamorphic are represented. The Cainozoic rocks extend southwards to the Lake Victoria shores

and river valleys of the district. They include mainly swamps deposits, alluvium and lacustrine deposits. The laterite rocks are widespread on Wakiso summits in the central and northern parts of the district. It is well developed below the summit levels where it forms protective pavements on many slopes.

The soils of Wakiso are generally of high productivity and are mainly sandy clay soils. The dominant soils types are red gravely loams with occasional murram, reddish brown sandy loam on red clay loam and yellowish sands with quartz grave. The soils in the wetlands include grey sands whose parent material is alluvium and hill wash, grey coarse sand from lake deposits, black and grey clays from river alluvium and peat sands and clay formed from papyrus residue and river alluvium. The soils in the district are generally of high farming productivity although most of it has been turned into the built-up environment compromising on the role the district has played as a national food basket over the years.

3.2.2 Climate

Although the district lies within the equatorial belt, the would-be equatorial climate of the area was considerably modified by its vicinity to Lake Victoria, high elevation above sea level and its long distance from the Indian Ocean. Due to the influence of the movement of the sun, crossing the equator twice in a year, the climate of the district is influenced by the Inter Tropical Convergence Zone (ITCZ). Therefore, this gives the double peak rainfall exhibited in all the climatic parameters. The combined effect of the location of the district and the ITCZ results into a modified Afrotropical Climate.

The mean diurnal maximum temperatures range between 18° and 35°C while the corresponding minimum diurnal range is 8 °C and 25 °C. Cloudiness and rainfall affects temperatures slightly in the district. There are two wet seasons running from April to May and September to November. The principal rainfall peak is in April while the minor one is in November. The dry months are January - February and June - August. The mean annual rainfall is 1320mm, although in the Lake Zone it is between 1750 and 2000mm.

3.2.3 Hydrogeology and Drainage

Wakiso District is generally endowed with adequate surface and sub-surface water reserves with numerous streams, rivers and wetlands, both permanent (Lubugi, Namanve) and seasonal. Minor valleys have distinct seasonal swamps and rivers. The water tables along these swamps are quite high and are suitable for sinking shallow wells which are commonly used as sources of water for domestic use especially in the rural part of Wakiso. Sub-surface water reserves occur in fissures and aquifers of the rocks in the district. This was indicated by the number of boreholes, spring wells, tube wells and shallow wells, which have been drilled to harvest water for domestic supply.

The district has shallow seasonally to permanently water logged or flooded areas, which normally support hydrophilic vegetation. Most of the permanent wetlands are found in Entebbe Municipality, Katabi and Kajansi Town Councils, Bussi and Kasanje Sub Counties and along the shores of Lake Victoria. The existing wetlands have been significantly reclaimed and put under intensive cultivation, excavation and construction, all which are exhibiting cases of environmental degradation. The district has three water catchment areas namely Kafu, Kyoga and Victoria as illustrated in maps 3.3. The major river draining Wakiso District are River Mayanja, Lwajari and Nakiyanja which drains into the

Kafu basin. These are supported by numerous rivers like Danze, Kajansi, Kyetinda, Lufuka, Nonve, Nkerenge, Wabitamu, Mulanda, Semongo, Kayanja, Lubigi, Namanve, Wankongolo and Kitegala rivers.

3.2.4 Topography

Wakiso District landscape belongs to Buganda catena surface classification. The district is divided into two main topographic zones, the Lake Victoria zone and the high land zone (central and northern hills). The high land zone is characterized by isolated flat-topped hills with steep slopes in some areas, often merging abruptly into long and gentle pediments, which are usually dissected by relatively broad valleys (Figure 2). It lies at an approximate range of about 900 to 1,340 meters above sea level. The physical survey revealed that most of these hill tops are being excavated for construction of various housing developments. This has increased surface runoffs, escalating flooding of the low-lying areas in the district because of clearing the vegetation cover on these hill tops.

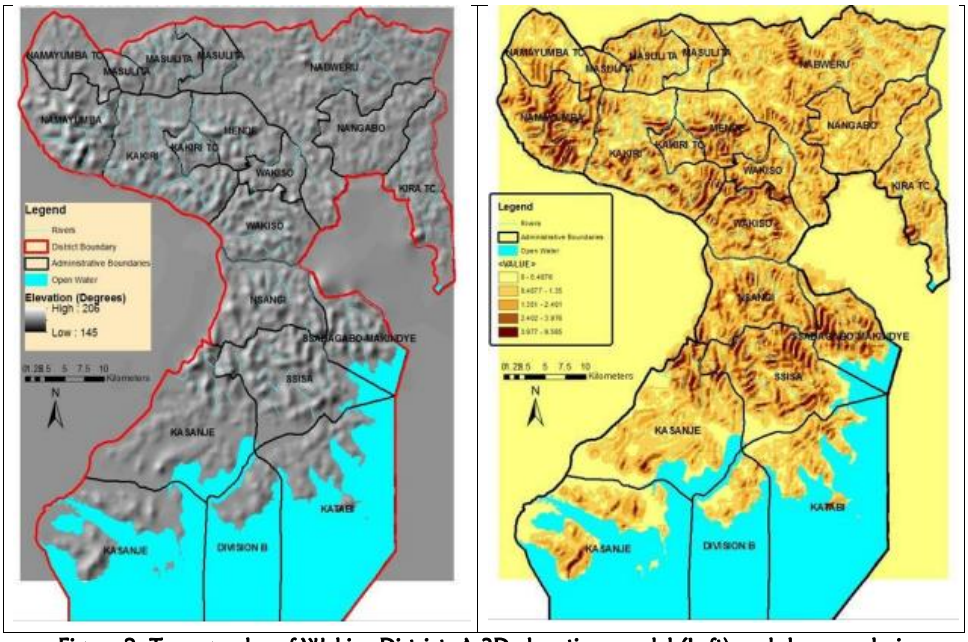

Figure 2: Topography of Wakiso District: A 3D elevation model (Left) and slope analysis

3.2.5 Flora

The vegetation of Wakiso District follows the existing rainfall and relief pattern. It is a relic of the original vegetation where there are remnants of communities related to the savanna woodland climax and the fire climax tree savanna, particularly on the hills. The area was once covered by forests prior to the introduction of agriculture. Because, of the intensification of between 1995 – 2016 agricultural activities and rapid urbanization, vegetation has greatly changed to secondly vegetation.

Around the proposed project area, vegetation is characteristic of semi-urban and agricultural landscapes, dominated by grasses, shrubs, weeds, crops and a few trees. The abstraction and reservoir sites are already converted into agricultural use, while the transmission lines follow existing roads and will be restricted within the road reserves (Plate 4). Generally, all the project affected sites are already modified and not representative of the natural conditions. The following vegetation species (Table 5) were identified in the different locations of project components. None of the vegetation species is listed on the IUCN'S Red List of endangered species.

Plate 4: Vegetation characteristics at the proposed abstraction site (Top Left), reservoir site (Top Right) and the along the transmission line from the abstraction site to Bbigo-Mpanga Village (Bottom)

Table 4: Vegetation species identified at in the project area

Site	Site Characterization	Species	Form
Abstraction, Kibujjo Village	A wetland with several channels to allow vegetable growing. A eucalyptus tree plantation exists about 100 metres west of the road from Gobero to Bembe. The exact site size is 50 x 100 metres	*Pancium maximum*	Grass
		Melinus repens	Grass
		Leerasia hexandra	Grass
		Alpinia purpuata	Grass
		Brassica oleracea	Food crop
		Solanum sp.	Food crop
		Lactuca sativa	Food crop
		Allium cepa	Food crop
		Cucurbita maxima	Food crop
		Zea mais	Food crop
		Saccharum officinarum	Food crop
		Musa sp.	Food crop
		Stachytarpheta jamaicensis	Herb
		Desmodium uniculatum	Herb
		Artocapus heterophyllus	Tree
		Phoenix reclinata	Tree
Water Reservoir, Bembe-Nansiti Village	On top of a hill behind Bembe C.O.U church. There is an existing tree eucalyptus plantation, crop gardens and a few homesteads nearby	*Melinus repens*	Grass
		Celosia trigyna	Herb
		Vigna sp.	Herb
		Phytolacca dodecandra	Shrub
		Clerodendrum rotundifollium	Shrub
		Eucalyptus sp.	Tree
		Markhamia lutea	Tree
		Persea americana	Tree
		Phoenix reclinata	Tree
		Manihot aesculenta	Food crop
		Musa sp.	Food crop
		Coffea robusta	Cash crop
Water Transmission line from the abstraction site to Bigo-Mpanga Village, via Bembe trading centre (Right hand side of the road reserve)	The transmission line will be laid from the drilled Borehole and is expected to follow the access road of the pump station through eucalyptus tree plantations on the R.H.S of the road reserve	*Leerasia hexandra*	Grass
		Pancium maximum	Grass
		Melinus repens	Grass
		Penmsetum purpureum	Grass
		Bidens pilosa	Herb
		Crassocephallum vitellinum	Herb
		Musa sp.	Herb
		Manihot aesculeta	Food crop
		Ipomea batatas	Food crop
		Zea mais	Food crop
		Lycoperscion aesculenta	Food crop
		Coffea robusta	Food crop

Site	Site Characterization	Species	Form
		Artocarpus leterophyllus	Food crop
		Maesopsis eminii	Food crop
		Mangifera indica	Tree
		Aleurites moluccana	Tree
		Albizia zygia	Tree
		Polyscias fulra	Tree
		Margaritaria discoideus	Tree
Water transmission pipeline from the abstraction point Kibujjo trading centre	Transmission line to be laid on the L.H.S of road to Kibujjo trading centre. The line will pass through crop gardens which have been established along the road, covering part of the road reserve	*Mellinus ripens*	Grass
		Panicum maximum	Grass
		Pennisetum purpureum	Grass
		Bidens pilosa	Herb
		Ageratum conyzoides	Herb
		Conyza floribunda	Herb
		Musa sp.	Food crop
		Ipomea batatas	Food crop
		Manihot aesculenta	Food crop
		Zea mais	Food crop
		Cofea robusta	Cash crop
		Artocarpus heterophyllus	Fruit tree
		Mangifera indica	Fruit tree
		Persia americana	Fruit tree
		Albizia zygia	Tree
		Albizia coriaria	Tree
		Markhamia lutea	Tree
		Aleurites moluccana	Tree

3.2.6 Fauna

At the advent of colonisation in 1890, the district was awash with wild game like elephants, lions, leopards, hyenas, zebras, wild pigs and the famous impala (Kampala is named after the animal which was seen grazing in numerous herds by the early European Explorers). But due to anthropogenic activities such as sport hunting by the Colonial Administrators and tradition hunting by the natives in the earlier 19th Century, coupled with the current rate of deforestation, cultivation, draining of swamps and urbanization have disseminated wild game in the district.

Currently, remnants of wildlife are seen in the remaining natural forests, bushland and wetlands, which are acting as a refugia. Local communities report on the occurrence of the Common Rats, Giant Otter Shrew, Vervet and Red-tailed monkeys.

The district has 300 species of birds and 200 species of butterflies (Wakiso District Physical Development Plan 2018-2040). Many of these have their habitats in wetlands which are refugia.

