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Environmental and Social Impacts Assessment for Construction of a Sewerage System in Bukoba Municipality in Kagera Region

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Environmental and Social Impacts Assessment for Proposed Construction of Sewerage System in Bukoba Municipality in Kagera Region

Declaration

This Draft Environmental and Social Impacts Assessment report has been prepared by;

Name	Speciality and Responsibility	Signature
Eng. Venant Rwenyagira	Civil Environmental Engineer Registered EIA Expert	
Mr. Huruma Kisaka	Sociologist responsible for undertaking social impact assessment	
Mr. Ojung Longdare	Environmentalist responsible for undertaking environmental impacts assessment	
Eng. Patrick V. Cletus	Water Resources Engineer	

Executive Summary

A: Title and Location of the Project

Proposed Construction of a Sewerage system in Bukoba Municipality in Kagera Region

B: Name and Contact of the Proponent

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D: A Brief Outline and Justification of the Proposed Project

(i) Brief description of the Proposed Project

The proposed project site is the Bukoba Central Business District (CBD) within the boundaries of Bukoba Municipality in Kagera Region part of the United Republic of Tanzania on the western side of Lake Victoria. Bukoba Municipality is one of the eight local authorities in Kagera region. Bukoba Municipality is not only the administrative and commercial capital of Bukoba district and Kagera region as a whole, but is also a "gateway" linking a town to Great Lakes countries of Uganda, Kenya, Rwanda and Burundi by virtue of its strategic location. Bukoba lies between latitudes 1°6'0" to 1°8'42" south of the equator and as longitude 31°16´12" to 31°18'54" east of Greenwich. It is bordered by Lake Victoria on the east and Bukoba District Council on the south, west and north.

The proposed sewerage system project in Bukoba municipality will be comprised of the house connections collecting wastewater from individual houses to the collector lines then to trunk mains draining to the pumping station. From the pumping station, the wastewater will be lifted through the pressure mains to the waste stabilization ponds.

This first stage will involve mobilization of the construction human resource, construction equipment and plant and construction materials. Also, as required, the Contractor will hire labour and erect necessary temporary facilities to cater for offices and storage yards within the construction site. Mobilization phase will also involve purchase and stockpiling of the materials such as aggregates, sand, cement, timber and reinforcing steel. Other construction equipment such as scaffolding, sheet pile driving equipment, crane, will be mobilised to the site of works as need arises.

The construction phase will involve;

- setting out to demarcate rights of way, work areas, clearing limits. Access roads, detours, bypasses and protective fences,
- sites preparation

- Excavation of trenches in case of sewer lines and excavation of foundations in case of pumping stations and operators house.
- Trench sheeting and bracing to protect trench side walls. Bukoba municipality in general has a high water table, therefore dewatering during sewer construction is indeed expected.
- Pouring concrete to bases of foundations
- Laying of sanitary sewers
- Backfilling, disposal of overburden and surface restoration to match the condition that existed prior to the sanitary sewer construction

Once the substructures of pumping stations and operators houses are completed, works for the superstructures will start with walls up to roofing stage, installation of services including water, wastewater and electricity reticulation and finally finishing ready for handing over the pumping station.

Contractors' demobilization phase will involve clearing all the site activities in terms of tiding up of all sites facilities and demobilization of all construction equipment. Upon completion of contractor's obligations, the structures will be handed over to the Project Proponent BUWASA for the operation phase.

During operation, the sewerage system comprising of sanitary sewer, rising main and waste stabilization ponds will start its intended activity of collecting, conveying and treating the wastewater. The treated wastewater meeting the required discharge permits will drain in the lake through the outfall. At the waste stabilization pond there will be sludge drying beds to receive sludge from the ponds and the sedimentation or thickening ponds.

(ii) **Project Stakeholders and their involvement in EIA process.**

Public Participation in the initial stages of the project is of great importance particularly from the initial stages of the project preliminary design to detailed engineering design including stages of environmental assessment, scoping phase as well as preparation of the ESIA report to final stages of implementation of the proposed sewerage system. The Consultant conducted the public participation for the proposed project to involve as many potential Interested & Affected Parties as possible. Accordingly, issues arising from this public participation process were incorporated in the report and were used in determining mitigation measures for the project.

The consultants identified organization, groups and individuals considered to be regarded as "stakeholders". This identification was based on each ones roles and their relevance in the proposed sewerage system development project in Bukoba Central Business District. Some of the stakeholders such as government authorities, municipality/district level, wards and sub-ward level that might be impacted by or have interest in the project or exercise some influence on the project were predetermined. Comments/Concerns drawn from Public Meeting and corresponding response from the consultants have been presented in the main report.

(iii) **Results of public consultation.**

Among the highlighted issues, the stakeholders required the project to be implemented as early as possible. They also demanded the road to the project site and employment.

(iv) **Explanation on why some impacts are not addressed**

All impacts observed were addressed in the EIS.

(v) **Stakeholders consulted**

Key stakeholders were directly informed of the proposed sewerage system through physical visits in their respective areas and offices from 25th June to 29th June 2012. These offices included;

- Regional Manager-TANROADS
- Regional Manager-NHC KAGERA
- Acting Municipal Managing Director
- Municipal Planner
- Environmental Consultant BMC
- Natural Resource Officer
- Sub-Basin Water Officer
- Municipal Health Officer
- Municipal Engineer
- Laboratory Manager
- Municipal Environmental Officer

Also surrounding communities were sensitized to participate in the process through consultation meetings which were communicated to the respective communities through their Sub-wards Executive Officers who informed the communities to participate in consultation meetings.

(vi) **Description of the major significant impacts**

Pre-construction, Planning and Design Phase

Negative Impacts

- Vegetation loss through clearance
- Temporary obstruction of access roads by topographic survey and geotechnical investigation teams.
- Soil Erosion – during geotechnical investigation soils will remain bare and in some areas the soils will become loose due to pits digging to facilitate geotechnical investigations.
- Increase in motor vehicles in the area to facilitate topographic survey and geotechnical investigation
- Noise from geotechnical investigation equipment- hydraulic augers
- Noise from transport of equipment to proposed project site.
- Likely motor accidents with pedestrians from higher speeds by drivers of the topographic and geotechnical investigation teams and transportation of construction equipment.

Mobilization Phase

- Vegetation clearance
- Disturbances to historical and archaeological finds during site clearance
- Deterioration of original land use, scenic and visual quality
- Resettlement and Disturbance to some of the Residents particularly at the area for waste stabilization ponds

Construction Phase

- Disturbances, particularly land scarring at borrow sites or sources of construction materials
- Nuisance from noise and vibration during construction ,
- Soil Erosion
- Increase in traffic levels to the surrounding area
- Contamination of water from leakages of fuels and lubricants from construction equipment
- Poor air quality from dust and emissions around the construction site and material hauling routes
- Possible injuries to neighbours from falling into trenches and open pits for inspection chambers and pumping stations.
- Generation of construction solid and liquid wastes
- Socio-economic Impacts
- Spread of diseases (HIV/AIDs, STIs or STDs) among members involved in construction
- Injuries as the result of poor safety of employees and neighbours during construction
- Injuries to workmen due to poor safety at work place
- Generation of construction solid and liquid wastes

Demobilization Phase of Construction Activities

- Generation of wastes

Operation Phase

- Poor safety of employees and neighbours from overflowing sewage in the streets
- Pollution to the nearby water sources-Lake Victoria

Positive impacts of the proposed project

- Improved quality of health from proper management of faecal matter that would otherwise be dumped haphazardly and drain into rivers where others may become in contact.
- Improved water quality in rivers and subsequent reservoir downstream- Lake Victoria
- Increased fish catch from depleted nutrients which support the growth of water hyacinth and algae. The growth of the two plants has the tendency of depleting light and oxygen, respectively in the water bodies detrimental to the life of fish and other aquatic life.
- Employment and trading opportunities will be direct benefits to the neighbouring communities during the construction and operation phase of the project. This is likely to boost the household incomes and improve the living standards of the local community and other populations from the neighbouring and other areas.
- The government coffers will equally benefit from statutory contributions made by the contractor for his employees. Sales from construction materials will have value added tax that goes to the government.
- It is also anticipated that properly treated sludge can be re-used as fertilizer to increase agricultural productivity through minimization of the chemical fertilizers, which are potential pollutants of Lake Victoria. Similarly, the properly treated supernatant overflow from sludge digestion process can be used for land irrigation.

(vii) Environmental and Social Mitigation Measures

Construction related activities generally cause some alteration to the biophysical and social environment. The proposed sewerage system project is not an exception and therefore effective management strategies and mitigation means have been presented under section 7 of the main report. The mitigation measures for the impacts likely to be caused by the proposed project focuses on key potential impacts identified in section 6 during different phases of the project development.

(viii) Alternatives considered

Alternative Project Location

The sewerage system construction project in Bukoba municipality is one of LVEMP II initiative to improve management of the transboundary natural resources mainly to reduce pollution of Lake Victoria by reducing discharge of untreated effluent from municipal waste through implementing off-site sanitation system. In view of the above requirement, it should be noted that during initial phases of the assessment exercise, the investigation on project site/location alternatives was limited to the earmarked existing location specifically based on municipal land use plan and its environmental implications.

The Do-Nothing Option

Under the No-Action Alternative, the Sewerage System in the CBD would not be constructed and operated, environmental and socio-economic impacts described in the previous section would not occur. The do-nothing alternative assumes that future developments would comply with the existing requirements for the project area, which includes increased and continuous environmental pollution especially pollution of the nearby streams, soil and water pollution including waters of Lake Victoria through open dumping of municipality wastewater. Pending the proposal of other significant development within the area, population growth and other developmental activities that influence environmental pollution would likely continue on the same trend that currently exists which may later worsen the situation.

(ix) Environmental and Social Management Plan

An Environmental and Social Management Plan (ESMP) is tool that can be used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented. ESMPs are therefore important tools for ensuring that the management actions arising from EIA processes are clearly defined and implemented through all phases of the project life cycle.

The Financier of the proposed sewerage system project is the Ministry of Water through its Lake Victoria Environmental Management Project (LVEMP II) who will be assisted by the design and supervision consultants. These two bodies will ensure that the contractor and sub-contractors who will win the tender for implementing the sewerage system project adhere to the laid down procedures for construction and commissioning of the sewerage system. Table under chapter 8 of the main report outlines the actions of the ESMP. The organizational framework for the ESMP is designed to evolve as the project progresses through detailed engineering design, construction, commissioning and operation phases.

On reporting arrangements, the Ministry of Water Environmental Section (Sector Environmental Coordinator), the and Consultant's Appointee to deal with Environmental Management will cooperate with other experts in Bukoba Municipality such as Municipal Land Officer and Municipal Environmental Management Officer to provide the Regional Environmental Management Expert (REME) under the Regional Secretariat with environmental reports of the project implementation as part of the progress reports and annual environmental monitoring reports. The Regional Environmental Management Expert is the link person between the region and the Sector Ministry Environmental Section (Sector Environmental Coordinator) and the Director of Environment as well as the Director General of NEMC.

(x) Environmental and Social Monitoring Plan

Monitoring of the sewerage system is the long term process that should begin at the start of the project construction and continue throughout the life of the project. Its purpose is to establish environmental benchmarks so that the nature and magnitude of anticipated environmental impacts are continually assessed. Monitoring involves the continuous or periodic review of mitigation activities to determine their effectiveness. Consequently, trends in environmental degradation or recovery can be established and previously unforeseen impacts can be identified and dealt with during the sewerage system life.

Based on the monitoring plan presented in the report, the sewerage system contractor will prepare his Environmental and Social Monitoring Plan covering the mobilization, construction, commissioning and demobilization phases of the project.

During operation of the project, MOW/ LVEMPII/BUWASA will be responsible for monitoring the environmental and social impacts. The Environmental Specialist at the Bukoba Municipal Office will be in-charge of the environmental and social monitoring of issues related with the sewerage system if it is meeting all the statutory requirements.
Among other things, the appointed Municipal Environmental Management Officer should deal with

- monitoring water quality from various pollutants from the sewerage system; monitoring if collector lines are functioning as required
- monitoring air pollution from the obnoxious smell at various locations including sewer manholes, pumping station and at the waste stabilization ponds
- Monitoring any nuisance from the sewage pumping stations
- environmental degradation control measures such as soil erosion;
- risk to sewage overflow from gravity sewer lines from blockages and pressure main in case there pipe rupture ;
- changes in socio-economic status;

(xi) Resource evaluation and Cost Benefit Analysis

Resource Evaluation of Cost Benefit Analysis is a tool used either to rank projects or to choose the most appropriate project option. The ranking or decision making associated with the projects is based on the expected economic costs and benefits. The general rule is that the project should be undertaken if lifetime expected benefits exceed all expected costs mainly environmental costs.

The aim of Cost Benefit Analysis (ECBA) is to present the lifetime costs and benefits of a project as a single number that can be compared to either the interest rate prevailing or the

costs and benefits to the environment. The process of conducting the environmental cost benefit analysis involves

- Description of the project and corresponding capital costs.
- Identification of the project consequences in time frame order and obtain their monetary values.
- Determination of the type of Environmental Cost Benefit Analysis

The project preliminary investment costs to meet the requirements up to the year 2020 are estimated to USD 7,357,060 which is the cost of civil works, pipe works, electrical and mechanical works, tools plants and equipment, vehicles and house connections

Based on the combination of methods, the cost of the project and mitigation of impacts (including investment, management and monitoring costs estimated are all worth about less than ten million dollars.

Proper sanitation is a necessity for any known and developing town; otherwise the town environment we live in will not worth a name! A sewerage system is meant to convey the waste water away from the human dwellings and treat it for final disposal where there are minimum impacts to the human beings and the surrounding environment. A town like Bukoba which was built so many years ago, still misses this important infrastructure. The existing on–site sanitation facilities in Bukoba Municipality are the ones that have resulted into some of diseases recorded in the municipality. If the costs implication of these diseases were calculated over the lifetime of the project, then the reason for implementing the sewerage system project would be straight forward and evident on the table!

In Bukoba Municipality there are plans of improving the water supply. The improvement in supply of clean running water signifies the presence of wastewater and therefore without the efficient central sewerage system, the on–site sanitation facilities will not be able to cope! This will be a major factor in further spread of poverty-related waterborne diseases in the municipality and increasing air pollution from the stench of overflowing on-site sanitation facilities.

(xii) Decommissioning

Decommissioning is the final phase in the life cycle of the project. It is a process involving dismantling and demolition of the used structures and management of resulting materials. All these activities take into account of the environmental health and safety requirements for the operating personnel, the general public and any implications to the environment.

The sewerage system is not like manufacturing facilities whereby the methods used to manufacture some products are increasingly replaced by modern technology or process! The demolition of the sewerage system after its useful life can be thought of in terms of replacement of the defective sections of sewer line, replacement of the manholes and inspection chambers, replacement of pumps and parts of the rising main to the waste stabilization ponds or repairs and maintenance of the ponds. The life span of plastic pipes and concrete structures for manholes, waste stabilization ponds and pumping can live up to 25 years or so. Therefore in this project as long as human beings are there and they continue to use water, sewerage systems will always be required. Therefore decommissioning the sewerage system is not seen as an activity which will be needed in a near future besides improvements.

Alternatively if at any time, parts of the sewerage system become obsolete, life threatening or unsafe to a state where demolition is necessary, may be to pave a way for improvement or construction of a new sewerage system project, then a new environmental impact assessment study will be required as provided for in the Environmental Management Act Cap 191.

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Acknowledgements

A number of individuals participated in the on-site environmental and social impacts assessment and later in the preparation of this report. More importantly, these people committed their time and effort to make this assignment possible in the available short duration.