These include globally threated species such as; bushbuck and Blue Shallow; Shoebill, Papyrus Yellow Warbler, Spur winged geese, Goliath Herons, Pigmy Geese, African Jacana and several lesser Jacana (*Microparra capensis*).

During the field assessment of birds, the following observations were made:

Site counts

Species richness was highest at the water abstraction site (43 species), followed by the water reservoir area (37 species) and lowest along the alignment between Kidugala and Bbggo-Mpanga (34 species; Figure 3).

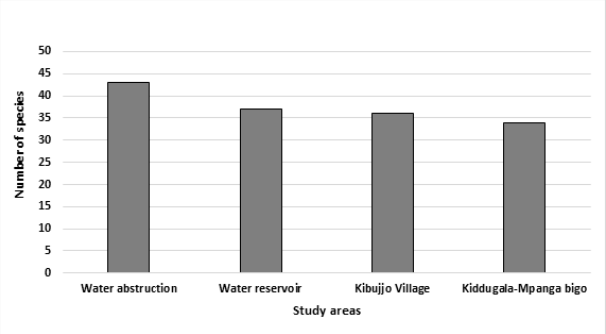

Figure 3: Number of species recorded across study sites

Species of conservation concern

These have been assessed globally (IUCN, 2023), nationally (MTWA, 2017), and regionally (Bennun and Njoroge, 1996). We recorded two globally-listed species (Grey Crowned Crane *Balearica regulorum* and Grey Parrot *Psittacus erithacus*) and three regionally listed species (Table 6).

Table 5: Details of species of conservation concern and there relative abundance levels

2016No[a]	COMMON NAME Scientific Name	Ecology	Conservation	Abundance[b]
870	WHITE-HEADED SAW-WING *Psalidoprocne albiceps*	f	R-RR	3.25
298	BROWN SNAKE EAGLE *Circaetus cinereus*		R-NT	2.75
152	GREY CROWNED CRANE *Balearica regulorum*	WG	G-EN,R-NT, U-EN	1.5
186	PURPLE HERON *Ardea purpurea*	W	R-NT	1.5
817	GREY-CAPPED WARBLER *Eminia lepida*	fw	R-RR	1.25
323	AFRICAN MARSH HARRIER *Circus ranivorus*	W	R-NT	0.75
488	GREY PARROT *Psittacus erithacus*	FF	G-EN,R-NT,U-VU	0.75

a: according to WCS 2016, b: Relative abundance level

Red-list data is used by many groups such as governments, developers and conservation organization to support to support conservation actions and priorities. Natural resource planners rely on red-list

data to better understand their environment and how to minimize project impacts on the environment.

Ecological features

Majority of the species were forest edge species (f) and wetland visitors (w). Specialists such as forest specialists, Water specialists and Grassland specialists were very few (Figure 4).

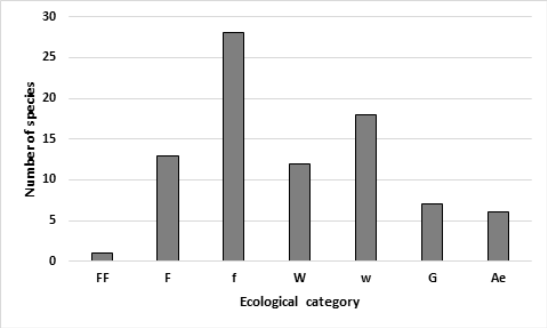

Figure 4: Number of species recorded in various ecological categories (FF-Forest specialist, F-Forest Generalist, f-Tree Species, W-Water specialist, w* Water non-specialist, G-Grassland specialist, Ae-Aerial feeder)

Forest species (FF and F)

One species (Grey Parrot; *Psittacus erithacus*) belonging to forest interior (FF) species was recorded. The Grey parrot originally occurred in natural forests, however it has adopted its self to several other habitats including built areas with trees. There were also thirteen (13) forest dependent species (F) and twenty-eight (28) forest edge species recorded (Table 7). The latter category does not depend on forests but do need trees, and therefore, trees within the wetland are important for them in various ways. Forest birds are of concern due to rampant deforestation.

Table 6: Forest species (FF-forest specialists and F-forest generalist) recorded and their relative abundance

2016 No	COMMON NAME Scientific Name	Ecology	Conservation	Abundance[a]
66	AFRICAN GREEN-PIGEON *Treron calvus*	F	LC	2.5
319	LIZARD BUZZARD *Kaupifalco monogrammicus*	F	LC	2.5
123	GREAT BLUE TURACO *Corythaeola cristata*	F	LC	2.3
308	LONG-CRESTED EAGLE *Lophaetus occipitalis*	F	LC	1.8
899	LITTLE GREENBUL *Eurillas virens*	F	LC	1.8
69	BLUE-SPOTTED WOOD DOVE *Turtur afer*	F	LC	1.5
550	FORK-TAILED DRONGO *Dicrurus adsimilis*	F	LC	1.5
533	NORTHERN PUFFBACK *Dryoscopus gambensis*	F	LC	1.3
594	OLIVE-BELLIED SUNBIRD *Cinnyris chloropygius*	F	LC	1.3
132	ROSS'S TURACO *Musophaga rossae*	F	LC	1.0

353	AFRICAN WOOD OWL *Strix woodfordii*	F	LC	0.8
488	GREY PARROT *Psittacus erithacus*	FF	G-EN,R-NT,U-VU	0.8
580	GREEN-HEADED SUNBIRD *Cyanomitra verticalis*	F	LC	0.8
923	GREEN HYLIA *Hylia prasina*	F	LC	0.5
378	BLACK-AND-WHITE CASQUED HORNBILL *Bycanistes subcylindricus*	F	LC	0.3

a-relative abundance level

Water birds (W and w)*

The twelve water birds recorded are shown in Table 8. These include 6 water specialists (W) and 5 non-water specialists (w*). Among them, two species (Grey-Crowned Crane and Purple Heron) are listed globally and regionally. Water birds are important for our wellbeing and to the environment in many ways for example; Water birds can maintain the diversity of other organisms, control pests, be effective bio-indicators of ecological conditions, and act as sentinels of potential disease outbreaks. They also provide important provisioning (meat, feathers, eggs, etc.) and cultural services to many indigenous communities.

Table 7: Relative abundances of water birds (water specialists (W) and wetland visitor (w))

2016 No	COMMON NAME Scientific Name	Ecology	Conservation	Abundance
196	HADADA IBIS *Bostrychia hagedash*	w		2.5
163	AFRICAN OPENBILL STORK *Anastomus lamelligerus*	w		2.3
190	LITTLE EGRET *Egretta garzetta*	W		2.0
152	GREY CROWNED CRANE *Balearica regulorum*	W	G-EN,R-NT, U-EN	1.5
186	PURPLE HERON *Ardea purpurea*	W	R-NT	1.5
184	BLACK-HEADED HERON *Ardea melanocephala*	w		1.3
161	MARABOU STORK *Leptoptilos crumeniferus*	w		1.0
171	HAMERKOP *Scopus umbretta*	w		1.0
221	LONG-TOED LAPWING *Vanellus crassirostris*	W		1.0
139	BLACK CRAKE *Zapornia flavirostra*	W		0.3
227	AFRICAN WATTLED LAPWING *Vanellus senegallus*	W		0.3
255	WOOD SANDPIPER *Tringa glareola*	W	PM	0.3

Grassland species (G)

Seven grassland species were recorded (Table 9), with African Open-billed Stork being the most abundant followed by Pin-tailed whydah whereas Common Waxbill as the least abundant. Grassland species are of conservation concern due to bush burning and overgrazing.

Table 8: Relative abundance of the seven grassland species recorded in the proposed project area

2016 No	COMMON NAME Scientific Name	Ecology	Conservation	Abundance
163	AFRICAN OPENBILL STORK *Anastomus lamelligerus*	AwG		2.25

709	PIN-TAILED WHYDAH *Vidua macroura*	G		1.75
25	HELMETED GUINEAFOWL *Numida meleagris*	G		1.5
152	GREY CROWNED CRANE *Balearica regulorum*	WG	G-EN,R-NT, U-EN	1.5
182	CATTLE EGRET *Bubulcus ibis*	G		1.5
727	AFRICAN PIPIT *Anthus cinnamomeus*	G		1.25
685	COMMON WAXBILL *Estrilda astrild*	wG		0.5

Aerial Feeders (Ae)

Six aerial feeders were recorded. Basically, these are insectivores, therefore, benefiting from the rich aquatic insect life within the existing habitats along the proposed water pipeline and the abstraction point. These species were most abundant near the water abstraction point. Three of these species are Palearctic migrants (Barn Swallow Common Swift and Common Sand Martin). Aerial feeders are of concern owing to the way they respond to deteriorating air quality in their environment.

Migrants

The migrant species recorded in the sampled community are shown in Table 10 and Plate 5. These included five Palearctic migrants and five Afro-tropical migrants. One species (Black Kite) belongs to both categories. Migratory birds provide ecosystem benefits that include pest control, pollination of plants and serve as food sources for other wildlife. They are also as a source of recreation for millions of bird watchers and enthusiasts.

Table 9: Palaerctic Migrants (PM) and Afrotropical Migrants (AM) and there abundance levels

2016 No	COMMON NAME Scientific Name	Ecology	Migration	Abundance[a]
880	BARN SWALLOW *Hirundo rustica*	w,Ae	PM	5.25
163	AFRICAN OPENBILL STORK *Anastomus lamelligerus*	wG	AM	2.25
337	BLACK KITE *Milvus migrans*		PM/AM	2.25
470	WOODLAND KINGFISHER *Halcyon senegalensis*		AM	2.25
100	COMMON SWIFT *Apus apus*	Ae	PM	1.75
441	WHITE-THROATED BEE-EATER *Merops albicollis*	f	AM	1.75
458	BROAD-BILLED ROLLER *Eurystomus glaucurus*	fw	AM	1.5
886	COMMON SAND MARTIN *Riparia riparia*	W,Ae	PM	1
121	AFRICAN CUCKOO *Cuculus gularis*		AM	0.75
447	EUROPEAN BEE-EATER *Merops apiaster*	f	PM	0.75
255	WOOD SANDPIPER *Tringa glareola*	W	PM	0.25

a- Relative abundance

Plate 5: Yellow-billed Kite *Milvus migrans*, categorized as both an Afro-tropical migrant as well as Palearctic migrant

3.3 Noise level

The noise levels recorded at the different sites in the project area is presented in Table 11. The results showed that baseline noise levels are within the permissible standards for residential and commercial areas.

Table 10: Noise levels in at selected project sites

Site	Noise Level (dB)	Maximum noise level permitted in dB (A) for residential	Maximum noise level permitted in dB (A) for commercial
Abstraction	56.4	60	75
Reservoir	53.3		

3.4 Existing Water Supply Situation

Presently, the major sources of water in Bembe are boreholes fitted with hand pumps and protected springs (Plate 6). The boreholes are owned by the communities or institutions such as schools and health centres. The water is obtained from the boreholes by community members free of charge. However, communities contribute fees in a case a borehole is damaged, to facilitate repair or maintenance.


Plate 6: Some of the existing boreholes in the project area

A socio-economic conducted in the project area showed that 55.0% of the respondents had access to water from boreholes and 30.0% from protected springs (Figure 5). During the rainy season, some respondents reported relying on rainwater.