Environmental BENCHMARK- Consulting Civil-Environmental Engineers on behalf of LVEMP II are grateful to all those who contributed in one way or another to this assessment in particular the Team Leader Eng. Venant Rwenyagira, Sociologist Mr. Huruma Kisaka, the Environmental Engineer and Registered EIA expert Mr. Ojung Longdare, Mass communication expert and Ms. Greven Msenga and assistant environmental assessment expert, Graduate Engineer Mr. Weisiko M. Magoto and the team driver, Mr. Ladslaus K. Mayowa.

The LVEMP II/BUWASA are as well grateful to the Bukoba Municipality authorities, wards leadership form the respective wards of Bakoba, Miembeni, Bilele, Kashai and Kahororo without forgetting the residents of Kufungu peninsular for their turn out during the assessment and consultation meetings. The support offered by BUWASA personnel especially the Managing Director Eng. Chaggaka Kalimbia, the Operations and Maintenance Engineer Mr. Charles Chibuga and UN-HABITAT Engineer Philbert Ishengoma in this assessment is immeasurable and instrumental in preparation of this report. We believe that since BUWASA will be the ultimate operator of the sewerage system, the team wholeheartedly provided the information that will lead into successful operation of the sewerage system. The company and inputs offered by the Environmental Consultant for Bukoba Municipal Council Mrs. Corin Schwab is highly appreciated.

LVEMP II is greatly indebted to the residents of the respective wards in Bukoba Central Business District for their time to participate in public consultation process and provide immeasurable input into this work. The support of various staffs from different government institutions, private companies, non-governmental organizations, who at different stages of the study were involved in supplying relevant information to the study team, is highly appreciated.

Acronyms and Abbreviations

BMC	Bukoba Municipal Council
BMU	Beach Management Unit
BOD	Biochemical Oxygen Demand
BSUDP	Bukoba Strategic Urban Development Plan
BUWASA	Bukoba Water and Sewerage Authority
CAP	Chapter
CBD	Central Business District
CBOs	Community Based Organizations
CITES	Convention on International Trade and Endangered Specifies
CRDB	Cooperatives and Rural Development Bank
dB (A)	Decibel measured on scale A
DN	Diameter Nominal
EAC	East African Community
ECBA	Environmental Cost Benefit Analysis
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMA	Environmental Management Act
EMP	Environmental Management Plan
ERB	Engineering Registration Board
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
HBS	Households Budget Survey
HIV	Human Immunodeficiency Virus
HIV/AIDS	Human Immunodeficiency Virus /Acquired Immune Deficiency Syndrome
HSE	Health Safety and Environment
I&AP	Interested and Affected Parties
I&APs	Interested and Affected Parties
IPM	Integrated Pest Management
IVM	Integrated Vector Management
KCU	Kagera Cooperative Union
KFCB	Kagera Farmers Cooperative Bank
LVB	Lake Victoria Basin
LVEMP I	Lake Victoria Environmental Management Project phase I
LVEMP II	Lake Victoria Environmental Management Project phase II
LVWATSAN	Lake Victoria Water and Sanitation
M^3	Cubic meter
MEAS	Multilateral Environmental Agreements
MHO	Municipal Health Officer
MOU	Memorandum of Understanding
MoW	Ministry of Water
N/A	Not Applicable
NAWAPO	National Water Policy
NBC	National Bank of Commerce

NEMC	National Environmental Management Council
NEP	National Environmental Policy
NGO	Non-Governmental Organization
NHC	National Housing Corporation
NLUC	National Land Use Commission
NMB	National Microfinance Bank
OP/BP	Operation Policy / Best Practice
OPD	Out Patient Department
OSHA	Occupational Health and Safety Authority
PAPs	Project Affected Persons
PLHA	People Living with HIV/AIDS
PN	Plastic pipe pressure class
PPE	Personal Protective Equipment
PS1/PS2	Pumping Station no 1 and No 2
R.E.	Revised Edition
REME	Regional Environmental Management Expert
SACCOS	Servings and Credit Cooperative Organizations
Sq. m.	Square meter
STDs	Sexually Transmitted Diseases
SUMATRA	Surface and Marine Transport Authority
SWOT	Strengths, Weaknesses, Opportunities
TAC	Technical Advisory Committee
TANROADs	Tanzania National Roads Agency
ToR	Terms of Reference
UN–HABITAT	United Nations Human Settlements Programme
uPVC	Unplasticised Polyvinyl Chloride
USD	United States dollars
UTI	Urinary Tract Infection
VIP	Ventilated Improved Pit Latrine
VP	Vice President
WDC	Ward Development Committee
WSP	Waste Stabilization Pond
WWTP	Waste Water Treatment Plant

Environmental and Social Impacts Assessment for Construction of a Sewerage System in Bukoba Municipality in Kagera Region

1. Introduction

1.1 Background of the Project

Lake Victoria is the second largest freshwater Lake in the world with a surface area of about 68,000 km^2 located in the proportions of 6%, 43% and 51% in Kenya Uganda and Tanzania respectively. Its catchment area is about 197,500 km^2, extending to Republics of Rwanda and Burundi as well, with a population of more than 30 million people living in the basin. This is the largest inland water and fishery sanctuary in East Africa, with an estimate annual fish catch of about 750,000 metric tonnes and an inland water transport linkage for the three East African states. Furthermore, the lake is a major reservoir and source of water for domestic, industrial, hydropower production and commercial purposes. The lake also is a repository for both treated and untreated wastes generated from various activities in the basin, some of which can alternatively be reused for valuable activities such as agriculture.

The lake has suffered from increasing pollution from expansion of development activities and population growth including on-site sanitation system in the basin for the past thirty years.

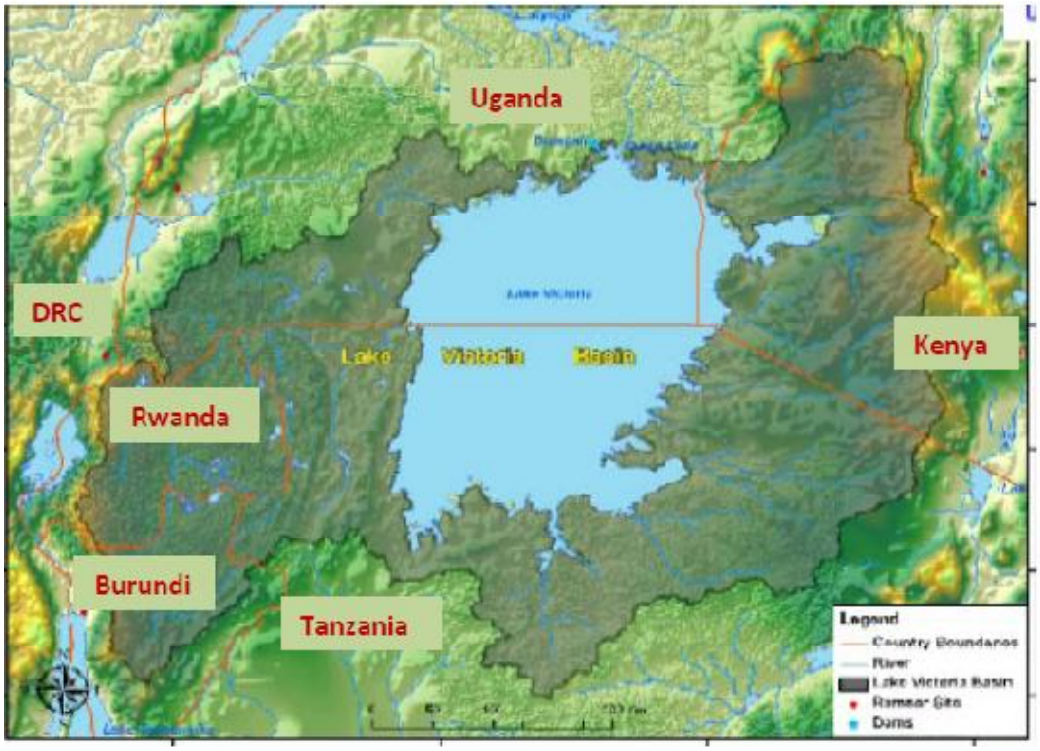


Figure 1: Lake Victoria Basin

In Bukoba Municipality almost 100% of households rely on on-site sanitation. Domestic and institutional wastewater is discharged in septic tanks, cesspits or in pit latrines. Industrial wastewater and wastewater from non-domestic sources is discharged on land or directly into Lake Victoria.

Generally management of faecal sludge especially collection and haulage have immense problems in urban centres including Bukoba Municipality. The Major challenges include indiscriminate dumping in urban environment and reuse of untreated faecal sludge, which leads terrestrial and

aquatic environment, contaminated by excreta, high risks of transmission of gastrointestinal infections and morbidity and mortality rates and increased Lake Victoria quality deterioration.

Among part of many initiatives to overcome the above challenges including controlling further deterioration of the Lake, the Government of Tanzania through the Ministry of Water under its Lake Victoria Environmental Management Project (LVEMP II) intends to construct the Sewerage System for Bukoba Municipality. The proposed sewerage system will mainly serve the central business district (CBD), bordered by the airstrip on the northern side and Kanoni river on western and southern sides, all draining to a central pumping station near the location where Kanoni River joins Lake Victoria. The proposed system will also include a pressure rising main from the pumping station to the Waste Stabilization Ponds on the northern part of Bukoba Town.

As LVEMP II objectives and key outputs targets at reducing pollution into the lake by reducing discharge of untreated effluent from municipal waste, construction of sewerage system in Bukoba Municipality will be one of the ways to achieve these objectives.

According to the requirements of Environmental Management Act (EMA) Cap 191 of 2004, Environmental Impact Assessment is mandatory for projects of this nature since they are likely to have the potential of causing significant impacts on the environment. Further to this requirement, the Environmental Impact Assessment and Audit Regulations of 2005 classify the proposed activities under the mandatory list of EIA. In other words, the projects of this nature have to be subjected to the environmental impacts assessment.

In recognition of the above requirements, the Ministry of Water (MoW) through LVEMP commissioned M/s Environmental BENCHMARK, Consulting Civil-Environmental Engineers to carry out an Environmental and Social Impact Assessment for proposed LVEMP II Works in Lake Victoria Basin.

1.2 Environmental Impact Assessment Requirement

According to the First Schedule of the Environmental Impact Assessment and Audit Regulations, 2005 made under sections 82(1) and 230 (2) (h) and (q) of the Environmental Management Act No. 20 of 2004 (CAP 191), the proposed project directly falls under the list of projects requiring EIA and therefore the full Environmental Impact Assessment is mandatory.

The proposed project falls under class 20 (c) Municipal Sewage as shown on the project development table below.

Table 1: Extract from the First Schedule of the EIA and Audit Regulations 2005

(i) Construction of incineration plant (ii) Construction of composting plant (iii) Construction of recovery/re-cycling plant (iv) Construction of Municipal Solid Waste landfill facility *(c) Municipal Sewage* (i) Construction of waste water treatment plant (ii) Construction of marine out fall (iii) Night soil collection transport and treatment. (iv) Construction of sewage system
20. Waste treatment and disposal *(a) Toxic and Hazardous waste* (i) Construction of Incineration plants (ii) Construction of recovery plant (off-site) (iii) Construction of waste water treatment plant (off-site) (iv) Construction of secure land fills facility (v) Construction of storage facility (off - site) *(b) Municipal Solid Waste*

Now, since the project is envisaged to involve construction of the sewerage system in Bukoba Municipality, laying the pressure main, construction of the wastewater treatment plant in form of waste stabilization ponds and sludge drying beds followed by an outfall to the Lake Victoria, as indicated in the extract above, the ESIA Report is hereby prepared, presenting all the necessary requirements as stipulated in the regulations. This ESIA Report shall thus serve as the guide to NEMC in deciding if the project is likely or unlikely to cause significant adverse environmental and social impact for subsequent stages of development.

1.3 Scope of the Environmental Impacts Assessment

The scope of the environmental and social impacts assessment study as amplified in the Terms of Reference submitted to NEMC earlier in the assessment process may be presented in the summary form as follows:

i. Describe and evaluate the present baseline data and the relevant environmental characteristics of the area proposed for the works development

ii. Outline the national policies, legislation and administrative framework within which the environmental management of the proposed works will be carried out.

iii. Identify, analyse and assess potential environmental and social impacts that will result from the proposed works, based on the proposed design.

iv. Propose costs-effective mitigation measures for minimizing or eliminating adverse social and environmental impacts of the proposed works, including recommendations on design changes if deemed necessary.

v. Propose modalities and arrangements for collection of stakeholders views ensuring participation of key public and civil society representatives

vi. Prepare an environmental and social management plan for implementing the mitigation measures and recommend institutional administrative and management framework. It should include the identification of the necessary measured which should be inbuilt in the current mechanisms.

1.4 Methodology of the Environmental Impact Assessment

The methodology used in this assessment is corresponding with the Environmental Impact Assessment and Audit Regulations of 2005, adopting the approach of identifying, collecting and analysing information which included;

i. Undertaking the activities initiated during the scoping phase including involvement of key stakeholders and collecting of the baseline information on both natural and built environment including socio economic conditions surrounding the project area and the municipality at large.
ii. Analysis of data for identification, prediction and evaluation of the impacts both beneficial and adverse ones from the proposed project development and operation. This was achieved through use of checklists, simple matrices and use of engineering judgment, standards and guidelines.
iii. Identifying and proposing mitigation measures aimed at minimising and where possible eliminating the potential negative impacts and enhancing positive ones using expert judgment.
iv. Preparing environmental and social management and monitoring plans for follow up and follow up during project operation
v. Presenting the information in the Environmental Impact Statement.

The assessment was done by superimposing project components such as collector lines and laterals into the existing environmental conditions surrounding the project site.

The methodology took into account likely impacts on the physical and biological environment (e.g. on air quality, soil, ground water quality and vegetation. The methodology is further elaborated under section 6 on the analysis of environmental and social impacts

Other methodologies used in this assessment include literature reviews, consultative meetings with respective offices including the Regional Commissioner's Office, Municipality officials and ward members and their respective leaders and visual observations through familiarization visits in the project area. Thus the following approaches/ techniques were used in data collection.

In-depth discussions with key informants

In-depth discussions with key informants such as ward leaders at Miembeni, Bilele, Bakoba, Kashai and Kahororo wards, municipality officials and other influential people in the project area were conducted.

Public Consultative meetings

Public meetings were held with project wards members whereby issues related to construction of the sewerage system were presented through which the local communities raised their concerns as indicated in the section for public consultation.

Visual observation

Observation was made through transect walks whereby the consultants observed among other things areas to receive intensive works in terms of the sewer lines existing sanitation infrastructures including toilets at the household level, business infrastructure, settlement patterns and other economic activities.

Literature review

Documents and records were reviewed to obtain existing secondary data and information relevant to the study area. The major source of such information includes district socio-economic and investment profiles, education, health and community development reports, both 2002 and 2012 National Population and Housing Census and Settlement Development and other relevant reports.

1.5 Structure of the ESIA Report

The report is presented in accordance with the requirements of regulation 18 (1), (2) of the Environmental Impact Assessment and Audit Regulations of 2005, with the following chapters;

- ✓ Cover page – with the title of proposed project, location of the project, developer, lead consultants, contact address and phone and date of submission
- ✓ executive summary
- ✓ Acknowledgements,
- ✓ Acronyms
- ✓ Introduction
- ✓ Project Background and Description
- ✓ Policy, Legal and Administrative Framework
- ✓ Baseline and Existing Conditions
- ✓ Stakeholders Engagement and Public Consultation
- ✓ Assessment of Impacts and Identification of alternatives
- ✓ Impacts management, Environmental Mitigation measures
- ✓ Environmental and Social Management Plan
- ✓ Environmental and social Monitoring Plan
- ✓ Cost Benefit Analysis
- ✓ Decommissioning
- ✓ Summary and conclusions
- ✓ References and
- ✓ Appendices

2. Proposed Project Description

2.1 Objective and Purpose of the Project

The overall objective of LVEMP II is to contribute towards achieving the vision of the EAC of "creating a prosperous population living in a healthy and sustainable managed environment and providing equitable opportunities and benefits".

The Project development/global environmental objectives are to:

- Improve collaborative management of the trans-boundary natural resources of LVB for the shared benefits of the EAC Partner States; and
- Reduce environmental stress in targeted pollution hotspots and selected degraded sub-catchments to improve the livelihoods of communities, who depend on the natural resources of LVB.

The sewerage system construction project in Bukoba municipality is one of LVEMP II initiative to improve management of the transboundary natural resources mainly to reduce pollution of Lake Victoria by reducing discharge of untreated effluent from municipal waste through implementing off-site sanitation system. Other purposes include;

- To improve quality of health from proper management of faecal matter
- To improve water quality in rivers and subsequent reservoir downstream- Lake Victoria
- To Increase fish catch from increased nutrients which normally support the growth of water hyacinth and algae
- To solve the problem of septic tanks overflowing among Bukoba town buildings

2.2 Location of the proposed project

The proposed project site is the Bukoba Central Business District (CBD) within the boundaries of Bukoba Municipality in Kagera Region part of the United Republic of Tanzania on the western side of Lake Victoria. Bukoba Municipality is one of the eight local authorities in Kagera region. Bukoba Municipality is not only the administrative and commercial capital of Bukoba district and Kagera region as a whole, but is also a "gateway" linking a town to Great Lakes countries of Uganda, Kenya, Rwanda and Burundi by virtue of its strategic location. Bukoba lies between latitudes 1°6'0" to 1°8'42" south of the equator and as longitude 31°16´12" to 31°18'54" east of Greenwich. It is bordered by Lake Victoria on the east and Bukoba District Council on the south, west and north. The location of this proposed project is shown in figures below.

Figure 2: Administrative map of Tanzania showing Kagera Region where the sewerage system project is proposed to be implemented

Figure 3: Kagera Region sketch map showing the location for the proposed construction of Bukoba Sewerage System

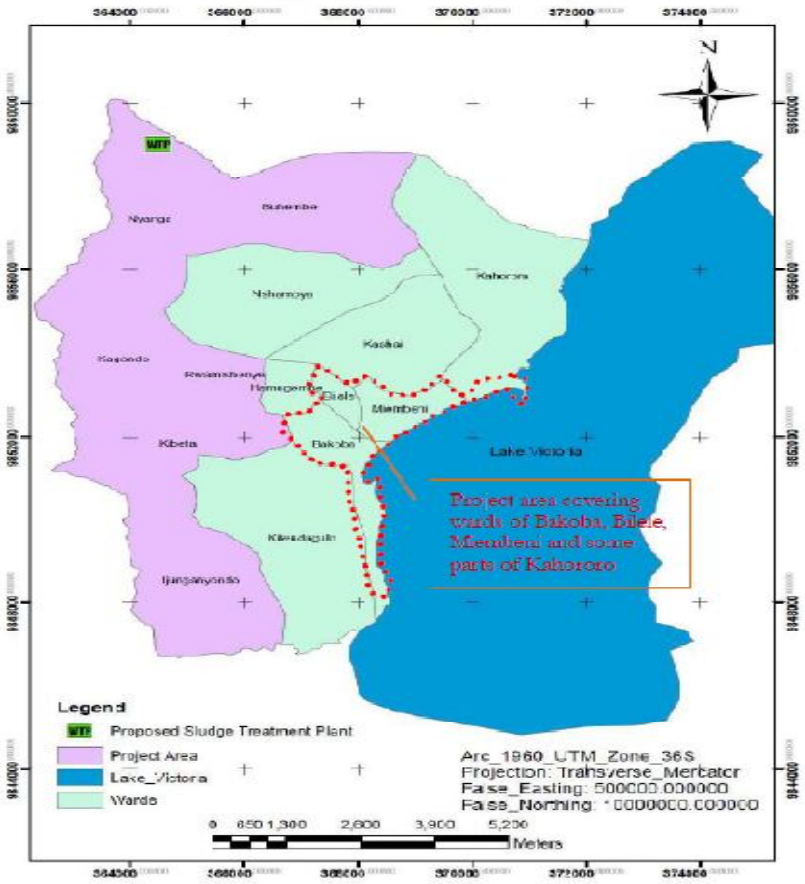


Figure 4: Bukoba Municipality Boundary showing the wards of Bakoba, Bilele, Miembeni and Some areas of Kahororo

Figure 5: Satellite image showing Bukoba Central Business District

Figure 6: Satellite image showing the locations of the pump station, rising main and waste water treatment plant

2.3 Project activities

2.3.1 Mobilization

Since the proposed project includes Environmental and Social Impact Assessment, the project activities will be assumed to follow the project routines whereby there are pre-construction activities, construction activities and finally operations and maintenance activities.

This stage will involve mobilization of the construction human resource, construction equipment and plant and construction materials. Also, as required, the Contractor will hire labour and erect necessary temporary facilities to cater for offices and storage yards within the construction site or outside the site as it may be agreed and permitted by the Bukoba Municipality authorities. At this stage, wastes (solid, liquid and gaseous) will be generated from storage yards and temporary workers camp and offices. The staff camp like any other domestic place will generate, garbage, packaging, sacks, papers, cardboard boxes, plastic, wood crates, bottles, glass, metal cans and the like. Such wastes will need to be segregated for recycling or incinerating at designated project sites.

All project activities are supposed to be carried out along the streets and roads within the boundaries of the identified project sites without disturbing or obstructing the neighbouring facilities and offices.

Mobilization phase will also involve purchase and stockpiling of the materials such as aggregates, sand, cement, timber and reinforcing steel. Other construction equipment such as scaffolding, sheet pile driving equipment, crane, will be mobilised to the site of works as need arises.

2.3.2 Construction phase of the project

Upon completion of preliminary activities involving erection of site offices, storage facilities and services (water, temporary wastewater facilities and electricity) as required, the actual construction work of sewer lines will start which will involve;

- Setting out to demarcate rights of way, work areas, clearing limits. Access roads, detours, bypasses and protective fences or barricades should all be in place before sanitary sewer construction begins
- Sites preparation –clearing and grubbing to remove unsuitable soils, construction of bypasses and possible modification of existing drainage structures
- Excavation for trenches in case of sewer lines and excavation of foundations in case of pumping stations and operators house.
- Trench sheeting and bracing to protect trench side walls. Bukoba municipality in general has a high water table, therefore dewatering during sewer construction is indeed expected. The environmental concern of such waters with high content of sediments will need to be observed
- Concreting bases of foundations
- Laying of pipe sanitary sewers
- Backfilling, disposal of overburden and surface restoration to at least match the condition that existed prior to the sanitary sewer construction

Once the substructures of pumping stations and operators houses are completed, works for the superstructures will start with walls up to roofing stage, Installation of services including water, wastewater and electricity reticulation and finally finishing ready for handing over the pumping station.

Various wastes, ranging from solid to liquid and gaseous materials will be generated. The staff camp like any other domestic place will generate wastes in form of garbage, packaging, sacks, papers, cardboard boxes, plastic, wood crates, bottles, glass, metal cans and the like. Such wastes will need to be segregated for recycling or incinerating at site. However, burning or incineration should be done with great care excluding materials with poisonous emissions. In case of trenches, and excavated sewer lines proper barricades have to be applied to warn and protect the people of impending dangers of falling into open trenches.

2.3.3 Contractors Demobilization Phase

Contractors' demobilization phase will involve clearing all the site activities in terms of tiding up of all sites facilities and demobilization of all construction equipment. Disposal of any remaining unwanted material will also be carried out during this contractor's demobilization phase.

However, various wastes will be generated during this stage of which the same methods used to manage waste for previous phases will apply. These will include solid wastes from packaging materials, wood and steel crates, cardboard, wrapping materials, boxes, sacks, drums, cans and chemical containers and any other unused materials. Along with this, upgrading for damaged areas will be carried out before commissioning the project.

On the other hand wastewater will also be generated from work camps, and runoffs crossing hydrocarbon contaminated areas. As this wastewater can cause detrimental effects to the surrounding environment, conventional wastewater treatment systems such as septic tank and soak away pit will be employed to ensure safe and proper onsite disposal of waste water. After the project completion, temporary workers especially unskilled ones will have to go back to their places before construction of the sewer started.

Upon completion of contractor's obligations, the structures will be handed over to the Project Proponent BUWASA for the operation phase.

2.3.4 Operation Phase

Once construction of sanitary sewer, rising main and waste stabilization ponds is completed, the actual purpose of the sewerage system will start, that is draining the sewage from the houses towards the pumping station, then lifting the sewage to the wastewater treatment plants (waste stabilization ponds) where the waste water will be retained in the ponds for a substantial time while natural purification processes taking place. The treated wastewater will be then be allowed to drain in the lake through the outfall.

2.4 Project Preliminary Design

The sewerage system is proposed to be comprised of the following elements;

2.4.1 Lateral / Collector Sewer lines from Building Blocks.

The sewerage reticulation system will consist of laterals, secondary and primary lines. The laterals which will facilitate collection of sewage from household, institutional, commercial and business premises shall be of size DN150. The house connections on private plots have to be provided by

the house owners. The interface of the sewer network and house connection will be defined by the connection chambers, to where the laterals are limited. Several laterals shall connect into the proposed DN200 secondary sewers (collector sewers) which shall eventually connect to the primary (trunk) sewers through appropriately located manholes. The primary sewers are proposed to have a minimum size of DN 250 to facilitate half full flow in the pipe in order to avoid blockage. All pipe materials for the sewer reticulation system shall be uPVC PN6.

Figure 7: Site layout drawing for the proposed laterals/collectors, primary and secondary lines draining to pumping Station

The proposed sewer system serves the wards of Bilele, Miembeni and Bakoba; which form the Bukoba Central Business District.

2.4.2 Pumping Stations

Two pumping stations are proposed for construction to lift the collected sewage to the proposed waste water treatment plant at Kifungu peninsular:

- Pump Station 1 (PS 1) located behind the Police Station and
- Pump Station 2 (PS 2) located at Bukoba Beach.

Pump Station 1 will be positioned at the lowest possible location so as to be able to catch all incoming sewage at the same time minimizing the depth of the sump. In case the pumps are not functioning, the total flow will be by-passed to the outflow of the pumping station through an emergency by-pass chamber provided within the pump well. The pump station shall be equipped with 2 submersible pumps, one duty and the other standby.

From the pump station, wastewater will be pumped to a transfer manhole, from where it can flow by gravity to Pump Station PS 2. From PS 2 the sewage shall be pumped to the proposed WWTP at Kifungu peninsular. PS 2 is proposed because the ground levels from Bukoba Beach all through to the proposed WWTP are uniform and do not allow a uniform fall to the WWTP, hence the need for lifting the sewage. In case the pumps are not functioning, the flow will be by-passed to the outflow of the pumping station through an emergency by-pass chamber provided within the pump well. The pump station shall be equipped with 2 submersible pumps, one duty and the other standby.
It is important to choose a pumping plant of the highest reliability that is appropriate and easily serviced and maintained. Experience shows that, submersible pumps are increasingly becoming the most common type constructed and show reliability in operation. Two standby generators of capacity 7kVA and 5kVA to supply electric power in case of power outage will be installed at each pumping station.

Table 2: Estimated sewage flows for years 2020 and 2030

Sewage flows			**2020**			**2030**		
			Bilele	Miembeni	Totals	Bilele	Miembeni	Totals
Peak Flow	Peak Factor	2.0	671	1,358	2,029	1,201	2,432	3,633
Infiltration inflow	50% of sewage flow	50%	168	339	507	300	608	908
Sewage flow to ponds	Sewage flow + infiltration inflow (*)	m^3/d	503	1,018	1,522	901	1,824	2,725
Sewage Peak Flow	Sewage Peak flow + infiltration inflow (**)	m^3/d	839	1,697	2,536	1,502	3,040	4,542
		m^3/hr	35	71	106	63	127	190
(*) For the design of waste stabilization ponds **(**) For the design of sewer network and pumping station**								

(Source: Final Detailed Design Report for Bukoba Municipality by Poyry of 2011)

Table 3: Expected pump discharge capacity and the pressure head in meters of column

Station Description	No of pumps	Discharge and Pressure Head
Pump Station1 (PS1)	2 nos.	63m^3/hr at 6m head
Pump Station 2 (PS2)	2 nos.	109 m^3/hr at 6m head

(Source: Final Detailed Design Report for Bukoba Municipality by Poyry of 2011)

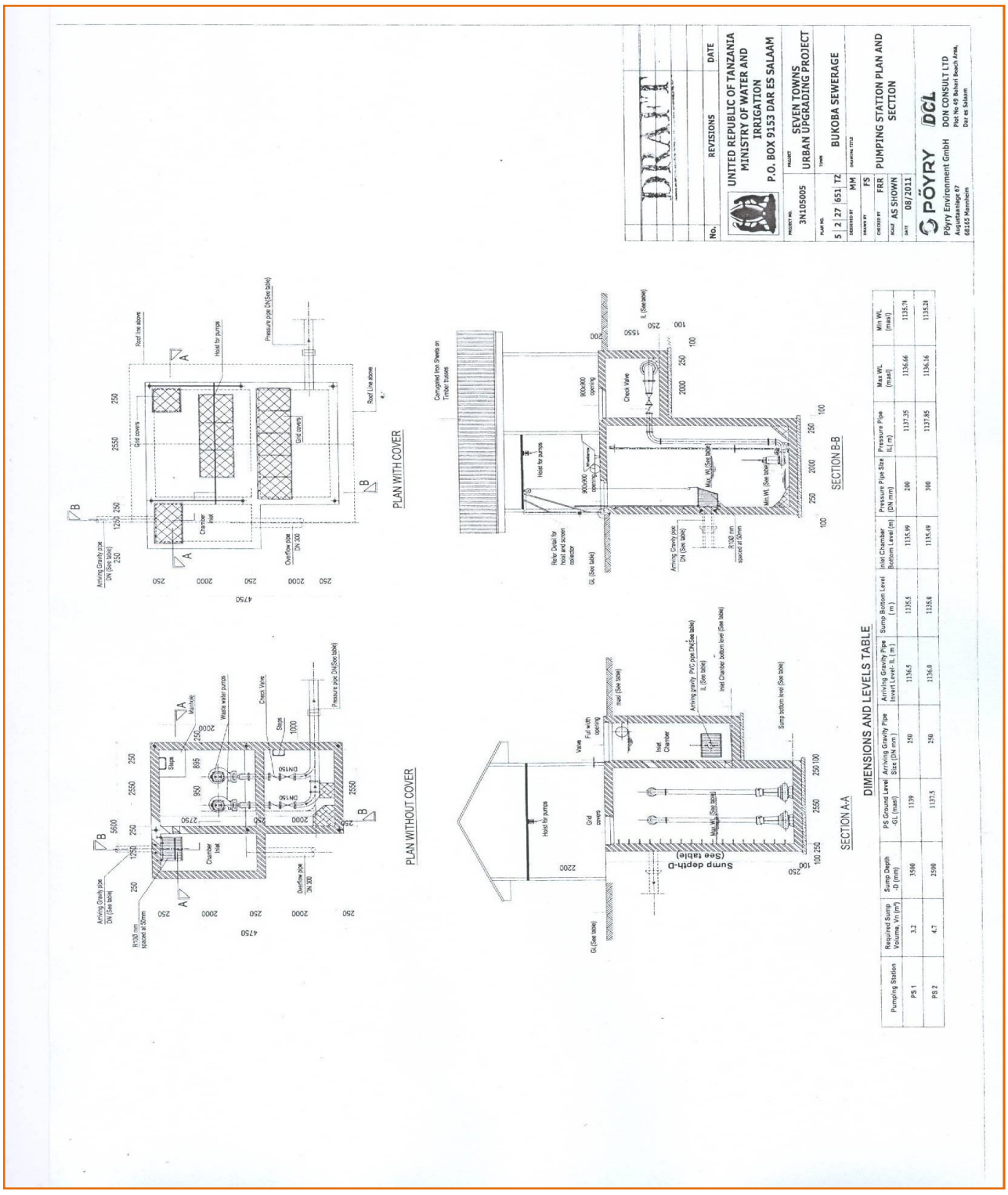


Figure 8: Pumping Station Plan and Sectional Details

2.4.3 Pressure Main from PS2 to Waste Stabilization Ponds

The pressure main pipe of about 3100 m with the size of 200 mm diameter in unplasticised polyvinyl chloride (uPVC) material has been designed to convey the wastewater from the pumping Station to the Waste Stabilization Ponds at Kifungu peninsular. The velocity of flow in the pumping main should be between 0.75m/s and 2.0m/s for the proposed plastic pipe of size 200mm in diameter. Low velocities may cause deposition of silt in the pipeline while high velocities may lead to scouring effect of the pipe inner surface thus weakening its strength with the consequential results of regular raptures.