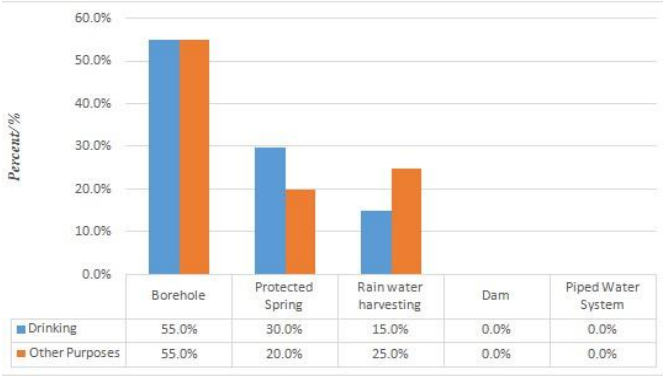

Figure 5: Main Water Source for Drinking and Other Domestic Purposes

In terms of distance to the nearest water source, majority of the households (50.0%) travelled a distance less than 200 m, 25% travelled a distance of 200 m – 500 m. The longest distance travelled was 2 km.

Majority (40%) of the respondents indicated that they spend between 30-60 minutes to fetch water for drinking for other domestic purposes. Figure 6 shows the time taken to fetch water by households in the project areas.

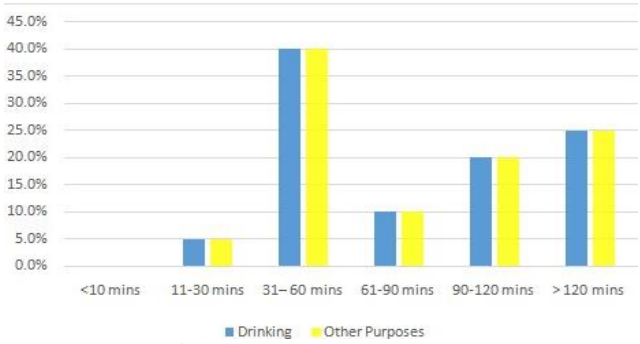

Figure 6: Time taken to fetch water by households

A further analysis of the results showed that it was mainly the women and children (both boys and girls) who mostly collected water from the water source (Figure 7). The mode of carrying the water was carrying on the head as reported by the respondents.

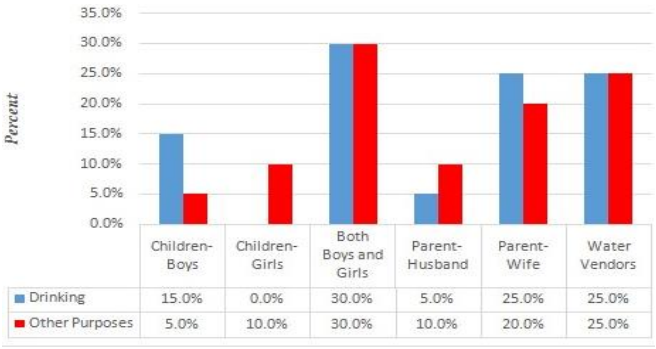

Figure 7: People in the household who collect water

3.4.2 Water Quality

The borehole proposed for water abstraction was not yet installed during the period of the field assessment. However, there are existing boreholes in the vicinity of the proposed abstraction borehole. Water samples for water quality analysis were obtained from one of the existing boreholes. The results of water quality analysis are presented in Annex II.

3.5 Socio-Economic Profile

3.5.1 Administrative Arrangement

Wakiso District is made up of two counties and a municipality: Kyaddondo County, Busiro County and Entebbe Municipality. The district headquarters are located in Wakiso Town, approximately 20 kilometres (12 mi) northwest of Kampala on the highway to Hoima. Wakiso District has a total area of 2,704 square kilometres (1,044 sq mi). Bembe is categorized as a parish in Namayumba Sub-county according to the administrative classification in Uganda. The

overall administration of this sub-county is in the office of the Local Council Chairperson –III. The Administrative structure of the project area is summarized in Table 12.

Table 11: Administrative structure of the project area

District	County	Sub-County	Parish	Villages
Wakiso	Busiiro	Namayumba	Bembe	Bembe-Nsiiti, Kidugala, Mpanga and Kibujjo

3.5.2 Population

3.5.2.1 Current population, growth rate and projections

From the recent 2014 national census, Namayumba sub-county where Bembe project area is situated has a population of 26,082 people of which male are 13,346 and female 12,736 respectively with an annual growth rate of 6.61% for Wakiso District.

During the field survey, the area Local Council (LC-III) Chairperson estimated that Bembe RGC has about 1,580 household translating to 6,569 people at an average population of 3.9 persons per household. The population projections for the domestic and non-domestic populations up to the ultimate year are summarized in Table 13.

Table 12: Summary of the population projections for water demand

Domestic	Number	Average Population	Initial year (2019)	Future year (2029)	Ultimate year (2039)
Domestic					
People served with kiosks	1580	3.9	6,569	12,447	23,584
Commercial					
Shops	3	1	39	7	14
Bars and restaurants	3	1	38	7	13
Lodges	3	1	3	6	11
Stores	1	1	11	2	3
Clinics	1	1	13	2	4
Salons	1	1	18	3	6
Market (1/5th of hectare)	1				
Institutions					
A. Schools					
Day School Bembe St. Kizito P/S	1	401	427	81	1,535
Day School Edith Junior School	1	120	128	24	45
Day School Victor Standard Junior	1	200	213	40	76
Bembe COU Primary school	1	254	271	51	97

Kibujjo COU Primary school	1	80	85	16	30
Glorious Nursery school	1	60	64	121	23
B. Health Center					
Kibujjo Health Centre II	2	2	2	4	8
C. Churches					
Catholic churches	2	75	160	30	57
Church of Uganda	2	60	128	24	45
Born Again Churches	4	20	128	24	45
Mosques	1	25	27	5	9
Total			**8,324**	**15,773**	**29,888**

3.5.3 Access to Infrastructure

Access to electricity: Bembe is not connected to the national electricity grid. The grid is 9 km from water source, there were other energy options observed and being utilized by the local residents of Bembe namely; simple solar systems, fuel for lighting, firewood and charcoal for cooking.

Communication: The project area is not connected to the National hydro-electricity power grid but it is linked by wireless telephone services provided by MTN and AIRTEL. The television reception is relatively good and various FM radios like Radio Simba, CBS, Radio Maria, Radio Galaxy, Mityana Fm and TV Stations NTV, BBS, Spark TV, NBS, Salt, Bukedde, and many others are received. They serve as main channel for entertainment, making announcements and regular news bulletins.

Road network: The main road in the project area is an unpaved murrum road in good condition running from Jjembe junction on Hoima. The existing road follows mostly gentle slopes and its width is about 7m. The feeder roads in the project area are in good conditions but during the wet seasons these murrum roads usually develop pot holes and turn slippery.

3.5.4 Education Level

Education is important because it contributes to improved living conditions not only for the individual household but for the society as a whole. Reproductive behavior, the use of contraception, health habits, school attendance of household members and habits relating to hygiene and nutrition are all influenced by education.

The findings of the household survey showed that 20% of the respondents in project area attained secondary level of education, 55% attained primary level of education, 25% went up to tertiary level and 0% never went to school. In terms of gender, the results showed that majority (60%) of the female heads of households studied up to primary level of education. Table 14 shows the educational levels by gender of the household heads in the project area.

Table 13: Educational Levels by Gender of the Household Heads

Level of Education	Gender of the Household Head				Total	%
	Male	%	Female	%		
Never went to school	0	0.0%	0	0.0%	0	0.0%
Primary	8	53.3%	3	60.0%	11	55.0%
Secondary	3	20.0%	1	20.0%	4	20.0%
Tertiary	4	26.7%	1	20.0%	5	25.0%
Total	**15**	**100.0%**	**5**	**100.0%**	**20**	**100.0%**

3.5.5 Economic Activities

The household survey findings showed that 45.0% of the respondents were engaged in farming, 10.0% were in engaged in business/trading, 5.0% were salary/wage earners, 15.0% sold agro-products, 20.0% had small shops/kiosks and 5.0% had other sources of income such as boda riding, charcoal selling, building, sale of local brew, welding and tailoring. Figure 8 shows the sources of income for the interviewed households.

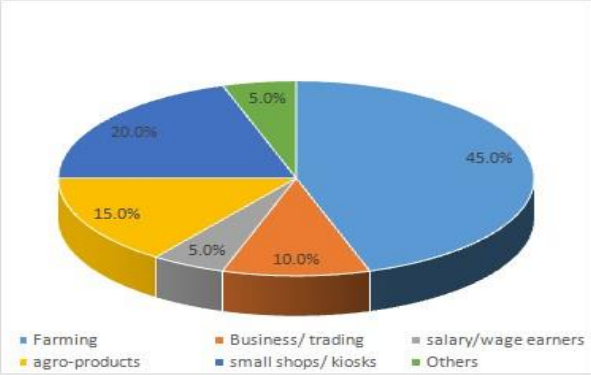

Figure 8: Economic activities in the project area

4 PROJECT DESCRIPTION

4.1 Introduction

The proposed project will be composed of: water abstraction system, transmission mains, reservoir, distribution mains and intensification lines, water supply points (yard taps and public standpipes/kiosks). The detailed description of the project components is in the following sections:

4.2 Water Source

The Bembe piped water scheme will be supplied by a deep borehole **(DWD 67039)** well which was drilled by Wakiso District Local Government. The well is located at coordinates 36N 418858 mE 49216 mN.

The current limiting yield capacity of this water source is 15 m^3/hr; which implies that the current design pumping rate of 15m^3/hr can only supply about 150 m^3/day when using solar-PV technology alone for a 10-hour day period. It is thus evident that, this single water source is adequate to supply water that meets the daily demand in initial and even future years for only 10-hours of pumping per day. The characteristics of the borehole are summarized in Table 15.

Table 14: Proposed water source Characteristics

Static Water Level (m)	5.01
Pump installation depth (m)	90
Dynamic water level (m)	46.06
Created Drawdown	27.59
Available drawdown	40.96
Pump test discharge (m^3/hr)	15.00
Recovery	95% after 2hrs

4.3 Water Pump

The water pump to be used at Bembe water supply scheme shall be centrifugal multistage submersible pump with a 3-phase AC-type, corrosion-resistant motor, all stainless-steel exterior construction, stainless steel splined shaft, NEMA mounting dimensions, hermetically-sealed windings, water lubrication and with a pressure equalizing diaphragm.

The pump end shall be constructed from centrifugal multistage direct-coupled pump end, with non-return valve, of material: stainless steel (AISI 304), rubber, dry running protection, shall withstand maximum sand content of 50 g/m^3, maximum salt content of 300-500 ppm at maximum 30°C, with water pH value of 6-9 and shall be of high life expectancy.

The pump shall be equipped with a variable speed capable motor (+3Hz selectable frequency) that works well in the solar environment, in which the energy generated from the solar array varies as solar radiation (cause by moving clouds/rainy weather or sun movements for fixed solar arrays). Hence, the pump will not stall at low solar radiation, but will work at a reduced rate using the availed energy portion from the solar arrays.