The proposed pressure main will be running along the shore line of Lake Victoria crossing two rivers of Kanoni and Mafumbo and the Bukoba airstrip.

2.4.4 Sludge Drying Beds and Waste Stabilization Ponds

Sludge drying beds shall be constructed to receive sludge from the ponds and the sedimentation or thickening ponds. The beds are composed of one sand layer (0-12 mm grain size), two gravel layers (18-24 mm and > 60 mm grain size) and one impermeable clay layer. Concrete slab walls will separate the single bed units. The beds are proposed to be filled in rotation and then allowed to dry out naturally, where the dried sludge can be scooped out for use in soil conditioning. The designed 6 sludge drying bed units are of the size 25m by 10 m.

The proposed WSP facility shall comprise a combination of anaerobic, facultative and maturation ponds. Anaerobic and facultative ponds are designed for BOD removal, and maturation ponds for pathogen removal, although some BOD removal occurs in maturation ponds and some pathogen removal in anaerobic and facultative ponds.

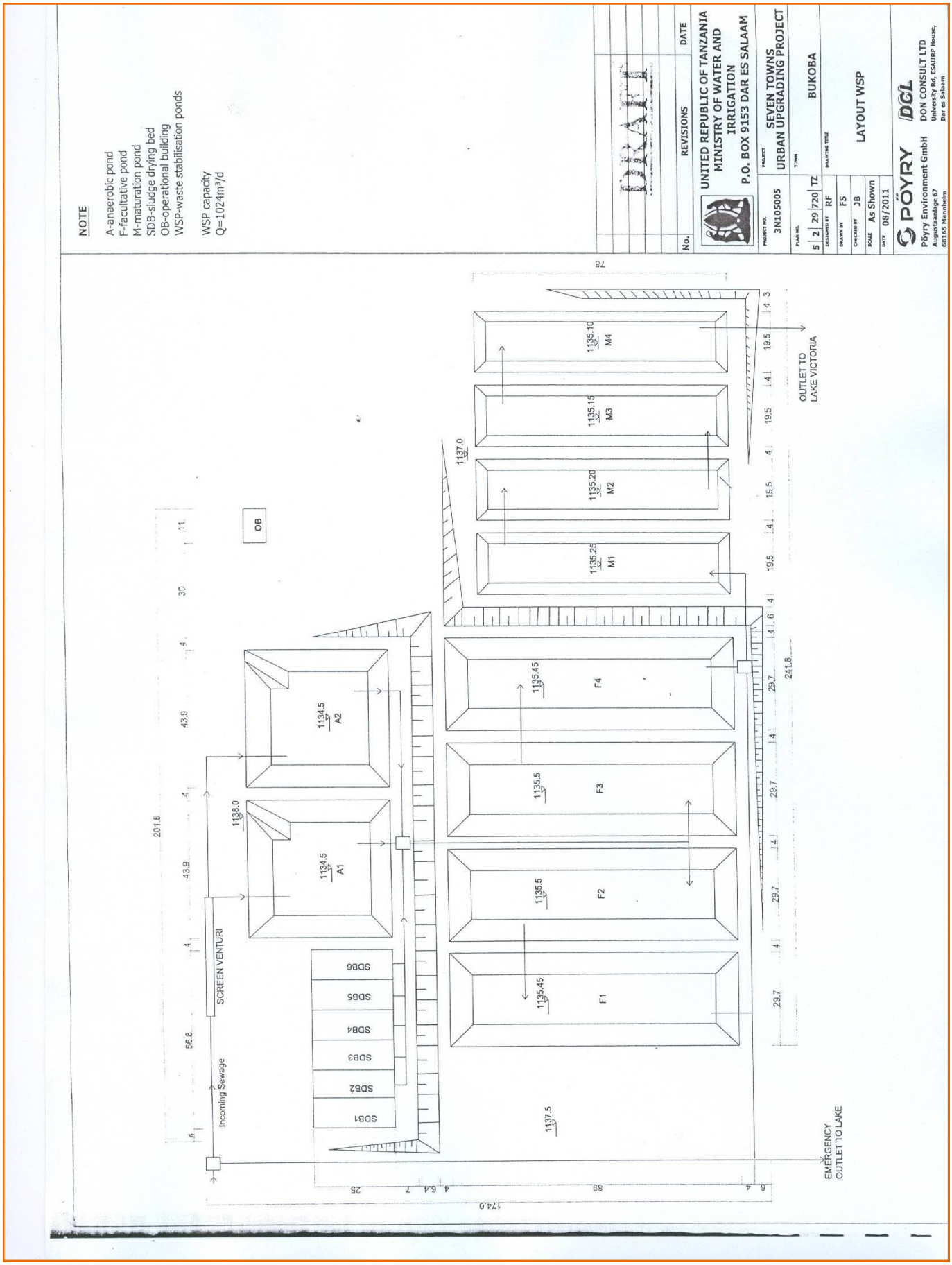


Figure 9: Layout drawing for sludge drying beds and waste stabilization ponds

2.4.5 Operations Building

The operations building will comprise of the workshop, laboratory for analysis of collected samples, store, office and kitchen. The building will also be equipped with the washroom comprising of the shower area and water closet. The building will not be provided with resting/sleeping rooms as all the working staff will be in rotation shifts.

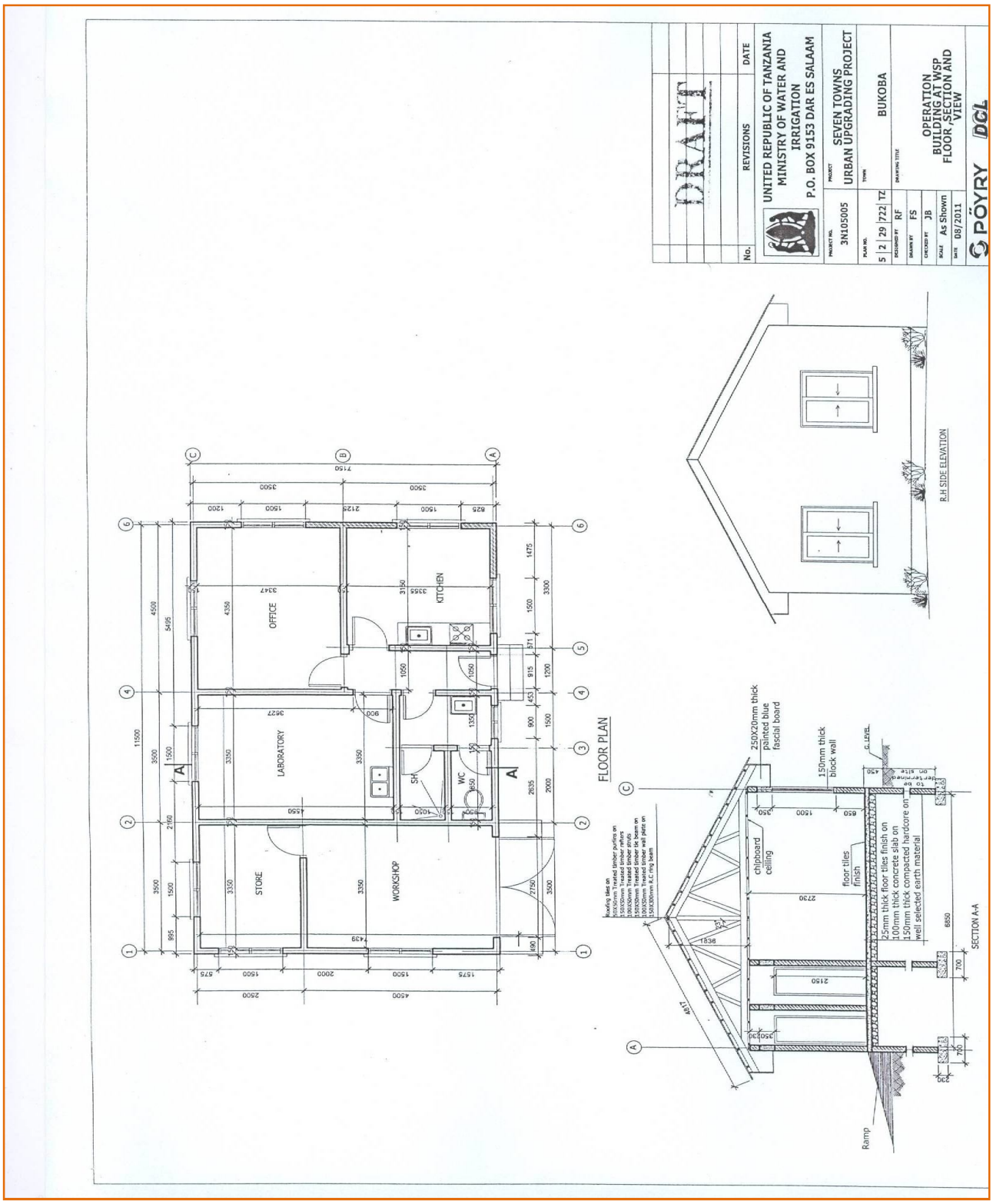


Figure 10: Operations Building

2.5 Project Requirements, Waste Generation and Disposal Methods

The project is going to require various locally available materials at different phases of the project implementation. Such locally available materials required include aggregates, gravel or crushed stone, sand and water.

2.5.1 Mobilization phase materials

Site Preparation - Preparation of the site for proposed laterals, primary and secondary sewer lines, pressure main and waste stabilization pond will automatically result into removal of existing few exotic trees and other vegetation around the site. These practices remove protective plants cover over the existing ground. The sites proposed for pumping stations and pressure main will equally be cleared of vegetation. These activities will result into generation of wastes like tree debris and other solid wastes like plastics all of which will be collected and disposed off in designated municipal waste disposal site preferred. Decomposable materials may be buried; plastics and other recyclable materials will be collected and sent out for recycling.

2.5.2 Construction Phase Materials and Equipment

Since the pumping station and waste stabilization ponds will be mainly of plain or reinforced concrete structure, the main construction materials will be aggregates, cement, sand, reinforcing steel and water. Other requirements such as timber, formwork, scaffolding etc, will also be required as included in the table below. Borrow materials to be used for construction will be collected from the identified borrow areas such as those used for road construction or new ones opened on agreement with the municipal authorities. Once these borrow pits are no longer in use, they will be backfilled with the spoil or these pits may be turned into water storage points for livestock on agreement with the respective local communities. Steep edges of these pits will be smoothened to avoid posing risks to children and livestock. The estimate of construction materials for the proposed project is shown on the table below.

Table 4: Materials estimated quantities

Construction Materials	Estimated Quantity
Stones / Aggregates	10,000 tons
Cement	350 tons
Sand	15,000 tons
Reinforcing steel/bars, binding wire etc	750 tons
Water	300 m^3 per day
Nails	600 kg
Formwork (Marine Plywood)	1,500 sq. m
Timber	5,000 m^3
Roofing material (Harvey tiles? Industrial troughs	125 sq. m.
Scaffolding	2,000 m

Wastes

Biodegradable materials wastes such as food leftovers, cardboards, papers will be collected and disposed off along with other municipality wastes in sanitary landfills at Nyanga. Other materials such as plastics, metal straps, reinforcing bars, unusable timber crates, steel cable pieces, pipes, etc., will be collected and transported to recycling centres within the town premises.

Wastewater Drainage and Treatment

There is currently no central sewer system running along the streets in the project area. Therefore any waste water generated as the result of the proposed works will be lead to the existing septic tanks. The waste water from the construction site, particularly the toilets will be linked to the nearby septic tanks or improved pit latrines.

2.5.3 Demobilization Material wastes

Upon completion of construction activities, all construction waste materials such plastics, glass and metal plates ideal for recycling will be collected and delivered at recycling centres. Unusable aggregates with concrete debris, chippings, sand will be sieved and the good one will be separated for reuse at other sites by the contractor. Natural grass to match the existing will be planted in all areas around the pumping stations, along the rising main to ponds and around the waste stabilization ponds.

2.6. Project Boundaries

Due to the nature of the project, it is expected that it will exert it pressure in different areas, thus the essence of demarcating the project area of influence. The area of influence of the project covers the whole neighbourhood and the road network which will be linked to the project area in the course of transferring equipment, debris and construction materials during different phases of the project. The project which will be within the town premises particularly in the area like Central Business District (CBD), will require construction materials from distant places which are currently used as borrow sites for construction materials such as aggregates, sand, hardcore stones etc. All these locations may be considered to be within project boundaries as it may influence its impacts to these locations. Looking at this area of influence it is evident that the boundary of the project can be considered in terms of spatial, temporal and institutional boundaries as presented below in the subsequent sub-sections.

2.6.1 Spatial Boundaries

Spatial boundaries refer to impact area coverage. Some of impacts have local (sub-ward, district) or regional or international implications. On impact area coverage we can consider two concentric influence zones namely;

Sewerage System Area,- The proposed project for construction of sewer lines will take land adjacent to the houses or housing blocks but once the trenches are backfilled the land will revert to ordinary use except in locations where inspection chambers are constructed above the existing ground level. Pumping station(s) will take land of about 0.125 ha each. The rising main will take land during installation but after backfilling the trenches the land will revert to normal use except building over it. Waste stabilization ponds including operator's house will take about 7 ha. Access road to ponds will take about 0.6ha deduced from 1000m by 6m in width. The proposed site for sewerage system is located within the planned Bukoba Central Business District to serve

residential buildings. The rising main runs along the shoreline of Lake Victoria where there might be some houses ranging from fishing landing sites and other facilities such as an airstrip, rivers and grasshopper "senene" catching camps.

The waste stabilization ponds and sludge drying beds will be constructed at Kifungu peninsular where within 50m there are residential houses in temporary building materials. The access road to the treatment works will pass through residential houses which were equally built on temporary building materials. All these areas will be treated as receptors of project impact during construction and operation phases. Undoubtedly these will equally have a significant impact if proposed mitigation measures are not implemented.