4.4 Transmission Pipe System

The water pumping main shall start from the pump house and discharge at the elevated steel paneled tank over a distance of about 1.227 km. The transmission main has been designed with a capacity of delivering 15 m^3/hr. The total heads of the economic size along with other pipe sizes were calculated using the Hazen William formula to obtain a pipe size that gives a sufficient head as shown in Tables 16-17.

Table 15: Pipe sizing for transmission line

TRANSMISSION PIPE LINE TYPE	HDPE 90mm	HDPE 110mm
Friction head loss (m)	5.961	2.246
Minor losses due to pipe fittings (m)	5.00	5.00
Tank tower height (m)	6.00	6.00
Tank height (m)	3.66	3.66
Installation depth (m)	90	90
Elevation (m)	72	72
TOTAL HEAD	**182.621**	**178.906**

The DN 90 HDPE PN 20 pipe was found as the optimum pipe size and was therefore adopted.

Table 16: Transmission main design components

Pipe Section	**~Length** (m)	**Flow** (m^3/h)	**Pumping Head** (m)	**Pipe Type**
Pumping station to Reservoir	1227	15.0	190	DN 90 HDPE PN 20

4.5 Water Storage Reservoir

The water reservoir is to be located in Bembe-Nasiti Village at coordinates 36N 0419268 UTM 0048705. The capacity of the water reservoir is 30% of the maximum day demand of the ultimate year. This capacity is anticipated to also cater for emergency volume in case of fire. Bembe water system has a future year 2029 maximum day water demand of 397.4 m^3/day, thus a tank capacity of 130 m^3 has been designed. Table 18 summarizes the tank requirements.

Table 17: Sizing of Bembe Water Storage Reservoir

Particulars	**Specification**
Maximum Day Demand (m^3/day)	397.4
Storage Capacity (30% of MDD) (m^3)	119
Size of Reservoir Considered (m^3)	130

The tank will be made of cold pressed steel sections and constructed on a steel tower of 6 m. The key features of the steel tank are summarized in Table 19.

Table 18: Key Design Features of Steel Reservoir Tank – Bembe WSS

Feature	**Description**	
Reservoir Capacity (m^3)	130	
Tank dimensions (m)	Length	7.32

Feature	Description	
	Width	4.88
	Height	3.66
Tank stand Height (m)	6.0	
Dimensions of Tank Plate (mm)	Length	1000
	Width	1000
	Thickness	4
Material	**Cold Pressed steel**	
Inlet Size (mm)	**GI DN 90**	
Outlet Size (mm)	**GI DN 90**	
Overflow Size (mm)	**GI DN 90**	

The reservoir walls will be made of square cold pressed steel panels of length 1.22 m. The reservoir shall be provided with inlet, overflow, outlet, and drain pipe work. The following fittings shall also be provided for the reservoirs;

I. Internal ladder of galvanised steel,
II. Wall mounted level indicator,
III. Vents on the tank roof,
IV. Roof level access cover of galvanised steel.

The access covers shall be at least 100 mm above the finished level of the roof and shall be lockable. The roof vents shall be similarly set out and shall be fitted with vermin proofing and mosquito proofing fabric.

4.5.1 Reservoir Site Works

The site works for all the reservoirs will consist of the following:

- The general earthworks,
- The site pipe work,
- The site drainage,
- Fencing and miscellaneous works.

The outlet from the reservoir will be fitted with a bulk flow meter.

4.6 Valves and Fittings

In general, valves and fittings facilitate the operation of the water supply system. A careful design of the routing of the pipeline was done to minimize their number and related costs. The following valves and fittings shall be installed within the piped water supply network;

i. Section Valves - Section valves will not be provided to facilitate maintenance of the pipes by isolating one section from the others since the pipe network is limited in length.

ii. Air Valves – 1 Air valve shall be installed to release air from the pipeline, during normal operation (degasing due to changes in pressure) and during the pipe filling process. The air valves shall be installed at peaks/crests within the pipe network.

iii. Wash outs – no washouts will be installed on pipelines to drain the pipe section especially during cleaning out of sediments in the pipe. They are usually provided at pronounced low points or valleys in the pipeline.

4.7 Array Power Output

The power to be supplied from the array to power the water pump shall at least be 13 kW at a solar insolation of 5.32 kWh/m²/day for a solar-PV energy package of 22.32 kWp, and shall meet the following technical particulars as per Table 20.

Table 19: Sizing and Specifications of solar-PV array

Parameter	Characteristics
Total power required, including losses	13kW
Solar Module rating	310Wp, 36.38VDC$_{mpp}$, 8.52ADC$_{mpp}$
System Voltage Configuration	650 VDC V$_{mpp}$
The solar-PV array power rating	22.32kWp
Number of modules to supply the required power	4x18pcs (each array containing 18 pieces of modules)
Solar Module Material	Poly-Crystalline or Mono-crystalline
Warranty on solar Module	25 years [minimum]
Certification on Solar Modules	UL, ISO, IEC and IEE requirements

4.8 Inverter Specifications

The inverter to be supplied shall be three phase DC-AC variable speed drive, for direct interconnection with the solar array, with the MPPT power control algorithm. Table 21 shows the inverter specifications.

Table 20: Inverter Specifications for Bembe Water System

Parameter	Characteristics
Inverter Type	DC-AC Inverter, with "Variable speed pump drive"
Power Input type	DC Voltage (max. 850VDC)
Power Output type	3-Phase AC (max. MCB rating: 39Amps)
Recommended Input Voltage	500-700VDC
Rated Power Output	18.5kW at 98% efficiency at full-load
Output Voltage	3x380-400-415VAC
Power Control	Based on IGBTs for digital signal processing, with Pulse-width modulation

Power Control Algorithm	Maximum Power Point Tracking
Frequency	50Hz (Variable speed, +5hz selectable speed increase)
Other features	Good sealing, IP65 protection grade, Surge protection, over voltage, overload, configurable run parameters, remote on/off switch, tank empty sensor, Dry-run protection sensor; with "auto ON" when water level normalizes.
Data storage and Remote	RS485/GPRS interface for system remote
Monitoring	monitoring; with Datalogger for data storage to be retrieved through USB/RS232/SD-Card options
Warranty	5years

4.9 Design Summary of Bembe Water Supply Network

Table 22 summarizes the design data output for the Bembe water supply network. The overall design of the water supply network was accomplished using the ultimate population and water demand data to ensure that no much network upgrades are made within Bembe central when there is some water demand increase, and probably new supply and storage are added into the system.

Table 21: Design Summary of the Bembe Water Supply System

Features	Description
Total Population	12,447 (Future year 2029 population)
Water Demand	397.4 m^3/day (Future year 2029 demand)
Water Source borehole	Borehole at 15.0m^3/hr
Water Pump	Qmax=15.6 m^3/hr, H=190 m, 13kW, 29 Amps, 415 V/50 Hz
Inverter	18.5kW, 415V/50Hz, 39Amps
Solar Array	22.32 kWp/4x8.52A/650 Vmp, 4x18pcs rated 310Wp/ 36.38V/ 8.52A
Pumping Main to Reservoir	90mm HDPE PN-20 at length of 1.227km
Storage Reservoir	130 m^3 cold pressed steel tank elevated at 6meters
Distribution Mains	DN 50 HDPE PN 10 at length of 481m DN 63 HDPE PN-10 at length of 5068m DN 75 HDPE PN 10 at length of 32m GI DN 90 PN 10 at length of 7m HDPE DN 90 PN 10 at length of 373m
Public Stand Posts	Seven (7) with 4 taps each
Waterborne Toilet	At production borehole site

5 PUBLIC CONSULTATION AND INVOLVEMENT

5.1 Introduction

This section presents details of the stakeholder consultations that were undertaken for the project. It contains the consultation approach that was used, stakeholders that were consulted and the key issues and concerns that were identified during the consultation.

5.2 Concerns /Views of the Stakeholder

The Concerns/ views of the consulted stakeholders are presented in Table 23, and the details of the stakeholders are presented in Annex III.

Table 22: Stakeholder Concerns/Comments on the Proposed Project

No.	Stakeholder	Concerns/Comments	Response
1	District Water Officer-Wakiso District	• The existing water supply system in Bembe is unreliable. They generally depend on boreholes and shallow hand-dug wells which are overwhelmed by demand and an ever-growing population. • Mass community sensitization is necessary as well as a catchment management plan including water source and water reservoir protection activities that integrate agriculture, environment, and production. • The water project should harmonize with the community over where the reservoir should be located. • The water project is envisaged to substantially improve water supply in Namayumba sub-county and particularly Bembe Parish	• The proposed project will increase access to safe water, reduce walking distances to the sources as well as queueing time. • As part of the project, stakeholder engagement activities will be undertaken including community consultations about critical aspects of the project, community sensitization and grievance redress. • Risks and impacts of the project will be identified and appropriate mitigation measures undertaken including catchment management and source protection measures.
2	District Environmental Officer_Wakiso District	• Extensive community sensitization is critical • The district is constrained with funding, the project is big for a district, it had started with Wakiso Bumyuka, Busi, Masurita and Namayumba, Busi, and Bumyuka were finalized in the other financial year of 2022 now they are embarking on this one.	

No.	Stakeholder	Concerns/Comments	Response
3	Sub-County Chairperson Namayumba Sub-County	• The water engineers estimated that the quantity of water in the ground has the capacity to supply water in the whole sub-county, the challenge is that households are scattered in these villages which cripples accessibility, it is estimated to serve Bembe trading center where there is Nansiti and Kidugala, Bbigompaga, Buryana and Kibujo • The only challenge is that distance between villages is big, but the capacity of the water in the ground can serve between 25000 to 30000 which is almost equivalent to the population of the sub-county which was about 21600 and is now approximated to be 25000 due to new settlements • • There are institutions and work places that have huge populations which increase the demand for water	The design of the water supply and sanitation system will be reviewed to supply as many villages, institutions and people to the extent possible. • Appropriate stakeholder engagement and consultations will be conducted throughout the project life cycle.
4.	Sub-County Chief Namayumba Sub-County	• The budget for the project is big and beyond what the district can afford hence the need for support from central government.	• The project has been identified and is being proposed for funding under the African Development
5	FGD with the members of Bembe-Nansiti Cell	• They are aware and were told about the project about 6 years ago but need more details. The demand for accessible and safe water is high to reduce the current expenditure on safe water which can be as high as 700 shillings for 20 - litre jerrycan moreover the safe source is located in a great distance. The nearby spring is seasonal while the shallow well is dirty. • The community lacks a proper drainage systems and wastewater	• The proposed project is going to bring safe, piped water closer to the people at affordable rates. Appropriate engagements with all the stakeholders will be conducted at the various stages of the project to provide as much information as possible and also answer any queries that may exist in the community. • The project will have a hygiene and sanitation component that

No.	Stakeholder	Concerns/Comments	Response
		ends up in the same stream where they fetch water exposing them to diseases like Bilharzia. • These communities live in squeezed plots of land and they wonder if the passage of water pipes is not likely to affect people's plots. • The project of piped water will save the community from sharing the same water source with animals and reduce on solve the issue of children drowning from open wells.	will include construction of public/institutional sanitation facilities as well as hygiene and sanitation promotional activities. The community will also be guided on waste water management, safe water chain, solid waste management among others. • Due consideration will be made to minimize land take by following road reserves especially for the large pipes. Appropriate procedures that are in line with the land laws will be used in case of any compensations. The community will be engaged and prepared to receive the Piped water system so that the work can move smoothly and water starts to flow.

No.	Stakeholder	Concerns/Comments	Response
6	FGD with the members of Bembe-Bbigo-Mpanga Cell.	• The project will reduce the burden of walking 1.5km to access the boreholes and waiting time of at least 2 hours. • • It will reduce domestic violence where the husbands quarrel with women and children when they delay bringing the water home. •	
7	FGD with the members of Bembe-Kibujjo Cell	• The water project will save the huge population in their village from dirty water from unsafe sources, reduce expenses on water bought from vendors, and also the long queues at the boreholes • The owner of the land where water will be pumped from gave it to the community officially and it is known, it was the late Ssekandi in 2017. The owner died but there is no wrangle. •	• The project is here and all members of the community should embrace it. Offering land for the project is a noble action and the project is grateful for the kindness. Appropriate measures will be taken to formalize ownership of the land that was offered to ensure its availability for the project.
8	FGD with members of Bembe Kidugala Cell.	• The community has waited for long for the project to help them access clean and safe water, save their children from the risks associated with fetching water in the dark. • The cost implication of accessing the water should be made clear so that communities prepare adequately in time. •	• The water project is here to solve water problems and should be embraced and supported by all stakeholders. The piped water will be paid for at an affordable tariff that will be generated in consultation with the community. It is important to note that people will only pay for they have consumed.
9	School Head Teacher, Bembe Primary School and	• The water project is welcome and will save the school from burdening learners to fetch water during class hours, shorten queuing time, minimize	• The project is here to solve water problems and minimize associated risks like losing valuable time to fetching water, gender based violence, exposure

No.	Stakeholder	Concerns/Comments	Response
	Priest Bembe C.O.U	unnecessary students' interaction with community members which exposes them to risks and also enable meals to be prepared in time. • There was a concern on the sustainability and reliability of the water system. •	of children to Violence against children, sexual exploitation and abuse/ sexual harassment among others. It is anticipated that the project will be sustainable and measures will be taken at the design stage, construction phase, operation and maintenance phase to ensure that all stakeholders play their respective roles and the water supply system continues to serve the area.

5.3 General recommendations to enhance the sustainability of the project

1. People who have been consulted welcome the proposed project. However, to enhance the benefits that are anticipated, the project design should include a sensitization/educational program component, especially on safe water use and proper sanitation behavior. Without this, the investment in the water and sanitation infrastructure alone may not lead to the desired benefits, for example, improvement in public health. In partnership with the local authorities, this program should be designed, financed, and implemented to leverage proper hygiene and water handling practices in the project area.
2. It is recommended that appropriate land acquisition procedures be followed to ensure that the locations of the critical project infrastructure is secured. adequate and prompt negotiations for PAPs be implemented before the implementation of project activities. Therefore, there is a need for an adequate information system that updates the PAPs on all pending issues related to their compensation, especially where the water transmission lines will be laid.
3. Communication with the PAPs should be prioritized to ensure that they are brought on board for the sustainability of the project.

6 PROJECT NEED AND DISCUSSION OF ALTERNATIVES

6.1 Introduction

Analysis of project alternatives as part of this environmental impact assessment considers other practicable strategies that can be taken to minimize or eliminate the negative impacts while enhancing the positive ones. This ensures that the project is implemented with minimal damage to environmental and socio-economic components.

6.2 Project Need

Extension of a Piped Water Supply System to proposed project area will generally come along with several benefits.

Extension of a Piped Water Supply System to proposed project area in Bembe Parish will generally come along with several benefits. These will include; meeting the increased demand for clean and affordable water and provision of job opportunities during the construction and operation phases and reduction on the water borne diseases (e.g., cholera, dysentery) related to using unsafe water among others. The availability of clean, safe and affordable water will also change the economic and wellbeing of people of Bembe Parish, and Wakiso District in general.

6.3 The "No- Action" Alternative

Analysis of the "No project option" as an alternative, provides an environmental and socio-economic baseline against which impacts of the proposed action can be compared. This alternative means that the status quo remains and the proposed piped water supply system is not established in the area. The alternative ignores all positive impacts such as creation of employment to both skilled and unskilled labour, and provision of convenient, safe and affordable water that are likely to be realized in the area. The No-Action alternative is clearly not recommended.

6.4 Water Source Alternatives

Two water source option were evaluated; ground water and surface. The surface water resources in the project area mainly includes wetlands. The water resources assessment established that these wetlands are not sufficient sources to meet the water demand since they dry during the dry season. As a result, the surface water resource alternative was not considered. Therefore, the only available water source for consideration, and which was selected, was the ground water source.

6.5 Power Source Alternatives

The power sources considered in the analysis included solar, diesel and hydroelectricity from the national grid. The evaluation of the power source alternative considered the ability of the power source to pump the required water volumes and the investment costs. Solar power source was evaluated as the most feasible power source because it is cheaper and the sunshine the project area is sufficient to support a solar system. However, in future, to meet the increasing demand, more high yielding borehole wells must be sought and developed, which will require

high pumping capacity beyond solar. As a result, a hybrid solar-hydropower energy source was recommended. Both the solar and hybrid solar-hydropower energy sources are cheaper compared to diesel.

6.6 Design Considerations

Putting in place a piped water supply system according to approved designs will be a priority as it helps in enhancing the future planning of Bembe RGC and Wakiso District at large. Therefore, it will be paramount that the proponent ensures that the facilities especially at the water source have the following in place.

- Well-designed drainage system
- Sufficient walkways within established infrastructure especially at the pumping station
- Consideration of solid waste management and other waste refuse
- Proper landscaping
- Sufficient sanitary facilities for workers
- Well-built and firm reservoir
- Well maintained power supply system for example regular maintenance of the Solar Panels.
- Well maintained water transmission line

6.6 The Action Alternative

This option implies that Wakiso District Local Government implements the proposed project as per the proposed project designs and recommendations by different stakeholders. A comprehensive environmental and social impact assessment has been undertaken. Details of the study are the subject of this project brief report. The study has found no significant issues (environmental and socio-economic) to stop the implementation of the project. Mitigation measures for the identified negative impacts of this alternative have been thoroughly discussed throughout this EPB. If they are implemented as proposed, the project will not cause damage to the environment. It is here thus we recommend that this alternative is the most appropriate.

7 ENVIRONMENTAL AND SOCIAL IMPACTS AND MITIGATION MEASURES

7.1 Introduction

This chapter identifies and evaluates significant environmental consequences of the construction and operation phases of the proposed Bembe Piped Water Supply System. While positive impacts should be enhanced, the proposed mitigation measures should be implemented as suggested to minimize or eliminate the predicted negative environmental and social impacts.

7.2 Impact Evaluation Methodology

The criteria for assessment of severity of environmental and social impacts was categorised in terms of:

- **Extent:** Evaluates the area of occurrence/influence by the impact on the subject environment; whether the impact will occur- Within limited area/site specific (<200 m from site), local (200 m up to 5 km) or wide (up to 10 km and above).
- **Duration:** Evaluates the persistence of impact on the subject environment, whether the impact will be Temporary (1 year), Short term (1-3 years), Medium term (3 -5 years) or Permanent (> 5 years).
- **Magnitude:** The quantifiable effects of impacts, measured where possible, against the appropriate standard for each respective environmental component. This includes existing standards, guidelines or expert judgment, it can be Minor (25%), Medium (25-75%), or High (>75%)
- **Probability of Occurrence:** Evaluates the likelihood of occurrence of the predicted impact on the subject environment; Low (25%), Medium (25-75%), or High (>75%)
- **Overall Assessment of Impact:** Using a combination of the above criteria, the overall effect of the impact is assigned a rating of Severe, Substantial, Moderate, Minor, or Negligible.

To systematically assess the impacts associated with the proposed development, an impact matrix in Table 24, was constructed which arrayed the main project activities against the relevant environmental issues.

Table 23: Impact Matrix

Impact	Extent	Duration	Magnitude	Probability of occurrence	Overall assessment
Site Preparation and Construction Phase					
Land take	Site specific	Permanent	Minor	High	Moderate
Loss of property	Site specific	Permanent	Minor	High	Moderate
Traffic disruption	Local	Temporary	Medium	Low	Moderate
Disruption of social order	Local	Temporary	Minor	Low	Minor
Loss of vegetation and soil cover	Site specific	Permanent	Minor	High	Moderate

Impact	Extent	Duration	Magnitude	Probability of occurrence	Overall assessment
Workers' faecal waste disposal impacts	Local	Temporary	Medium	High	Moderate
Noise from construction machinery	Local	Temporary	Medium	High	Moderate
Generation of dust, leading to air pollution	Site specific	Temporary	Medium	High	Moderate
Solid waste generation					
Occupational health and safety issues	Site specific	Temporary	Minor	Medium	Minor
Public health and safety issues	Local	Temporary	Minor	Low	Minor
Increased susceptibility of soil erosion	Local	Temporary	Medium	Medium	Moderate
Air pollution and climate change	Local	Temporary	Medium	High	Moderate
Operation and Maintenance phase					
Water and soil pollution	Site specific	Temporary	Minor	Low	Minor
Operational health and safety issues	Site specific	Permanent	Minor	Medium	Moderate
Local incapacity to operate and maintain project equipment	Wide	Permanent	Medium	High	Moderate
Unaffordability of water charges	Local	Permanent	Medium	High	Moderate

7.3 Discussion of Impacts

The impacts identified were minor and moderate according to the overall assessment. Table 25 gives the assessment criteria that was used.

Table 24: Impact Rating Description

Impact rating	Description of Impacts
Minor	The impact has noticeable effects on the environment but it returns naturally to the original state in the medium term.
Moderate	The impact has noticeable effects on the environment but they are reversible over the long term.
Major	The impact exceeds the accepted limit or standard, or has a large magnitude and occurs to highly valued/sensitive resource/receptors. The project cannot proceed unless adequate mitigation measures are put in place

7.4 Potential Positive Impacts of the Project

Table 26 summarizes the positive social impacts that are likely to result from the project development as perceived by the local stakeholders consulted.

Table 25: Positive Impacts of the Proposed Project

No.	IMPACT	REMARKS
1	Employment opportunities and income	▪ During the construction stage, preference for employment opportunities for appropriate skills will be given to the local community as far as it is possible. ▪ The use of appropriate labour-intensive methods for some of the construction activities (for example excavation for pipelines) would present employment opportunities for local people (including women) and generate direct income benefits to local households. ▪ In addition, some people could be employed in the service sector (restaurants, lodges, clinics, shops, and so on) around the project site.
2	Acquisition/improvement of skills	▪ People who have ever worked on similar projects before will improve on their skills. ▪ People who have never worked on such projects will acquire such skills which they would use to seek employment in future. ▪ The Project will provide grassroots management opportunities for the local people to both manage their piped water supply and protect their local environment.
3	Reduction of poverty and improved livelihoods of the local people	▪ Water is a catalyst for socio-economic development e.g., through agro-processing and business. The project will therefore enhance the growth of small-scale industries that depend on safe and adequate water supplies, which will improve the livelihoods of people in the area
4	Improved health in the area	▪ People will have access to safe water, which will help reduce the prevalence of water-borne diseases ▪ Improved water supply will promote good health and reduce health care costs thus making overall national savings for investment in other developmental activities.
5	Improve maternal health	▪ The Project will result into reduced physical stress and improved health status of pregnant women by extending water closer, thereby reducing stress associated with walking for long distances and waiting at water sources for long hours
6	Achieve universal primary education	▪ Access to good water would save time and keep children healthy so that they would be able to attend school regularly.
7	Promotion of gender equality and empowerment of women and the girl child	▪ The proposed project would free women and girls of the burden of having to spend a lot of their time collecting and carrying water almost on a daily basis often from sources distant from their houses. This reduction in burden would allow women and girls time for other activities including

No.	IMPACT	REMARKS
		involvement in economic ventures that could contribute to reducing poverty and furthering their education (thus increasing school enrolment).