Wider Project Area, this is the area that will coincide with the road network that will be used by project trucks during delivery of building materials. This will be dictated by the number of heavy trucks needed at once to haul construction materials. Therefore the project impacts either positive or negative are likely to extend beyond the boundaries of the project area following the road network to sources of construction materials and back to the project site. During operation phase the effluent from WSP may also cause pollution to receiving bodies if these facilities do not work as planned, this may extend project impact beyond the boundaries as it may affect the aquatic life and the ecosystem as whole. The detailed Environmental Impact Assessment will involve carrying out a thorough analysis of these spatial boundaries. Of course the WSP will be used to treat wastewater from different municipality areas of which is significant to environmental management especially sub-basin management and livelihood improvement among municipality residents.

2.6.2 Temporal Boundaries

Temporal boundaries are referring to project life span and the reversibility of impacts. The project under consideration is envisaged to last for over 15 to 20 years from the date of construction to the date when it requires rehabilitation. Therefore the assessment will involve looking into areas that will be impacted by the project activities and recovery status. These will include impact to a nearby stream, borrow pits, quarries, sand pits, water sources, waterways for delivering construction materials to site, social impacts and sexually transmitted diseases, to name a few.

2.6.3 Institutional boundaries

These boundaries refer to those administrative and institutional boundaries in which the project lies or interacts. These can be determined from the legislations, ministries/departmental mandates. The project area is in the Bukoba municipality within Kagera region. Within the municipality there are various divisions, wards and sub-wards. There is a long chain of authority in the local government, with three intermediate levels between the Regional Administrative levels to the sub-ward chairman. Each administrative unit is governed by its own council, responsible for environmental measures. Therefore starting from the Ministry of water where the project proponent falls, the project will need to interact with the Regional, city, municipality, divisions, wards and sub-wards administrative levels.

3. Policy, Administrative and Legal Frameworks

3.1 Introduction

Construction of the sewerage system like many other development project, may result into a number of environmental impacts that must be adequately addressed during the project lifecycle. The activities associated with preconstruction, preparation of the project, construction, lying of the sewer pipes, operation and decommissioning of the project, have various positive and negative environmental and social impacts. While there will be efforts to mitigate and enhance negative and positive impacts respectively, the project proponent must ensure total compliance with various policies, legal frameworks in cooperation with the administrative structures in place. This section provides the summary of the various national and sectoral legal frameworks that govern the environment and social aspects. International treaties and donor agency policies relevant to the project are also presented.

In Tanzania, the main sources of the environmental legislation are common laws and statutory laws in the form of principal legislation and subsidiary legislation.

Common law refers to binding rules and principles of laws developed by the courts over time as opposed to the laws enacted by Parliament. According to the concepts in environmental law, the common law and rules that are applicable in Tanzania are those developed by the Tanzanian courts, both colonial and post-colonial, as well as those that were in force in England.

Due to the limitations of the common law, Parliaments have also enacted statutory laws to deal with various aspects of environmental protection. All laws enacted by the Parliament in Tanzania are known as principle legislation.

Subsidiary legislation or Regulations are rules or orders having force of law and are issued by a competent authority under specific provisions of the principle legislation. Regulations vest wide powers, mostly on Ministers of relevant Ministries, to permit, limit, control or prohibit the carrying out of any activities over which they have regulatory competence.

Relevant legislations pertaining to development of sewerage system project mainly on the environmental management in terms of quality, health and safety, pollution of ground and surface water, pollution of soil, land and land use control, aquatic environment, wildlife, protection of sensitive areas, protection of endangered species among others, were examined in order to ensure that the proposed development project meets and abides by the existing regulations. In this section, a full analysis of different policies, administrative and legal frameworks and relevant international treaties and conventions as they apply to this project are discussed.

3.2 Environmental Related and Other National Policies

The National Environmental Policy, NEP (1997)

It highlights sustainable development as its core concept. NEP states that Tanzania is committed to sustainable development in the short, medium and long-terms. Section 4 of the NEP stresses the importance of Environmental Impact Assessment in the implementation of the Environmental National Action Plan. It asserts that although it is important to tackle immediate environmental problems, precautionary, anticipatory and preventive approaches, used in EIAs, are the most effective and economical measures in achieving environmentally sound development. In observing the requirements of this policy the project proponent has initiated the environmental impact Assessment process.

The National Land Policy (1996)

It promotes and ensures a secure land tenure system to encourage the optimal use of land resources, and to facilitate broad-based social and economic development without upsetting or endangering the ecological balance of the environment. In recognizing that land has value and can facilitate access to capital, the government has instituted a land policy that supports responsible use, allocation ownership or leasehold, management and land administration. The land policy supports investments in agriculture and other development. It also provides for "full fair and prompt compensations" when land is acquired for development. In the case of this sewerage system development project, the identified land for project is mainly along the road and the land earmarked for the waste stabilization ponds is by now owned by the municipality. Of course in the project area there are a few houses all in temporary materials whose compensation will be easily compensated.

The National Water Policy (2002)

The National Water Policy (NAWAPO) of 2002 directs an adoption of a holistic basin approach that integrates multi-sectoral and multi-objective planning and management that minimizes negative impacts on water resources development so as to ensure sustainability and protection of the resource and its environment. The policy underscores the importance of a holistic approach by stating that "all water abstractions and effluents discharges into water bodies shall be subjected to a water use permit or discharge permit to be issued only for a determined beneficial use and for a specified period of time.

On policy issues in urban water supply and sewerage, the policy has a goal of having wastewater treatment systems which are environmentally friendly. And to ensure that domestic and industrial wastewater is not haphazardly discharged to contaminate water sources, the following relevant actions to the project are planned;

i. Sewerage systems and sludge disposals facilities will be constructed and old ones will be rehabilitated.
ii. Cesspit emptying services will be established and/or contracted to the private operators , cesspit emptiers will be required to discharge only at the

The project proponent is indeed targeting to meet the goal of the policy through all the activities planned and indeed all requirements of the policy will be observed during implementation and later operation of the project.

Cultural Policy (1997) covers a wide range of topics relating to both living cultural heritage and historical and archaeological remains ("cultural property"). The policy requires that "all land development shall be preceded by Cultural Resource Impact Studies". No historical or cultural sites observed in the area, however, Bukoba Municipal Council and the contractor will follow the requirements of this policy and in case such historical or cultural sites are discovered, appropriate measures will be taken to involve local and national authorities in their conservation.

The National Policy on HIV/AIDs (2001)

This is a policy which provides for the framework, direction and general principles in the national response interventions in the prevention, care and support of those infected and affected by the epidemic and mitigation of its impact. The specific objectives of the policy are

- Prevention of transmission of HIV/AIDs
- HIV/AIDs testing through voluntary testing with pre-and-post test counselling
- Care for people living with HIV/AIDs (PLHAs)
- To strengthen the role of all the sectors, public, private, NGOs, faith groups, PLHAs, CBOs and other specific groups to ensure that all stake holders are actively involved in HIV/AIDS work and to provide a framework for coordination and collaboration

- Research on HIV/AIDs
- To create legal framework by enacting a law on HIV/AIDS with a view to establishing multi-sectoral response to HIV/AIDS and to address legal and ethical issues in HIV/AIDS and to revise the legal situation of families affected by HIV/AIDS in order to give them access to family property after the death of their parent(s).
- Other objectives include
  - To monitor the efforts towards community mobilization for living positively with HIV/AIDS in order to cope with the impact of the epidemic while safeguarding the rights of those infected or affected directly by HIV/AIDS in the community.
  - To identify human rights abuses in HIV/AIDS and to protect PLHAs and everyone else in society against all forms of discrimination and social injustice.
  - To provide appropriate effective treatment for opportunistic infections at all levels of the health care system
  - To work closely with the Ministry of Home Affairs, NGOs and Faith Groups in the fight against drug substance abuse that increases the risk of HIV transmission
  - To prohibit misleading advertisements of drugs and other products for HIV/AIDS prevention, treatment and care.

In order to contribute towards observing the objectives of the National Policy on HIV/AIDs, the project proponent will have HIV/AIDs programme aimed at promoting awareness of HIV/AIDs among its service providers and its employees.

The National Employment Policy (1997)

The policy aims at

- Preparing the conducive environment for the unemployed to employ themselves by directing more resources to the self employment sectors,
- Identifying potential areas for employment and to lay down strategies of how to utilize such areas in promoting employment in the country,
- To prepare a special procedure for coordination and developing sources of employment including creation of a body that will supervise implementation of the employment policy,
- Identify and elaborate on the status and roles of various stakeholders in promoting and sustaining employment.
- To strengthen (through removal of bottlenecks the relationship between formal sector and that of self employment.
- To develop the self employment sector in rural areas so as to reduce the rate of migration to urban areas.
- To ensure that activities initiated on self employment act as a basis for development of the economy and are an inspiration for the culture of self reliance, etc

In view of the Government efforts in development of National Employment Policy, the contractor in collaboration with Bukoba Municipal Council intends to supplement these efforts by providing some few employments during the project implementation. During this period, transfer of technology can be attained among those who will be employed and after their contract terms they can engage in self employment activities in the informal sector with abundant wealth which has not been exploited significantly. A few will be engaged by the project proponent in attending the project during operation phase.

Women and Gender Development Policy (2000)

The Women and Gender Development policy's overall objective is to promote gender equality and equal participation of men and women in economic, cultural and political matters. Also focuses on - fairer opportunities for women and men and access to education, child care, employment and decision making. Therefore during project implementation the proponent intends to give fair opportunities for both women and men.

National Construction Industry Policy (2003)

The main objectives of the Construction Industry Policy include:

- To improve the capacity and competitiveness of the local construction enterprises (contractors, consultants and informal sector)
- To develop an efficient and self-sustaining roads network that is capable of meeting the diverse needs for construction upgrading and maintenance of civil works for trunk, regional, districts and feeder roads network.
- To improve the capacity and performance of the public sector and private sector clients so as to ensure efficient, transparent and effective implementation and management of construction projects.
- To ensure efficient and cost effective performance of the construction industry that will guarantee value for money on constructed facilities in line with best practices.
- To promote application of cost effective and innovative technologies and practices to support socio-economic development activities such as road works, water supply, sanitation, shelter delivery and income generating activities.
- To ensure application of practices, technologies and products which are not harmful to both environment and human health
- To mobilize adequate resources from both the public sector and the private sector for construction and maintenance of public infrastructure.
- To enhance participation in regional and international co-operation arrangements for the purpose of promoting the capacity and competitiveness of the industry and developing markets for export of its services and products.
- To improve co-ordination, collaboration and performance of the institutions supporting the development and performance of the construction industry.
  With respect to environmental protection and conservation, section 8.2.2 of the National Construction Industry Policy addresses a number of issues regarding the environment. The construction industry is generally said to be a major source of environmental damage and occupational health problems. A number of the industry's activities are environmentally not sustainable partly owing to lack of awareness of environmentally sound practices and technologies.

Moreover, construction activities affect the environment in many ways: through resource deterioration, physical disruption and chemical pollution. Large civil engineering projects can easily destabilize fragile hill slopes. As a step towards observing the requirements of this policy, the proponent has facilitated carrying out of the Environmental Impact Assessment to safeguard the environment and intends to use the services of a local registered contractor aware of the environmental issues.

3.3 Laws, Regulations and Guidelines

3.3.1 Acts Dealing with Environment or relate to EIA

The Environmental Management Act (EMA), Cap 191 (No. 20 of 2004)
The administrative and institutional arrangements for environmental management for all sectors in Tanzania are stipulated in the Environmental Management Act, Cap 191 (No. 20 of 2004). EMA Cap 191 gives National Environment Management Council (NEMC) the overall responsibility for undertaking the enforcement, compliance, review and monitoring of Environmental Impact Assessment and in this regard facilitates public participation in environmental decision-making. NEMC is responsible for screening and reviewing various investments and projects of the national significance. All these requirements are observed and the proponent is closely collaborating with NEMC to ensure that nothing slips unnoticed.

Environmental Impact Assessment and Audit Regulation of 2005
These regulations were prepared under EMA Cap. 191 and require developers to conduct an Environmental Impact Assessment for any project likely to have negative impacts on the environment. Application for an Environmental Impact Assessment certificate is necessary for such project. In observing the requirements of these regulations the proponent has initiated the assessment of the impacts of the proposed sewerage system.

3.3.2 Acts Dealing with Land Use Planning

Land Act Cap. 113, (No. 4 of 1999)
The Land Act, Cap 113, replaces the previous basic land law of 1923, and establishes three categories of land: general, village and reserved. In addition, land may be declared 'hazard land' where its development might lead to environmental damage, e.g. locations such as wetlands, mangrove swamps and coral reefs, steep lands and other areas of environmental significance or fragility. The Act recognizes customary tenure as of equal status to granted rights of occupancy. Importantly the land Act promotes gender equality by recognizing equal access to land ownership and use by all citizens- men and women – and giving them equal representation on the land committees. Under this project the proposed scheme development activities are to be carried out in the municipality land mainly along the access roads all of which is owned by the government through existing country legislations. However, any land which will be interfered with, that does not belong to the Municipality will be taken in observance of the requirements of the Land Act, Cap, 113.

The Land (Forms) Regulation 2001
The Land Regulations were made under section 179 of the Land Act 1999, and provide all specific forms required for Management and Administration, Granted Right of Occupancy, Mortgage, Lease, Easement, Co-occupancy and others including compensation forms (Forms 69 and 70). Some land acquisition such as land for the waste stabilization ponds was done by the municipality (government) hence no any kind of compensation will be required, but in case there are areas that belong the private people, appropriate measures of land acquisition and corresponding compensation will be undertaken as provided for in the said regulations.

The Village Land Act, Cap 114 (No. 5 of 1999)
The Village Land Act, Cap 114 (No.5 of 1999) confers the management and administration of village lands to Village Councils, under the approval of the Village Assemblies, although the Minister of Lands is entitled to decide on the size of land which can be owned by a single person

or commercial entity. The acts also provides for the fundamental principles of National Land Policy which are the objectives of the Village Land Act, Cap 114 geared towards;

- ensuring that existing rights and recognized long standing occupation or use of land are clarified and secured by the law;
- ensuring that land is used productively and that any such use complies with the principles of sustainable development;
- to take into account that an interest in land has value and that value is taken into consideration in any transaction affecting that interest; and

to pay full, fair and prompt compensation to any person whose right of occupancy or recognized long-standing occupation or customary use of land is revoked or otherwise interfered with to their detriment by the State under this Act or is acquired under the Land Acquisition Act, Cap 118 of 2002. In view of these requirements, Bukoba Municipal Council secured a piece of land without encumbrances ready for public use in development of the waste stabilization ponds at Kifungu area. The Kifungu area is more or less like a rural set up even though it is within in the municipality boundaries. Therefore the Village Land Act was referred to avoid any ambiguities that may crop up.

The Land Acquisition Act, Cap 118 R.E. 2002

The Land Acquisition Act Cap 118 Revised Edition 2002 requires the minister responsible for land to pay compensation as may be agreed upon or determined in accordance with the provisions of the Act. The Act stipulates that no compensation shall be awarded in respect of land, which is vacant ground, or to be limited to the value of the un-exhausted improvement of the land, in case the development of the land is deemed inadequate.

The Act defines the circumstances in which public interest could be invoked, e.g., for exclusive government use, public use, for or in connection with sanitary improvement of any kind or in connection with laying out any new city, municipality, township or minor settlement or extension or improvement of any existing city. Other purposes are in connection with development of any airfield, port or harbour; mining for minerals or oils; for use by the community or corporation within community; for use by any person or group of persons as the President may decide to grant them such land. The acquisition of the land for the public use as well as for the resettlement sites is within the provision of this Act. Further the Act specifies other requirements prior to the acquisition of the land such as investigation for the land to be taken, issuing notice of intention to take land and mode in which notices will be served. It further defines the requirements for and restrictions on compensation.