7.5 Negative Impacts during the Construction and Operation Phase

The potential negative impacts of the proposed Bembe Water Supply Project are summarized in Table 27.

Table 26: Potential Negative Impacts

IMPACT	REMARKS
Construction phase	
Land take	▪ Land will be required to accommodate project components
Loss of property	▪ Properties such as crops, houses may be destroyed, especially those that may be found at sites for water abstraction, reservoir, along the alignment of the transmission system, along access corridors
Traffic disruption	▪ Project construction machinery, including trucks transporting material to the sites may disrupt traffic along public roads
Loss of vegetation	▪ Vegetation clearance to pave way for construction activities
Disruption of social order	▪ Influx of foreign labour (outside of the project area e.g., from other districts) during construction works may results into disruption of the cultural norms and customs. These may include drug misuse, inappropriate sexual behaviour, vulgar language among others
Faecal matter disposal	▪ Faecal matter originating from construction staff
Increased vehicular traffic, which can result into accidents and disruption of transport	▪ Construction vehicles may cause traffic jam, accidents or inconvenience on public roads especially during delivery of raw materials to construction sites
Noise from construction machinery	▪ Noise pollution may arise from construction equipment. This may cause a nuisance to the public and construction staff
Generation of dust, leading to air pollution	▪ Dust will originate from unpaved compounds, roads.
Solid waste generation	▪ Solid waste will come especially from excavated material, unused construction material, packaging material, etc
Occupational health and safety issues	▪ Health and safety of workforce due exposure to unsafe site conditions, lack of protective gear etc.
Public health and safety issues	▪ Health and safety impacts such injury due to falling debris from works along public routes, falling in excavated areas along public routes, accidents from project vehicles transporting material along community access roads, etc
Increased susceptibility to soil erosion during construction	▪ Vegetation clearance may expose top soil to erosion during rain and heavy winds events

IMPACT	REMARKS
Air pollution and climate change	▪ Dust emission from murram access road, uncovered loose construction material or construction waste, fumes from construction machinery, including greenhouse gases like carbon dioxide
Operation and Maintenance Phase	
Water and soil pollution	▪ Soil erosion may result from spillage/leakage of water treatment chemicals such as chlorine
Occupational safety and health issues	▪ Health and safety of workforce due exposure to unsafe site conditions, lack of protective gear etc.
Incapacity to operate and maintain the project components by local people	▪ Local communities may not have adequate capacity to operate and maintain the project components, which may fail the project
Unaffordability of water charges	▪ People in the project area current access water free of charge from the existing water sources. Some stakeholders were scared that they might fail to afford the water charges, which may be hiked by managers of the water scheme

7.6 Proposed Mitigation Measures

Where potentially significant adverse impacts were identified, mitigation measures to avoid, reduce or minimise them have been suggested (Table 28); some of them were incorporated into the project designs while others would be implemented during project implementation.

Table 27: Mitigation Measures

IMPACT	MITIGATION MEASURE
Construction phase	
Land take	▪ All privately owned land to host project components should be duly compensated prior start of construction activities
Loss of property	▪ All property should be valued and duly compensated prior to start of construction works ▪ For property like crops, where possible, owners should be informed early about the project work plan and allowed to harvest them prior to start of construction
Traffic disruption	▪ Liaise with the local traffic authority to manage traffic at busy crossings e.g., markets, schools, churches
Loss of vegetation and soil cover	▪ Restrict clearance to only areas to be constructed. ▪ Landscaping and re-vegetation after construction especially around the water abstraction source.
Disruption of social order	▪ Prioritize employment of local people where they have the required skills ▪ Sensitizing all workers to ensure awareness of and sensitivity to the local cultures, traditions and lifestyles
Faecal matter disposal	▪ Provide temporary eco-san toilet on site during site works
Increased vehicular traffic, which can result into accidents	▪ Installing speed reduction humps at crossings of many people, e.g., at a school, market; ▪ Using reflective signature to direct traffic to designated areas;

IMPACT	MITIGATION MEASURE
and disruption of transport	▪ Informing inform local communities and road users in advance, in case access roads have to be closed.
Noise from construction machinery	▪ Schedule noise-intensive work for the least noise-sensitive time of the day (work between 8 am and 5 pm); ▪ Provision of PPE to project workers ▪ Regular noise assessments
Generation of dust, leading to air pollution	▪ Materials delivery trucks be covered with tarpaulins; ▪ Sprinkle water to dusty grounds during the dry seasons; ▪ Cover earth materials with tarpaulin during transportation to minimise their falling off trucks; ▪ Provision of PPE to project workers;
Solid waste generation	▪ Use the excavated material for backfilling. ▪ Provide waste bins for proper storage. ▪ Contract a waste collection company to manage waste generated.
Occupational health and safety issues	▪ Provide workers with PPE and sensitise them on basic safety precautions. ▪ Provision of a first aid kit; ▪ Provision of adequate sanitary facilities; ▪ An occupational safety and health policy should be drafted and implemented.
Public health and safety issues	▪ Cordon off all dangerous areas along public roads ▪ Project vehicles transport material along community roads should not exceed 40 km/h. ▪ Schedule of construction works along community access roads should be communicated to public at least a week prior to start of construction works
Increased susceptibility to soil erosion during construction	▪ Immediately dispose of any excavated soil to avoid loose soil being washed away by storm water. ▪ Planting of bands of grass on erosion prone surfaces.
Air pollution and climate change	▪ Vehicles transporting construction material along community access roads should move as lower speeds, not exceeding 40 km/hr ▪ All lose material like sand, cement, murram, soil should be covered with a tarpaulin during transportation ▪ Water should be sprinkled on dusty ground where other measures cannot appropriately minimize dust emission ▪ Repair and maintain construction equipment following the manufacturer's specifications, including on fuelling ▪ Offset emitted carbon dioxide during construction activities by planting local trees at all devastated sites
Operation and Maintenance Phase	
Water and soil pollution	▪ Ensuring that storage containers are checked regularly for leakage;
Occupational safety and health issues	▪ Employees checking the water reservoir tanks should have a harnessing equipment before any activities are carried out; ▪ Workers should be given gloves and masks especially those handling chemicals;

IMPACT	MITIGATION MEASURE
	▪ Regular trainings on the operations of the water system; ▪ Safety signages should be put at the reservoir tank points and abstraction point; ▪ Installation of firefighting equipment at the abstraction point; ▪ A well-equipped first aid kit should be availed to project workers.
Incapacity to operate and maintain the project components by local people	▪ Train local community members in the operation and maintenance of the water supply infrastructure
Unaffordability of the water charges	▪ Levy charges in consideration of the income levels of the area. Charges for poor people should be just enough to cover the operational costs ▪ Provide many public standard pipes where poor people can obtain water cheaply

8 ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN

8.1 Introduction

The goal of the Environmental and Social Management and Monitoring Plan (ESMP) is to ensure that environmental and socio-economic issues continue to be fully integrated into the decisions by the project proponent while promoting resource allocation efficiency throughout the lifetime of the project. This section provides a framework for managing and monitoring impacts for the life of the project. It is designed to ensure that the commitments/mitigation measures in this EPB, and in any subsequent assessment reports, together with any license approval or similar conditions, are implemented. In executing the project, the project proponents shall take all practicable measures to ensure that the requirements and recommendations of this Project Brief report are complied with.

8.2 Environmental and Social Monitoring Plan

A monitoring process will need to be established to check/assess the implementation progress and effectiveness of the mitigation measures suggested and the resulting effects of the proposed project on the environment. The process will begin during the construction stage and continue throughout the operation phase. It should also include regular reviews of the impacts that cannot be adequately assessed before the beginning of the project, or which arise unexpectedly. In such cases, appropriate new actions to mitigate any adverse effects will be undertaken.

A monitoring plan has been prepared considering the chronology of potential project activities. The recommendations in this report would provide a basis for tracking progress of the proposed project activities with regard to sound environmental practice and mitigation measures.

8.3 Roles and Responsibilities

In order to enhance the potential for integrating sustainability concerns in this proposed Piped Water Supply System, it is important to assign clear roles and responsibilities to dominant professionals, contractors and/or sub-contractors so as to ensure that environmental plans are implemented effectively.

8.3.1 The Role of NEMA and Lead Agencies

NEMA will, in consultation with Wakiso District Local Government (represented by District Environment Officer), monitor all environmental phenomena with a view of assessing any possible changes in the environment and their possible impacts; the operation of the water supply facility with a view of determining its immediate and long-term effects on the environment.

8.3.2 The Role of Wakiso District Local Government

Although the contractor will have the primary role in delivering on the measures set out in the ESMMP, Wakiso District Local Government will have the ultimate responsibility for ensuring that the measures are delivered. In this respect, Wakiso District Local Government will review and approve contractor plans for delivery of the actions contained in the ESMP and subsequently during project operation, review contractor performance through monitoring,

audits and inspection to ensure that all proposed mitigation measures are implemented as well as ensuring regulatory compliance.

8.3.3 The Role of the Contractor

During sites preparation and construction, the contractor will be responsible for ensuring compliance with all relevant legislation as well as adherence to all environmental and socio-economic mitigation measures specified in the Environment and Social Management Plan. The contractor is also responsible for managing the potential environmental, socio-economic, safety and health impacts of all contract activities whether these are undertaken by themselves or by their sub-contractors. The contractor is also responsible for preparation of a Contractors – Environmental and Social Management Plan C-ESMP, Code-of-Conduct that all workers are to read and abide with through signing, and prepare monthly reports through their E&S officer

8.4 The Monitoring Team

It is recommended that a core team of individuals preferably headed by the Wakiso District Environment Officer (DEO) and the Water Officer (DWO). Other important players to take part in monitoring include the Community Development Officer (CDO) at the district or sub-county levels and the local leaders at sub-county, parish and village levels.

The monitoring team will start its work during the site preparation and construction process and continue throughout the operation phase and should ensure that the proposed mitigation measures are implemented as suggested in this report. The monitoring team will most particularly check for the following issues among others:

- Collaboration of the Project Proponents with NEMA and other relevant authorities to ensure that operations of the water scheme meet regulatory requirements.
- Efficient and functional water and sanitation system at the premises.
- Proper storage, handling and final disposal of any solid waste produced at the premises.
- General cleanliness and good housekeeping in and around the facilities.
- Emergency preparedness especially in cases of fire outbreak.
- Constant acquisition of appropriate permits and/or licenses from respective institutions and compliance with the regulatory framework.
- Supervise implementation of all the proposed mitigation measures.
- Compile a monitoring report indicating all non-conformances to mitigation measures.