Land Use Planning Act No. 6 of 2007

This Act repeals the National Land Use Planning Commission Act No. 3 of 1948 that established a National Land Use Commission (NLUC) as the principal advisory organ of the government on all matters related to land use. Among other things, it recommends measures to ensure that the government policies, including those for development and conservation of land, take adequate account of their effects on land use, seek the advancement of scientific knowledge of changes in land use and encourage development of technology to prevent, or minimize adverse effects that endanger human's health and welfare. The Act also specifies standards, norms and criteria for the protection of beneficial uses and the maintenance of the quality of the land.

The Land Use Planning Commission, currently, does not have any bearing on the sewerage system development activities proposed by Bukoba Municipality as the proposed site is located in open space where other land use development activities cannot be interfered with.

3.3.3 Acts Dealing with Natural Resources

Forest Act No. 14 of 2002

This Act deals with the protection of forests and forest products in forest reserves and the restrictions and prohibitions in forest reserves. Any contravention of the restrictions and prohibition is considered an offence under this ordinance and subject to enforcement. The law was repealed in 2002 to meet the new requirements under the Forest Policy. The new Forest Act No. 14 of 2002 requires that for any development including mining development, construction of dams, power stations, electrical or telecommunication and construction of building within a Forest Reserve, Private Forest or Sensitive Forest, the proponent must prepare an Environmental Impact Assessment for submission to the Director of Forestry. The law also requires licenses or permits for certain activities undertaken within the national or local forest reserves, such as, among others, felling or removing trees, harvesting forest produce, entering a forest reserve for the purpose of tourism or camping, mining activities, occupation or residence within the reserve, cultivation, erecting any structures. The proposed project does not touch any of the forest reserves, however the requirement of this Act will be observed through limiting use of the forest products such as timber for sustainability of the forests.

Wildlife Conservation Act, No. 5 of 2009

The Wildlife conservation Act establishes protected areas with restriction on access and utilization of wildlife resources. Among these protected areas include Game Reserve, Wetlands, Wildlife corridor, Dispersal areas and species management areas. The Act state clearly restrictions applying to game reserves, wetlands and game controlled area that any person shall not dig, lay, or construct any pitfall, net trap, snare or use any other device capable of killing, capturing or wounding any animal and conduct crop cultivation within any game reserve, wetlands reserve or game controlled area. The proposed project area particularly the area earmarked for waste stabilization ponds is purely not used. It is reserved for wastewater treatment facilities, there might be some snakes and other wildlife living within the area, since the area is not meant for protection, then these "uninvited guests" will find their way out during construction activities; therefore the legislation has no significant bearing on the project activities.

The Mining Act No. 14 of 2010

This Act provides for prospecting of minerals, mining and dealing in minerals. It also provides for building materials including all forms of rock, stones, gravel, sand, clay, volcanic ash or cinder or other minerals being used for the construction of buildings, roads, dams, and aerodromes or similar works. The Legislation makes EIA mandatory as a precondition for granting various categories of mining licenses. In this project borrow material and all forms of rock stones, gravel, clay and sand will be mined from existing borrow area or new ones developed whereby all the requirements of the Act will be met in parallel to other development projects in Bukoba Municipality all in agreement to respective authorities and owners.

The Water Resources Management Act No. 11 of 2009

Water legislation has been updated to bring it in line with the National Water Policy 2002. This current Water Resources Management Act No. 11 of 2009 provides for institutional and legal framework for sustainable management and development of water resources; outlines principles for water resources management; provides for the preventions and control of water pollution; provides for participation of stakeholders and the general public in implementation of the National Water Policy; repeals the Water Utilization (Control and Regulation) Act, 1974 and vests all water in the country to the Government of United Republic of Tanzania and sets

procedures and regulations for the extraction of water resources, but does not provide for the wetland resource management.

Section 63 of the Act states that the discharge of any effluents from any commercial, industrial, or agricultural source or from any sewage works or trade waste systems or from any other source into surface water or underground strata requires a "Discharge Permit" from the Basin Water Board. In accordance with section 65, the water quality and effluent standards to be applied to the discharge permit shall be made and published by the Minister in accordance with the requirements of the Environmental Management Act Cap 191. A provisional discharge permit may be granted in cases where pollutants are already being discharged, subject to conditions and terms of issued as per requirements of clause 67.

The sewerage system project being located closer to Lake Victoria, where any failure of its actions is likely to cause a significant pollution to the Lake, will comply with all provisions of this Water Management Act in order to ensure efficient management of the lake near the project area. Compliance with the requirements of this Act will be through implementation of the Environmental Management and Monitoring Plans set as part of this EIS.

The Environment Management (Water Quality Standards) Regulations, 2007

These environmental management regulations were made under section 143, 144, and 230(2) (s) of the EMA Cap191 with the following objectives

a. protect human health and conservation of the environment
b. enforce minimum water quality standards prescribed by the National Environment Standards Committee (NESC)
c. Enable NESC to determine water usages for the purposes of establishing environmental quality standards and values for each usage and
d. Ensure all discharges of pollutants take account the ability of the receiving waters to accommodate contaminants without detriment to the uses specified for the waters concerned

Under the first schedule, the regulations give the permissible limits for municipal and industrial effluents for both physical, inorganic organic and microbiological components. Since these limits are now readily available the project proponent will ensure that the objectives of regulations are totally observed to safeguard the environment around the project area.

The Water Resources Management (Water Abstraction, Use and Discharge) Regulations, 2010

Among other things, these regulations contain forms that are used for application for permit to discharge wastewater to the Basin Water Officer. The information required on the discharge application include the volume of discharge during the dry weather, maximum rate of discharge, average daily volume of trade effluent, method of measurement of flows from the works (V-notch/weir/current meter etc, maximum temperature of effluent discharge and maximum concentrations of any contaminants known to be present in the discharge. The above submission shall also include the plan of the discharging facility and the adjoining properties, body of water referred to; and the point on the body of water where it is desired to discharge effluent. These are standard requirements components of such a similar project. Therefore the project proponent will apply for the discharge permit according to the laid down procedures.

Water Supply and Sanitation Act No. 12 of 2009
The Water Supply and Sanitation Act No. 12 of 2009 has been enacted to provide for sustainable management and adequate operation and transparent regulation of water supply and sanitation services with a view to give effect to the National Water Policy (2002). It further provides for the establishment of water supply and sanitation authorities as well as community owned water supply organizations. The project will be implemented in total observance of the requirements of this Act.

The Public Health Act, 2009
This is an Act to provide for the promotion, preservation and maintenance of public health with a view to ensuring the provisions of comprehensive, functional and sustainable public health services to the general public and to provide for other related matters. Part IV section 93 to 125 of this Act describes on sewerage and drainage service to the public requirements. The project proponent will observe all the requirements of this Act in order to have smooth execution of its sewerage system development activities.

3.3.4 Acts Dealing with Trades and Professional Ethics / Conduct

The Engineers Registration Act No.15 of 1997, R.E. 2002
This is an Act which formed the Engineers Registration Board, a statutory body with the responsibility of monitoring and regulating engineering activities and the conduct of engineers and engineering consulting firms in Tanzania through registration of engineers and engineering consulting firms. Under the law, it is illegal for an engineer or an engineering firm to practice Engineering profession if not registered with the board. The board has also been given legal powers and has the obligation to withdraw the right to practice from registered engineers if found guilty of professional misconduct or professional incompetence. Registration with the board is, thus, a license to practice engineering in Tanzania.

Sewerage system construction project is an engineering assignment and the project proponent is observing all the requirement of this Act through engaging the services of personnel and firms that are registered with the Engineers Registration Board.

The Contractors Registration Act No. 17 of 1997 R.E. 2002
This is an Act which provides for registration of contractors and also establishment of the Contractors Registration Board, the body responsible for regulating the conduct of contractors in Tanzania. The project proponent will equally abide by all requirements of this Act in terms of supporting the activities of the board during inspection of any site for access road patching, installation, erection or demobilizing works for the purpose of verifying and ensuring that the works are being undertaken by registered contractors; and that the works comply with all governing regulations and laws of the country.

The Occupational Health and Safety Act No. 5 of 2003
This Act sets provisions for the safety, health and welfare of persons at work in factories and other places of work. It is also meant to provide for the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with activities of persons at work; and to provide for connected matters. The sewerage system construction project will eventually be a place of work to be registered as per OSHA regulations that govern the places of work and observe all safety and health practices at work sites by its consultants, contractors and sub-contractors.

The Surface and Marine Transport Regulatory Authority Act No. 9 of 2001

This is an Act which established the Surface and Marine Transport Regulatory Authority (SUMATRA) mainly dealing with surface and marine transport sectors. The Act presents a "regulated sector" environment in which SUMATRA executes its duties. This regulated sector includes rail transport, ports and maritime transport, public passenger road transport and commercial road transport:

The Act gives the duties of SUMATRA to include

a) Perform, the functions conferred on the Authority by sector legislation;
b) subject to sector legislation
    i. to issue, renew and cancel licenses;
    ii. to establish standards for regulated goods and regulated services;
    iii. to establish standards for the terms and conditions of supply of the regulated goods and sources;
    iv. to regulate rates and charges;
    v. to make rules.
c) To monitor the performance of the regulated sectors, including, in relation to-
    (i) levels of investment;
    (ii) availability, quality and standards of services;
    (iii) the cost of services;
    (iv) the efficiency of production and distribution of services, and
    (v) other matters relevant to the Authority;

Since all these elements are core to the success of the proposed sewerage system construction project, any transportation elements of construction equipment will follow the set requirements.

The Roads Act No. 13 of 2007

This Roads Act provides for road financing, development, maintenance, management and other related matters. Since the project intends to construct the access roads to the waste stabilization ponds, then the important clauses of the Roads Act will be observed in totality. The Act also provides for offences, penalties and recovery on destroying bridges, causing damage to public roads, obstructions on roads, nuisance on roads, stretching of ropes over public roads etc. The fines are also prescribed under the offences committed on the public roads. The project proponent will observe all the requirements of this Act in order to have smooth execution of its sewerage system development activities.

3.3.5 Acts with a Bearing on Environment at the Municipal / District Level

Local Government (Municipal / District) Authorities Act No. 7 of 1982

The Act provides for; inter alia, the establishment, composition, functions and legislative powers of district, township councils and village authorities. At the village level, the government structure is comprised of a village assembly consisting of all persons aged 18 and above. There are also village committees covering such matters as planning, finance, economic affairs, social services, security, forest protection, water resources etc [Section 35].

The village council's functions and roles include planning and coordinating activities, rendering assistance and advice to the villagers engaged in agriculture, forestry, horticultural, industrial or any other activity, and to encourage village residents to undertake and participate in communal enterprises. As an administrative subdivision between the village and the district, the ward

reviews the proposed village council's projects in its jurisdiction and approves them for passage up the line to the District Development Committee.

Local Government (District) Authorities Act of 1982 as amended by Act No. 6 of 1999 establishes the Ward Development Council (hereinafter referred to as "WDC). The WDC is responsible for developing general development plans for the ward. Further, the WDC must manage disasters and environmental related activities within its ward.

Local Government (District) Authorities Act, No. 7 of 1982 also provides for the protection and management of the environment on the part of the district council. This is deduced from section 111 of the Act, which promotes social welfare and economic well being of all residents within its area of jurisdiction.

Protection and management of the environment is further provided for under section 118 of Act number 7 of 1982. District councils are required to take the necessary measures to control soil erosion and desertification; to regulate the use of poisonous and noxious plants, drugs or poison; regulate and control the number of livestock; maintain forests; manage wildlife; ensure public health; provide effective solid and liquid waste management protect open spaces and parks etc. The Act also has provisions for a scheduled timetable and management of the environment. Since the project will be touching the areas where the local government authorities have roles to play, the village will work hand in hand with Municipal Council and other local government structures for the success of the project.

3.3.6 Other Relevant International Treaties and Conventions

Tanzania has ratified a number of Multilateral Environmental Agreements (MEAs) and consequently has duties under those agreements. In this sewerage system project, work will be carried out in environments likely to be affected if mitigation measures are not strictly applied. Table 5 below presents some of these agreements, treaties and conventions.

Table 5: Multilateral Environmental Agreements (MEAs), Treaties and Conventions to which Tanzania is a party

Type of Convention	Name of Convention	Relevance to the Project **
2. Bio diversity related Conventions	1. Convention of Biological Diversity, (1992) ratified by Tanzania in 1996).	Project activities involve clearing of vegetation. The Municipal Council will work with the respective communities in conservation of available plant and animal species.
	2. Convention to combat, desertification, particular Africa, Paris 1994	
	3. The Cartagena Protocol on Bio safety to the convention on Biological Diversity (2000)	
Other Conventions	1. The convention on International Trade and Endangered species of Wild Fauna and Flora (CITES), Washington (1973)	The project operations are likely to encounter area with endangered flora and fauna species, though no such species were observed during the study. The project staff, villagers and the Contractors staff will in no event involve themselves with trade

	2. The convention concerning the Protection of World Cultural and Natural Heritage, Paris, (1972) 3. The convention of Wetlands of International Importance especially as water fowl Habitat (The Ramsar Convention) (1971) ratified by Tanzania in 1998).	of these species
Climatic change Conventions	1. The United Nations Framework convention on climatic change (1992)	The project will prevent further clearance of vegetation in order to improve and maintain carbon dioxide consumption
	2. Kyoto Protocol (1997)	
Regional conventions	1. The Convention on the conservation of Nature and Natural Resources, 1968 Algiers, (1968)	
	2. The Bamako convention on the Ban of the import into Africa and the control of Trans boundary movement of Hazardous Wastes within Africa, 1990	
	3. Nairobi Convention for the protection, management and development of the Marine and Coastal environment of Eastern African Region, 1985 and the related protocols.	
	4. Lusaka Agreement on cooperative enforcement operations Directed at illegal Trade in Wild Fauna and Flora (1994)	The project operations are likely to encounter area with endangered flora and fauna species. The project staff, local communities and the contractors staff will in no event involve themselves with trade of these species

3.4 The World Bank's Safeguard Policies

The World Bank has keen interest in protection of the environment, particularly for investment projects supported by the Bank; they have to be in line with its safeguards policies. These policies provide guidelines, aimed at preventing and mitigating undue harm to people and the environment, when implementing development projects. The safeguard policies provide a platform for the participation of stakeholders in project design and implementation and the relevant policies to this project are:

- Environmental Assessment (OP/BP 4.01)
- Natural Habitats (OP/BP 4.04)
- Forests (OP/BP 4.36)
- Involuntary Resettlement (OP/BP 4.12)
- Indigenous Peoples (OP/BP 4.10)
- Pest Management (OP 4.09)

- Physical Cultural Resources (OP/BP 4.11)

The construction of the sewerage system project triggers some of these operational policies of the World Bank as presented below;

3.4.1 OP/BP 4.01 Environmental Assessment Policy

The objective of this policy is to ensure that Bank-financed projects are environmentally sound and sustainable, and that decision-making is improved through appropriate analysis of actions and of their likely environmental impacts. This policy is triggered if a project is likely to have potential (adverse) environmental risks and impacts on its area of influence. OP 4.01 covers impacts on the natural environment (air, water and land); human health and safety; physical cultural resources; and trans-boundary and global environment concerns.

Depending on the project, and nature of impacts a range of instruments can be used: EIA, environmental audit, hazard or risk assessment and environmental management plan (EMP). When a project is likely to have sectoral or regional impacts, sectoral or regional EIA is required. The Borrower is responsible for carrying out the EIA.