8.5 Environmental and Social Management and Monitoring Plan (ESMMP)

The ESMMP (Table 29) provides a detailed guidance for managing impacts, monitoring indicators, indicative costs for impact mitigation, responsibility for implementing the mitigation measures, the monitoring institution and the monitoring frequency. The Contractor and Developer/Operator must ensure that the ESMMP is implemented, and should allow the monitoring institution to carry out the monitoring duties without any obstruction.

Table 29: The Environmental and social management and monitoring plan for Bembe water supply system

IMPACT	MITIGATION MEASURE	INDICATOR	ESTIMATED COST OF MITIGATION (UGX)	RESPONSIBLE PARTY	MONITORING INSTITUTION	MONITORING FREQUENCY
	Construction phase					
Land take	▪ All privately owned land to host project components should be duly compensated prior start of construction activities	▪ Agreements of land sale	Dependent on the value of land	Developer, Chief Government Valuer, community	CDO	Once, to be cleared before start of construction
Loss of property	▪ All property should be valued and duly compensated prior to start of construction works	▪ Compensation agreement	Dependent on the value of property	Developer,	CDO	Once, to be cleared before start of construction
	▪ For property like crops, where possible, owners should be informed early about the project work plan and allowed to harvest them prior to start of construction	▪ Compensation agreement	Dependent on the value of crops	Developer, district Production officers	CDO	Once, to be cleared before start of construction
Traffic disruption	▪ Liaise with the local traffic authority to manage traffic at busy crossings e.g., markets, schools, churches	▪ Records of agreed work plans with traffic police	0.2 Million	Contractor	CDO	Weekly
Loss of vegetation and soil cover	▪ Restrict clearance to only areas to be constructed.	▪ Presence of bare soils	Part of the Contract	Contractor	DEO	Weekly
	▪ Landscaping and re-vegetation after construction especially around the water source and reservoir	▪ Presence of gullies due to soil erosion.	2 Million	Contractor	DEO	Weekly
	▪ Restrict alignment of the transmission route along road reserves	▪ Layout of the transmission line	Part of the Contract	Contractor	DWO /DEO	Monthly
Disruption of social order	▪ Prioritize employment of local people where they have the required skills	▪ Record of project staff and their area of origin	Part of the Contract	Contractor	CDO	Weekly

IMPACT	MITIGATION MEASURE	INDICATOR	ESTIMATED COST OF MITIGATION (UGX)	RESPONSIBLE PARTY	MONITORING INSTITUTION	MONITORING FREQUENCY
	▪ Sensitizing all workers to ensure awareness of and sensitivity to the local cultures, traditions and lifestyles	▪ Record of sensitization sessions	1 Million	Contractor	CDO	Monthly
Faecal matter disposal	• Provide temporary eco-san toilet on site during site works	• Disease outbreak • Bad odour and nuisance of flies	Part of the construction contract	Contractor	DEO	Monthly
Noise from construction machinery	▪ Schedule noise-intensive work for the least noise-sensitive time of the day (work between 8 am and 5 pm)	▪ Work schedule ▪ Complaints about noise;	0	Contractor	DEO	Weekly
	▪ Provision of PPE to project workers	▪ PPE in use	Part of the Contract	Contractor	DEO	Weekly
	▪ Regular noise assessments	▪ Noise assessment reports	1 Million	Contractor	DEO	Monthly
Generation of dust, leading to air pollution	▪ Materials delivery trucks be covered with tarpaulins;	▪ Complaints from the community	0	Contractor	DEO	Weekly
	▪ Sprinkle water to dusty grounds during the dry seasons	▪ Records of air water sprinkling	2 Million	Contractor	DEO	Weekly
	▪ Cover earth materials with tarpaulin during transportation to minimise their falling off trucks;	▪ Presence of tarpaulins for covering loose ,material	0.5 Million	Contractor	DEO	Weekly
	▪ Provision of PPE to project workers;	▪ PPE in use	Part of the Contract	Contractor	DEO	Weekly
Solid waste generation	▪ Use the excavated material for backfilling.	▪ Heaps of waste & excavated material on site	Part of the Contract	Contractor	DEO	Monthly

IMPACT	MITIGATION MEASURE	INDICATOR	ESTIMATED COST OF MITIGATION (UGX)	RESPONSIBLE PARTY	MONITORING INSTITUTION	MONITORING FREQUENCY
	▪ Provide waste bins for proper storage.	▪ Waste bins within the project area.	0.2 Million	Contractor	DEO	Monthly
	▪ Contract a waste management company where waste volumes are large	▪ Contract agreement with a waste management company	2 Million	Contractor	DEO	Monthly
Occupational health and safety issues	▪ Provide workers with PPE and sensitise them on basic safety precautions.	▪ PPE in use	Part of the Contract	Contractor	DEO	Weekly
	▪ Provision of a first aid kit	▪ First aid kit	Part of the Contract	Contractor	DEO	Monthly
	▪ An occupational safety and health policy should be drafted and implemented	▪ A health and Safety Policy in place and being implemented	2 Million	Contractor	DEO	Monthly
Public health and safety issues	▪ Cordon off all dangerous areas along public roads	▪ Marks of dangerous places	0.3 Million	Contractor	DEO	Weekly
	▪ Project vehicles transport material along community roads should not exceed 40 km/h.	▪ Records of sensitization of project drivers on speed limits ▪ Speed limit signs on roads	0.2 Million	Contractor	DEO	Monthly
	▪ Schedule of construction works along community access roads should be communicated to public at least a week prior to start of construction works	▪ Proof of communication of work schedule with communities ▪ Number accidents recorded	0.1 Million	Contractor	DEO	Bi-monthly

IMPACT	MITIGATION MEASURE	INDICATOR	ESTIMATED COST OF MITIGATION (UGX)	RESPONSIBLE PARTY	MONITORING INSTITUTION	MONITORING FREQUENCY
Increased susceptibility to soil erosion during construction	▪ Immediately dispose of any excavated soil to avoid loose soil being washed away by storm water.	▪ Presence of erosion gullies within the site premises	1 Million	Contractor	DEO	Weekly
	▪ Planting of bands of grass on erosion prone surfaces.	▪ Presence of bare soils on site	2 Million	Contractor	DEO	Quarterly
Operation and maintenance phase						
Water Pollution	▪ Ensuring that storage containers are checked regularly for leakage	▪ Records of chemical leakage/ spillage ▪ Complaints from water users.	0.3 Million	Developer / Operator	DEO	Monthly
Occupational Health and Safety	▪ Workers should be given appropriate PPE when handling chemical	▪ Workers using PPE	Part of the Contract	Developer / Operator	DEO	Quarterly
	▪ Regular trainings on the operations of the water system	▪ Records of training on operation systems	2 Million	Developer / Operator	DWO	Quarterly
	▪ Installation of firefighting equipment at the abstraction point	▪ Presence of firefighting equipment	2 Million	Developer / Operator	DEO	Quarterly
	▪ A well-equipped first aid kit should be availed to project workers.	▪ Presence of a first aid kit. ▪ Records of injuries	Part of the Contract	Developer / Operator	DEO	Quarterly
Incapacity to operate and maintain the project components	▪ Train local community members in the operation and maintenance of the water supply infrastructure	▪ Number of trained community members in operation and maintenance of	3 Million	Developer/ Operator	DWO	Quarterly

IMPACT	MITIGATION MEASURE	INDICATOR	ESTIMATED COST OF MITIGATION (UGX)	RESPONSIBLE PARTY	MONITORING INSTITUTION	MONITORING FREQUENCY
by local people		the piped water supply system				
Unaffordability of the water charges	▪ Levy charges in consideration of the income levels of the area. Charges for poor people should be just enough to cover the operational costs	▪ Records of water charges ▪ Complaints from the public	0	Developer / Operator	DWO	Quarterly
	▪ Provide many public standard pipes where poor people can obtain water cheaply	▪ Number of public stand pipes	Part of the Contract	Developer / Operator	DWO	Twice a year
▪ TOTAL COST OF ESMP			155,300,000/=			

Commented [MD9]: Provide the total cost of the ESMP implementation

Commented [M10R9]: Cost inculded

9 CONCLUSION AND RECOMMENDATIONS

9.1 Conclusions

In this study, the need for the project was examined, its compatibility with the surroundings and economic benefits evaluated and environmental impacts assessed and analysed. Adverse impacts were identified, mitigation measures to avoid, reduce and minimise these impacts have been suggested, either as part of the design, or as measures to be implemented. Good practice measures were also identified in order to minimize the impact of the proposed development further.

Overall, the negative impacts of this project are rated by this study as largely insignificant; however, adequate mitigation measures have been proposed to address them. When mitigation actions and environmental and social monitoring plans are implemented, the project would have minimal residual environmental effects. Hence the project can be implemented in a sustainable way.

It is not necessary to carry out a full ESIA for this project as a Project Brief is deemed sufficient and the proposed mitigation measures would be sufficient to ensure sustainable implementation of the proposed project. The project is therefore deemed environmentally and socially feasible for implementation provided the recommended mitigation and monitoring measures are implemented, and the proposed implementation arrangements are upheld.

Commented [MD11]: Revise this section as it does not highlight the content of the report in which there is no mention of sanitation and hygiene, though it is a component of the project

Commented [M12R11]: The section has been revised and the sanitation component is included as part of the recommendations

Commented [MD13R11]: This has not been addressed/included

Commented [M14R11]: Has been addressed as per the last bullet in the recommendations

9.2 Recommendations

This study therefore recommends that:

- A copy of this Environment and Social Project Brief should be availed to the Project Contractor, and advised to follow its recommendations and use it to develop the C-ESMP.
- The project ought to be approved for implementation by the relevant authorities to enable fulfilment of the project main objective of improving access to safe water in the area
- The sanitation and hygiene component of the project be expanded beyond provision of a water borne toilet to include hygiene and sanitation promotion in the community to enhance hygienic use of water, maintenance of the safe water chain as well as prevention of water pollution through safe disposal of human waste and waste water.