Under this project, the proponent Ministry of Water (LVEMP II) has facilitated the undertaking of Environmental and Social Impact Assessment to assess the social and environmental impacts of the project.

3.4.2 OP/BP 4.12 Involuntary Resettlement

The policy acknowledges that development projects that displace people generally give rise to economic, social and environmental problems. Its objective therefore, is to avoid or minimize involuntary resettlement where feasible, by exploring all viable alternative project designs. OP 4.12 is intended to assist displaced persons in maintaining or improving their living standards. It encourages community participation in planning and implementing resettlement; and in providing assistance to affected people, regardless of the legality of title to the land they posses, which has to be acquired for project activities. The Bank guidelines therefore, prescribe measures to minimize the negative impacts to ensure that the displaced community benefits from the project and to ensure that the affected persons are:

- compensated for their losses at full replacement costs prior to the actual move;
- assisted with the move and supported during the transition period in the resettlement site;
- assisted in their effort to improve (or at least restore) their former living standards, income earning capacity and production levels;
- Integrated socially and economically in the host communities, so that adverse impacts in the host communities are minimized. This is best achieved through appropriate planning and consultation, involving affected people.

In addition; land, housing, infrastructure and other compensation should be provided to the adversely affected population, indigenous groups, ethnic minorities, and pastoral people who may have customary rights to the land and other resources taken for the project. The absence of legal title to land by such groups should not be a bar to compensation.

The policy is triggered not only if physical relocation occurs, but also by any loss of land resulting in relocation or loss of shelter; loss of assets or access to assets; loss of income sources or means of livelihood, whether or not the affected people must move to another location.

The existing policies, land laws and regulations regarding land acquisition and compensation in the country should be generally consistent with the World Bank Operational Guidelines.

Therefore, if necessary at all, compensation could still be handled within the existing regulations, without contradicting the World Bank Policy requirements. Even though this respective policy is triggered but fortunately the sewerage system project was identified by the municipality having realised the impacts exerted on surrounding environment and later into Lake Victoria. Also the effected people are the residents of the municipality who are now suffering with others and they are equally going to benefit from the proposed project.

3.4.3 OP/BP 4.04 Natural Habitats

This policy recognizes that the conservation of natural habitats is essential to safeguard their unique biodiversity and to maintain environmental services and products for human society and for long-term sustainable development. The Bank therefore supports the protection, management, and restoration of natural habitats in its project financing, as well as policy dialogue and economic and sector work. The Bank supports, and expects borrowers to apply, a precautionary approach to natural resource management to ensure opportunities for environmentally sustainable development. Natural habitats are land and water areas where most of the original native plant and animal species are still present. Natural habitats comprise many types of terrestrial, freshwater, coastal, and marine ecosystems. They include areas lightly modified by human activities, but retaining their ecological functions and most native species.

This policy is triggered by any project (including any sub-project under a sector investment or financial intermediary) with the potential to cause significant conversion (loss) or degradation of natural habitats, whether directly (through construction) or indirectly (through human activities induced by the project).

The policy is slightly triggered as it is going to use some of the natural habitat which might be supporting other ecosystems. Environmental Impact Assessment has identified these natural habitats and mitigation measures are presented.

3.4.4 OP/BP 4.36 Forests

The objective of this policy is to assist borrowers to harness the potential of forests to reduce poverty in a sustainable manner, integrate forests effectively into sustainable economic development and protect the vital local and global environmental services and values of forests. Where forest restoration and plantation development are necessary to meet these objectives, the Bank assists borrowers with forest restoration activities that maintain or enhance biodiversity and ecosystem functionality. The Bank assists borrowers with the establishment of environmentally appropriate, socially beneficial and economically viable forest plantations to help meet growing demands for forest goods and services.

This policy is triggered whenever any Bank-financed investment project (i) has the potential to have impacts on the health and quality of forests or the rights and welfare of people and their level of dependence upon or interaction with forests; or (ii) aims to bring about changes in the management, protection or utilization of natural forests or plantations.

The policy is slightly triggered as some of the areas where forests would have developed are the ones that will be used for construction of the proposed sewerage system.

3.4.5 OP 4.09 Pest Management

The objective of this policy is to (i) promote the use of biological or environmental control and reduce reliance on synthetic chemical pesticides; and (ii) strengthen the capacity of the country's regulatory framework and institutions to promote and support safe, effective and environmentally sound pest management. More specifically, the policy aims to (a) Ascertain that pest management activities in Bank-financed operations are based on integrated approaches and

seek to reduce reliance on synthetic chemical pesticides (Integrated Pest Management (IPM) in agricultural projects and Integrated Vector Management (IVM) in public health projects. (b) Ensure that health and environmental hazards associated with pest management, especially the use of pesticides are minimized and can be properly managed by the user. (c) As necessary, support policy reform and institutional capacity development to (i) enhance implementation of IPM-based pest management and (ii) regulate and monitor the distribution and use of pesticides.

The policy is triggered if : (i) procurement of pesticides or pesticide application equipment is envisaged (either directly through the project, or indirectly through on-lending, co-financing, or government counterpart funding); (ii) the project may affect pest management in a way that harm could be done, even though the project is not envisaged to procure pesticides. This includes projects that may (i) lead to substantially increased pesticide use and subsequent increase in health and environmental risk; (ii) maintain or expand present pest management practices that are unsustainable, not based on an IPM approach, and/or pose significant health or environmental risks.
Under the construction of the sewerage system project, the policy will not be triggered as the project will not involve any pesticides.

3.4.6 OP/BP 4.11 Physical Cultural Resources

The objective of this policy is to assist countries to avoid or mitigate adverse impacts of development projects on physical cultural resources. For purposes of this policy, "physical cultural resources" are defined as movable or immovable objects, sites, structures, groups of structures, natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance. Physical cultural resources may be located in urban or rural settings, and may be above ground, underground, or underwater. The cultural interest may be at the local, provincial or national level, or within the international community.

This policy applies to all projects requiring a Category A or B Environmental Assessment under OP 4.01, project located in, or in the vicinity of, recognized cultural heritage sites, and projects designed to support the management or conservation of physical cultural resources.
The policy may be triggered during excavation of fill materials at both existing and new borrow sites however it is not expected that physical cultural resources will be affected.

3.4.7 OP/BP 4.10 Indigenous Peoples

The objective of this policy is to (i) ensure that the development process fosters full respect for the dignity, human rights, and cultural uniqueness of indigenous peoples; (ii) ensure that adverse effects during the development process are avoided, or if not feasible, ensure that these are minimized, mitigated or compensated; and (iii) ensure that indigenous peoples receive culturally appropriate and gender and inter-gene rationally inclusive social and economic benefits.

The policy is not triggered as it is not expected that indigenous peoples will be affected by the proposed sewerage system project and above all the project was initiated by the respective municipality.

3.5 Administrative Framework

3.5.1 Central Government Agencies

Environment Matters at the National Level

At the national level, the institutional and legal framework for sustainable management and development of Sewerage system project falls under the Ministry of Water. The ministry issues policy guidance and provides legal frameworks, water licenses, certificate of compliance and project monitoring.

Under the legal framework, the Water Resources Management Act No. 11 of 2009, assigns the following mandates;

- The Minister is responsible for management of water resources through national policy and strategy formulation and ensuring the execution of the functions connected with the implementation of the Water Resources Act No. 11 of 2009
- The Minister is assisted in the discharge of his duties by the Director of Water Resources.

The overall structure of Water Resources Management includes:

1. Minister of Water
2. Director of Water Resources
3. National Water Board
4. Basin Water Boards
5. Catchment and Sub-catchment Water Committees

When it comes to fulfilment of connected legal frameworks, the Act states that. "Any proposed development in a water resource area or watershed to which the Act applies, whether that development is proposed by or is to be implemented by a person or organization in the public or private sector shall carry out an Environmental Impact Assessment in accordance with the provisions of the Environmental Management Act cap 191". In this respect, then comes the Vice Presidents office with the following institutions;

- Division of Environment who coordinate environmental management activities like coordination of environmental policy and issuing environmental clearance or EIA approvals.
- National Environment Management Council (NEMC)- coordinating the Environmental Impact Assessments, Monitoring and Auditing.

Administrative Framework

The Minister responsible for Environment (VP Office) is the overall responsible for all matters relating to environment, responsible for all policy matters, necessary for the promotion, protection, and sustainable management of Environment in Tanzania.

The Director of Environment coordinates various environmental management activities being undertaken by other agencies and promotes the integration of environment consideration into policies, plans and programmes, strategies and projects.

EMA Cap 191 gives NEMC the overall responsibility of undertaking enforcement, compliance, review and monitoring of Environmental Impact Assessment.

3.5.2 Regional and District Administrative Structures

Environment at Regional and District Levels

The Regional Administration Act No. 9 of 1997 provides for Regional Commissioners to oversee Regional Secretariats, with District Commissioners directly supervising the District Councils. Local authorities oversee the local planning processes, including establishing local environmental policies.

The National Environmental Policy establishes a policy committee on Environment at Regional level chaired by the Regional Commissioner, mirrored by environmental committee at all lower levels, i.e. at the District, Division, Ward and sub-ward or "Mtaa" Councils.

Under EMA Cap 191, the Regional Secretariat is responsible for coordination for all advice on environmental management in their respective region and in liaison with the Director of Environment. At Local Government level, an Environmental Management Officer should be designated or appointed by each City, Municipal, District or Town Council. In each City or Municipality or District, Environmental Committees should be established to promote and enhance sustainable management of the Environment. The Ward Development Committee is responsible for proper management of the environment in their respective areas. The District or Municipal Council designates for each administrative area as township, ward, village, '*mtaa', 'kitongoji'* and Environmental Management Officer coordinates all functions and activities related to protection of environmental in their areas. In all levels starting at the regional level towards village level- (i.e. Kagera Region, Bukoba Municipality, Miembeni, Bilele, Bakoba, Kahororo, Kashai wards, to the lower level of sub-wards, such environmental structures are developed and the Consultants consulted and worked with the Ward Development Committee and the Village Council at the ward and village levels respectively.

4. Environmental and Social Baseline condition

4.1 Project Location:

Bukoba Municipality Council is one of the eight local authorities in Kagera region. Bukoba municipality is not only the administrative and commercial capital of Bukoba district and Kagera region as a whole, but is also a 'gateway' or linking town of Great Lakes Countries of Uganda, Kenya, Rwanda, and Burundi, by virtue of its strategic location. Bukoba Municipality is among eighteen Municipal Councils in the Country which are categorized as secondary cities. Bukoba lies between latitudes 1°6'0'' to 1°8'42'' south of the equator and longitude 31°16' to 31°18'54'' east of Greenwich. It is bordered by Lake Victoria on the east and Bukoba District council on the south, west and north.
Bukoba Municipality has a total area of 80 square kilometres whereby 22sq.km is covered by water and the remaining 58sq.km is land. The town lies at an altitude of 1150 m above sea level. Much of the town structures are at the basin surrounded by escarpments invariably decorated by coffee /banana plantations, trees and rocks.

Historical development:
Bukoba emerged as trading and commercial centre before becoming the administrative headquarters of Buhaya council which comprised of eight divisions, namely Bukoba itself, Kyamtwara, Bugabo, Kihanja, Kiziba, Missenyi, Ihangiro, and Karagwe.

Bukoba Town is among the oldest towns in the country. Its administrative authority as a Township was conferred upon by the then British Colonial Government under the Local Governance Cap 333 on the 27th June 1960. A t that time Bukoba was a small town comprising of what is now called Uzunguni in Miembeni ward, the Central Business District (CBD) and two residential neighbourhoods neighbouring the CBD called 'Uswahilini' and Nyakanyasi. The residential neighbourhoods form parts of the present Bilele and Bakoba wards.

By the time of Independence in December 1961 Bukoba town was an attractive town surrounded by homesteads under banana and coffee threes at its outskirts. There after the town expanded its administrative boundaries to meet the needs of the increasing population. This led to environmental degradation, growth of slums and deterioration of infrastructures.
As for 2005 Bukoba town council acquired the Municipal status and among the eight town councils in the country which promoted to Municipal council and both announced in the Government Gazette No.210 of 29th July, 2005.

4.2 Physical Environment

Topography
The project site is situated on a flat, marshy plain surrounded by escarpments to the North, west and south of Lake Victoria. These escarpments have been occupied by squatter settlements which continue to deteriorate the nature scenic beauty of town. Meandering of Kanoni River basin with its distributaries and the road network characterize the physiography of the town. The altitude of the town lies between 1,150m to 1,300m above sea level.

Geology and Hydrology
According to the Bukoba Strategic Urban Development Plan (BSUDP-2010), the geology of the town is predominated by the pre-Cambrian (older than 600 million years) rocks of Bukoban sedimentary system covering almost the all town. The large portion of the town (flat and low laying areas) is covered by geologically recent unconsolidated sediments and peat. The main rocks of Bukoban Sedimentary system are quartzes sandstones, shale's and phylites. The sandstones are fine to medium grained. The landscape includes Northern plateau on the

quartzes sandstones and valleys developed on shells and phylites. Alluvium of recent origin is found along the river valleys, particularly Kanoni River and Lake Victoria beaches.

Climate

Bukoba municipality enjoys an average temperature about 23°C and an average rainfall of 2000mm per year. There two rainy seasons namely February to May and September to December. Even during the dry season of January to February and June to August, there are still spells of rain which account for the secret of Bukoba being evergreen the whole year around.

Soil and Vegetation

The soil studies for Bukoba town carried out in 1997, showed that the nature and characteristics of soil in Bukoba town are determined by parent rocks or materials from which are they developed, and topographic position, climate and influence of land management. The major soils in the hilly and plateau areas of the town include: well drained, dark, reddish, brown to clay over dark red to red which thick include humid top soils have high water holding capacity. Low lying parts are characterized by sandy clay over dark sand to sandy soils along the beach and Kanoni river banks.

4.3 Biological Baseline

The vegetation of the town consists of both indigenous and exotic tree species. Indigenous tree species include:

- *Maesopsis emini* (Muhumula),
- *Markhamia spp* (Mishambya),
- Ficus spp (Murundu);
- *Erutrina Avbyssinia* (Mirinzi);
- *Musasae* (Bitoke) and
- "Migango".

Exotic tree species which have been noted to flourish well in the Municipality area are;

- *Grevellea Robusta,*
- *Pinus species,*
- *Senna spectabilis* and
- *Senna siamea*

4.4 Socio-Economic Baseline

Population

The 2012 National Population and Housing Census result indicated that the population in Bukoba municipality had reached 128,679 of whom 62,521 were men and 66,275 were women as presented by wards in table 6 below.

Table 6: Population of Bukoba Municipality by Wards in 2012

Serial No.	Ward/Shehia	Population (Number)			Average Household Size	Sex Ratio
		Total	Male	Female		
	Total	**128,796**	**62,521**	**66,275**	**3.9**	**94**
1	Hamugembe	12,906	6,116	6,790	3.5	90
2	Nshambya	9,020	4,378	4,642	4.1	94
3	Buhembe	4,042	1,938	2,104	4.4	92
4	Kahororo	6,618	3,387	3,231	4.4	105
5	Kashai	30,791	14,689	16,102	3.9	91
6	Miembeni	6,543	3,464	3,079	4.2	113
7	Bilele	5,405	2,577	2,828	3.8	91
8	Bakoba	17,474	8,481	8,993	3.9	94
9	Ijuganyondo	2,591	1,285	1,306	4.4	98
10	Kitendaguro	5,672	2,766	2,906	4.3	95
11	Kibeta	8,088	3,969	4,119	4.1	96
12	Kagondo	4,170	2,035	2,135	4.2	95
13	Nyanga	3,129	1,571	1,558	4.3	101
14	Rwamishenye	12,347	5,865	6,482	3.6	90

(Source: 2012 Population and Housing Census)

Administration and good governance

Bukoba Municipal Council consist of one division namely Rwamishenye which in turn comprises of 14 wards and 66 sub-wards 'mitaa' out of 14 wards, 8 wards are situated in the rural setting and the remaining 6 wards are located in urban proper. The municipal council is comprised of 23 councillors headed by the Lord Mayor.