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ANNEXES

Annex I: Summary of the project investment cost

Description	Amount/Ugx.
General	
Preliminary and General (P&G) Items including other civil works	35,252,000
Water Pumping Station	
Pump House	19,500,000
Guard House with water borne toilet	24,000,000
Water Reservoir and Pipeline Mains	
Water Reservoir	123,649,700
Water Transmission Mains	54,793,500
Water Distribution Mains	158,859,300
Electro-mechanical Works	
Electro-mechanical Equipment	243,293,000
Electro-mechanical Labour	71,001,830
Sub-total 1	**730,349,330**
Allow for 5% Contingency	36,517,466.5
Sub-total 2	**766,866,796.5**
Add VAT 18% of sub-total 2	138,036,023.37
Grand Total	**904,902,819.87**

Annex II: Certificate of Water Quality Analysis

MAKERERE UNIVERSITY
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TEL: 256-041-540992
E-mail: chemistry@chemistry.mak.ac.ug

DEPARTMENT OF CHEMISTRY

CLIENT: PROF KANSIIME F

MATRIX: GROUNDWATER (Bore) **Received;7/3/2923 Report:11/3/2023**

PROJECT: WATER QUALITY ASSESSMENT:ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR BEMBE WATER SUPPLY AND SANITATION SYSTEMS

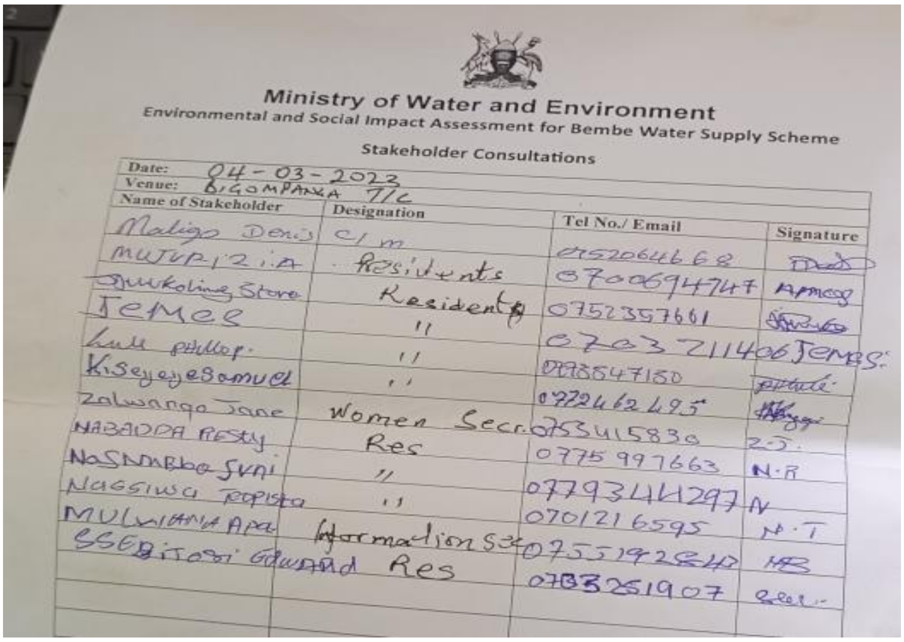
ANALYSIS RESULTS

PARAMETER	UNITS	BEMBA BOREHOLE	National Standards for Potable water(Maximum Permissible)
pH	-.	7.2	6.8-8.5
Ec	µS/cm	155	1000
Colour	Pt-Co	0	5
Turbidity	NTU	0	0
TDS	mg/l	77	700
TSS	mg/l	0	0
Total Alkalinity as CaCO3	mg/l	18	500
Total Hardness as CaCO3	mg/l	64	500
Magnesium	mg/l	1.6	50
Sodium	mg/l	6.4	200
Chloride	mg/l	26	250
Fluoride	mg/l	0.03	1.0
Iron-Total	mg/l	0.02	≤0.3
Sulphate	mg/l	0	200
TP	mg/l	0.14	-
TN	mg/l	0.64	-
Fecal Coliforms	CFU/100ml	0	0

Analysis by:
RuhararaBudigi
Email: rbudigi@gmail.com

CHEMISTRY DEPARTMENT KAMPALA UGANDA MAKERERE UNIVERSITY

Annex III: List of Stakeholders Consulted



Ministry of Water and Environment

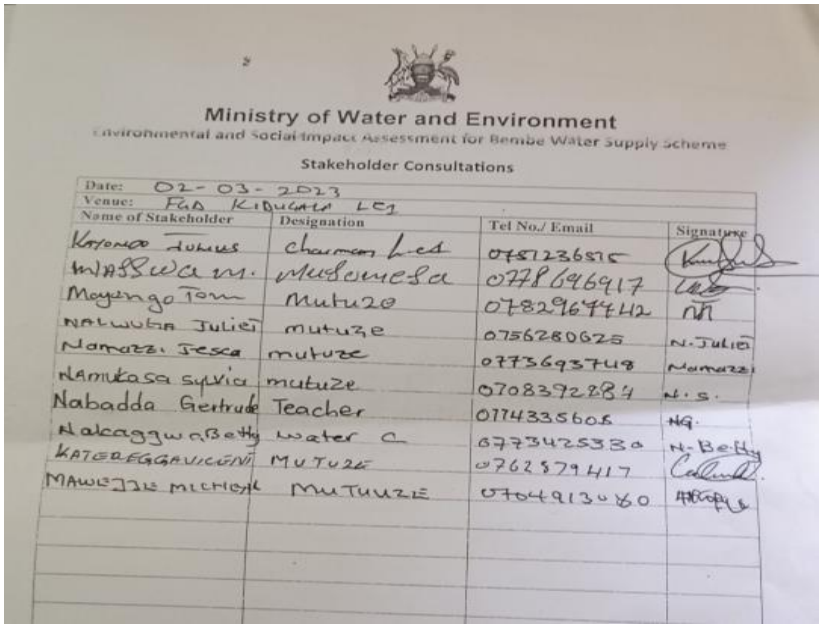
Environmental and Social Impact Assessment for Bembe Water Supply Scheme

Stakeholder Consultations

Date: 04-03-2023

Venue: BIGOMPANKA T/C

Name of Stakeholder	Designation	Tel No./ Email	Signature
Maligo Denis	C/M	0752064668	[illegible]
MUJUPIZIA	Residents	0700694747	[illegible]
Sswukoling Store	Residents	0752357661	[illegible]
JEMES	"	0703 211406	JEMES
Lule Phillop.	"	0793547150	[illegible]
KisejejeSamuel	"	0772462495	[illegible]
Zalwango Jane	Women Secr.	0753415830	Z.J.
NABADDA RESTY	Res	0775 997663	N.R
NaSAMBba Sylvi	"	0779344297	N
Nagsiwa Topista	"	0701216595	N.T
MULWANA Apal	Information Sec	0755192540	[illegible]
SSEBITOSI Edward	Res	0783251907	[illegible]



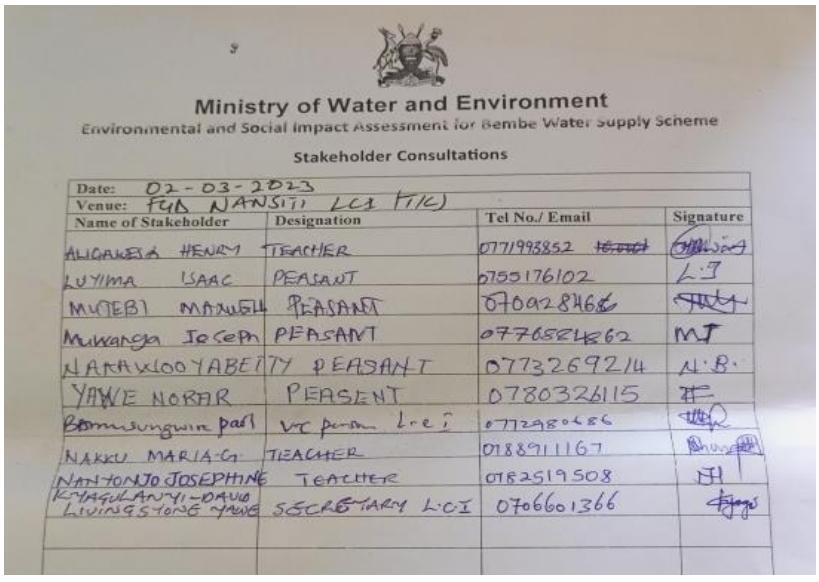
Ministry of Water and Environment

Environmental and Social Impact Assessment for Bembe Water Supply Scheme

Stakeholder Consultations

Date: 02-03-2023
Venue: FGD KIBUGATA LC1

Name of Stakeholder	Designation	Tel No./ Email	Signature
Katongo Julius	chairman LC1	0751236515	
Nassuna M.	Mubumeeza	0778696917	
Mayengo Tom	Mutuze	0782964442	
Natwuha Julie	mutuze	0756280625	N. Julie
Namazzi Jesca	mutuze	0773693748	Namazzi
Namukasa sylvia	mutuze	0708392884	N. S.
Nabadda Gertrude	Teacher	0774335605	NG
Nakaggwa Betty	water C	0773425330	N. Betty
KATEREGGANICONI	MUTUZE	0762879417	
MAWEJJE MICHEAL	MUTUUZE	0704913080	



Ministry of Water and Environment

Environmental and Social Impact Assessment for Bembe Water Supply Scheme

Stakeholder Consultations

Date: 02-03-2023
Venue: FGD NANSITI LC1 PIC)

Name of Stakeholder	Designation	Tel No./ Email	Signature
ALIGANESA HENRY	TEACHER	0771993852	
LUYIMA ISAAC	PEASANT	0755176102	L.I
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YAWE NORAH	PEASENT	0780326115	
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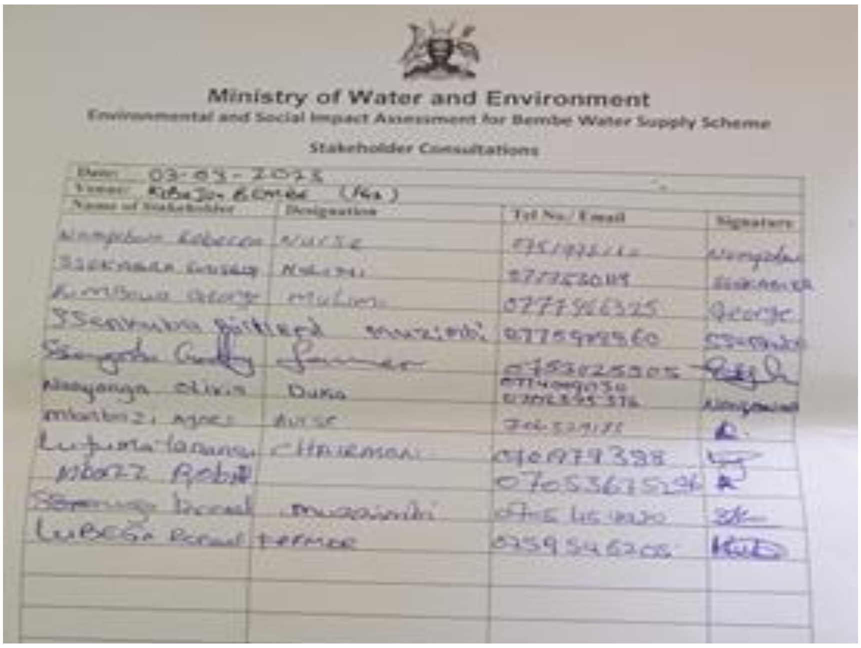
NANYONJO JOSEPHINE	TEACHER	0782519508	
KYAGULANYI-DAVID LIVINGSTONE YAWE	SECRETARY LC1	0706601366	



Ministry of Water and Environment

Environmental and Social Impact Assessment for Bembe Water Supply Scheme

Stakeholder Consultations

Date: 03-03-2023

Venue: Kibajja Bembe ([illegible])

Name of Stakeholder	Designation	Tel No./ Email	Signature
Nampebwa Rebecca	Nurse	0751922112	Nampebwa
Ssekabira [illegible]	[illegible]	0777530119	Ssekabira
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Ssengoba Godfrey	farmer	0753025505	[illegible]
Nanyonga Olivia	Duka	0774090030 0702395376	Nanyonga
Mbabazi Agnes	Nurse	0706329171	[illegible]
Lukuma Lawrence	Chairman	0701979388	[illegible]
Mbazzi Robert		0705367529	[illegible]
[illegible] Donald	[illegible]	0705115130	[illegible]
Lubega Ronald	Farmer	0759546205	[illegible]