Stakeholder's Participation

Stakeholders of Bukoba Municipal council includes but limited to NGO's, Religious institutions' CBO's, entrepreneurs, financial institutions, co-operative unions, media, government agencies and the community at large. Stakeholders contribute a lot in development activities and services. Some activities undertaken by these stakeholders include-

1. HIV/AIDS campaign (control program)
2. Provision of health and education services
3. Provision of agriculture inputs and extension services.
4. Environmental conservation
5. Industrial promotion
6. Income generating activities
7. Provision of water supply
8. Power supply etc.

4.4.1 Socio Economic Analysis

This section analyses the social, economic and infrastructural aspects of Bukoba municipality.

Water supply

Water services are provided by urban water authority namely Bukoba Water Supply and Sanitation (BUWASA). Bukoba Municipality has plenty of water sources such as springs, river and Lake Victoria. Currently 76% of the proper urban population is served with portable water. While in greenbelt population served is 57%.

Most of water pipes are concentrated in the town centre and only a few the sub-urban areas are connected to the main pipe water system.

Challenges

- Low coverage of water supply especially in peri-urban areas.
- Low community awareness on water and sanitation issues.
- High rate for uncounted water due to the dilapidated infrastructures.

Water and sanitation

UN-HABITAT through the Lake Victoria water and sanitation (LVWATSAN) initiative is undertaking some interventions in order to rectify the situation. The main activities are rehabilitation of pump house at Custom and Kashura tank. Other interventions are construction of public toilets at primary, secondary schools and dispensaries.

Electricity supply and energy sources

Bukoba Municipal Council receives reliable electricity from Uganda. It is important to note that Bukoba is having enough supply of electricity.

4.4.2 Social services

Education

(a) Primary Education

The Tanzania Education system is 2:7:4:2:3+, by 2011 Bukoba Municipality had a total of 33 pre-primary schools with total of 2784 pupils, out of whom 1418 were boys and 1366 are girls. The council has 35 primary schools with a total of 20,920 pupils of whom 10618 (equivalent to 50.75%) are girls and 10302 (equivalent to 49.25%), where as 12 of the said schools are privately owned and the remaining 23 are owned by the government.

There are also 3 special school for children with physical handicapped, the mentally retarded, the deaf and blind. The said schools have a total of 708 pupils, out of whom 333 are girls and 375 are boys.

(b) Primary school infrastructures

As regards to education facilities in primary school, not all schools have enough facilities as indicated in table 7 below.

Table 7: Primary Education facilities, 2010

Na.	**Facility**	**Required**	**Available**	**Shortage**
1	Classrooms	454	258	196
2	Offices	107	51	56
3	Teacher houses	464	59	405
4	Latrines	894	316	578
5	Desks	8378	5813	2565
6	Chairs	927	694	233
7	Tables	785	460	325
8	Text books	44,483	5200	239283

Source**:** Municipal Education department December 2010

Table 8: Primary Education Indicator, 2010

No	**Indicator**	**Present status**	**National target**
1.	Teachers pupil ratio	1:46	1:40
2.	Classroom pupil ratio	1:66	1:40
3.	Toilet pupil ratio (boys)	1:85	1:25
4.	Toilet pupil ratio (girls)	1:74	1:20
5.	Desk pupil ratio	1.4	1.3
6.	Text book pupil ratio	1:10	1.2

Source: Municipality Education department quarterly report 2010.

The challenges which faces education sector includes:-

- Shortage of teacher houses.
- Shortage of schools infrastructure such as classrooms, latrines, etc.
- Lack of water supply in primary schools.
- School meals
- Community contributions towards education promotion.
- Shortage of text and reference books in primary schools etc.

(c) Secondary education

Bukoba Municipality has 29 secondary schools with a total number of 6,082 students. Out of that number, 3,343 are girls and 2,739 are boys. As regards to ownership 20 schools are owned by government and 9 are privately owned.

(d) Secondary school infrastructures.

The infrastructures which are required and available in secondary schools are as follows:-

Table 9: Secondary Education facilities, 2011

No.	**Facility**	**required**	**Available**	**Shortage**
1	Classroom	149	96	78
2	Laboratories	39	10	29
3	Administrative block	15	5	10
4	Teacher houses	235	81	154
5	Latrines	254	184	70
6	Chairs	3,297	1,971	1,326
7	Tables	2,892	2,174	718

Source: municipal Education department quarterly report 2011.

(e) Other Education Institutions.

Table 10: Other Education Institutions

No.	Type	Number	Students	teachers
1	Open University (branch)	1	77	N/A
2	Vocational Training	4	52	-
3	Adult Education	16	242	14
4	Teachers Training college	1	-	-

Source: municipal Education department quarterly report 2011

Health

Bukoba Municipality has the following health facilities:-

Table 11: Number and type of health facilities

Health facility	Number	Ownership		Number of beats
		Public	Private	
Hospital	1	1	0	250
Health centre	3	2	1	25
Dispensaries	15	11	4	0
Drug/chemists	3	0	3	N/A
Medical stores	34	0	34	N/A

Source: municipal health department report, 2011.

(a) Incidence of diseases

Malaria is still the leading disease in most of people's lives followed by diarrhoea. The top ten diseases in Bukoba Municipality as were in 2010 are listed in the table below.

Table 12: Top ten diseases for 2010

No	Disease	Fatality	Deaths
1	Malaria	62,674	380
2	ARI	18,027	70
3	Intestinal worms	12,071	4
4	Diarrhoea	8,563	102
5	Skin infection	4,947	3
6	M. surgical cond.	4,669	57
7	Eye infection	4,4439	1
8	UTI	3,244	3
9	Pneumonia	2,258	66
10	Anaemia	1,119	183

Source: Municipal health department report, 2010

(b) Health indicators

Table 13: District Health indicators

No	Indicator	Rate /percentage
1	Maternal mortality rate	397/100,00
2	Infant mortality rate in health facilities	51/1,000
3	Under five mortality rate	36/1,000
4	Immunization coverage for under 1 year children	90%
5	Number of Malaria cases (OPD)	59%
6	HIV/AIDS	9%

Source: Municipal health department report, 2010

Challenges

- High maternal and infant mortality rate
- High prevalence of HIV/AIDS
- Inadequate health facilities to pregnant mothers for deliveries

Solid Waste Management

The Municipality uses its one vehicle and four tractors to collect the garbage. Solid wastes are generated mainly from households, markets, bus stand and industrial areas. The volume of solid wastes generated per day is 70 tones and average of 50% of generated solid waste is collected per day. There are 14 garbage collection points and one dumping site.

Challenges

- Inadequate working tools and safety gears**.**
- Shortage of human resources
- Un protected disposal area

Existing Liquid Waste Management and Sanitation Situation

Wastewater disposal in the municipality is currently handled by the Bukoba Municipal Council. The Municipal Council is also responsible for solid wastes collection and disposal. Bukoba town does not have a waterborne sewerage system and disposal of wastewater and excreta is based on onsite sanitation methods. Extensive use is made of cesspits, soakage pits, septic tanks and pit latrines.

The underlying soil is mainly pervious, but there are certain areas where the water table is high or rocks occurs and thus there are problems associated with using such a system.

The Municipal Health Office reported that the residents of the municipality use traditional pit latrines, VIP latrines, and septic tanks with soak away pits although no data exists in the Municipal Council to show the distribution in numbers (or percentages) of these facilities.

Household surveys done in 2009 to establish the condition of toilet facilities in the municipality show that 47 % of the total households had acceptable toilets.

Table 14: Wastewater disposal methods in Bukoba Town

Description	%
Traditional pit latrines	50
Ventilated Improved Pit (VIP) latrines	18
Septic tanks with soak aways	30
No toilets	2
Total	100

Sanitation situation in most public places is generally appealing (compared to other towns). There are several public pay toilets and bathrooms in the public places. The public toilets are owned either by the Municipal Council or by private entrepreneurs. Charges for using the toilet range from TZS 100-200.

The town lacks an open surface drainage system for storm water. In many places, direct outlets of domestic water of from residential premises are found. Due to lack of sewerage services, rivers and Lake Victoria are polluted and hence endanger the hearth of the residents.

Other sources of Energy

The main source of energy for cooking for most of households is charcoal followed by firewood which is transported from the rural districts. The main source for lighting is electricity 44%, wick lamp 32% and hurricane lamp 22%

Economic Activities

Agriculture and livestock

A substantial area of Bukoba Municipality is fully utilized for subsistence farming to enable the inhabitants to earn their living. Vanilla and coffee are the major cash crops grown in the area and banana, maize, sweet potatoes, cassava, and yams are the main food crops especially for the majority of the people in greenbelt. Dairy cattle keeping, poultry and piggery husbandry are also undertaken.

The agriculture services which are provided by the council include:-

- Extension services and advice on the modern agriculture and livestock husbandly techniques.
- Training to farmers on the theory and practice of modern agriculture and livestock keeping.
- Training of farmers on new technology in order to increase quality and production of both food and cash crops.
- Provision of curative and preventive of agriculture crops and veterinary services.

These services are provided by only five extension workers. That is livestock officers 4 and agriculture officers 3. The ratio of extension worker to farmer/livestock keepers is:

- Livestock sector=1:583
- Agriculture sector =1:9,210

  On the other there are:-
  - Livestock keepers 1,750.
  - Farmers 18,420
  - Demonstration farm 1.

Table 15: Crop production in 2010

No	Crops	Actual production (tones)	Market (sold)	Value
	Maize	2426.6	1091	381,850,000.00
	Cassava	3186	1430	786,500,000.00
	Banana	5079	708	141,600,000.00
	Beans	615	123	98,400,000.00
	Sweet potatoes	1247	249	136,950,00.00
	Coffee	338	338	253,500,000.00
	Vanilla	1.8	1.8	5,760,000.00
	Total			1,804,560,000.00

Source: Agriculture& Livestock department quarterly, 2010

Besides the above specified services rendered by the council extension officers, there are also private practitioners who provides agricultural and livestock service such as:-

- Sale of agricultural and livestock implements and inputs.
- Immunization and curative services
- Coffee processing and instant coffee manufacturing
- Purchase and processing of milk.

Table 16: Livestock statistics in 2010

Type	Available
Cattle (Exotic)	2580
Cattle (Indigenous)	1118
Goat (Exotic)	376
Goat (Indigenous)	2112
Chicken (Exotic)	14957
Chicken (indigenous)	1082
Cat	356
Dog	573
Sheep	82
Pig	493

Source: agriculture& livestock department quarterly, 2010

In the coming five years, the council will continue to implement the following agricultural and livestock targets:-

- Advisory services to farmers and livestock keepers on good faming and livestock keeping method/techniques.
- Training to farmers on modern farming and livestock keeping.
- Extension services and advice on modern agriculture and livestock husbandry techniques.
- Training of farmers on new technology in order to increase the quality and production of both food and cash crops.
- Provision of curative and preventive of agriculture crops and veterinary services.
- To collaborate with research institution (MARUKU) in order to get research services for agriculture crops and livestock diseases.

Communication transport and transportation
By virtual of its location, Bukoba municipality is a node of regional transportation network. The existing road network covers a distance of 122.910 km and it has been classified as follows:-

Table 17: Classification of roads

Type of road	Coverage (km)	Percentage
Tarmac	16.879	13.73%
Gravel	36.567	29.75%
Earth	69.455	56.51%
Total	122.901	100%

Source: Municipal Works Department 2011

Tarmac and gravel roads are in good condition. Some of earth roads are in a poor condition due to frequent heavy rainfall pattern.

There is marine service between Mwanza and Bukoba. There are also air services of light and medium craft connection Bukoba to different parts of the country. Apart from transport, there are several communication systems, such as land and mobile phones, internet/e-mail etc. undoubtedly, the presence of such communication and transport network stimulates socio-economic development in Bukoba municipality.

Fire and rescue services

Bukoba municipality also provides fire and rescue services. The municipality has four fire fighting vehicles and two fire brigades.

Public transport

Road transport

The importance of Bukoba is due to its strategic location as a node in the region transportation network. Different conveyances such as roads, air and water links Bukoba with its hinterland. The existing road network covers a distance of 117.8 km classified as presented on table 18 below.

Table 18: Classification of roads

Type of road	Coverage (km)	Percentage
Tarmac	24.1	20
Murram	41.1	35
Earth	52.6	45
Total	117.8	100

Apart from tarmac road which are in good condition, the rest of the road namely, earth roads and murram roads are in poor condition due to frequent and heavy rainfall which fall each year in Bukoba. The situation is even worse especially for the roads in the green belt.

Air transport

There are air transport services of light aircraft between Bukoba and different part of the country. 'Precision Air' is an exclusive air line operating at least two trips per day in 2010 alone, the said airtime transported 10,400 passengers.

Water transport

There are several ships and boats which sail between Bukoba and Mwanza every week. MV Victoria which in 2006 transported 65,350 passengers and 7,210 tons of cargo is the biggest and the reliable vessel in Lake Victoria.

Telecommunication

Apart from transport, there are several communication systems such as land and mobile phones, internet/e-mails etc. Undoubtedly, the presence of such communication and transport network stimulates socio-economic development in Bukoba Municipality.

Tourism

Bukoba Municipal offers very fascinating scenery and most interesting tourist attractions with rains throughout the year and the land is evergreen everywhere. Lake Victoria is the biggest and the second largest fresh water in Africa. It attracts visitors with its waves, beautiful air breeze and diversified fish varieties with the smallest sardines to the giants like Nile perch**.**

Musila isle is good camping site and provides good scenario of vegetation coverage, beautiful species of birds and rocks of different formations

Other tourist attractions in Bukoba Municipality are Kagera museum, Germany cemetery, Kyamunene waterfalls in Rubale forest, Bunena stone beach, Ntungamo caves and Gymkyana towers. According to statistics obtained from Kiroyera tours (an NGO dealing with tourism promotion) the tourist who visited Bukoba Municipality over the past five years are as follows;

Table 19: Number of tourists who visited Bukoba Municipality from 2002-2006

2002	2003	2004	2005	2006	Total
50	190	472	570	964	2,246

Source: Kiroyera tours report, 2007

Fishing

Lake Victoria is the most important fishing ground. According to available data 2010 there are about 1,000 active fishermen. Common fish species are tilapia, Nile perch, sardines and haplochrornis. Earning from fishing industry has a great potential for expansion and generating employment and income. It is also among major sources of local revenue to the council.

Challenges

- Prevalence of illegal fishing
- Water hyacinth plant and other aquatic weeds
- Lack of sufficient fishing skills and capital

Cooperatives

The cooperative sector is responsible for the education and mobilization of communities to form cooperative societies. Also it conducts inspection and offer legal and managerial advice to cooperatives so that they may discharge their functions efficiently and profitably. The ultimate goal of cooperative is to raise the economic stance of members and communities and hence leading to poverty reduction.

Table 20: Type and number of cooperative societies in 2009

Type of society	Total number	Working	Dormant
Cooperative Union (KCU)	1	1	0
Cooperative Banks (KFCB)	1	1	0
Crop societies (AMCOS)	3	3	0
SACCOS	34	34	0

Source: Cooperative annual report 2009

Commerce and trade

It is the primary responsibility of the commerce and trade section to educate entrepreneurs about the Act and procedures governing business and ensure business is conducted in accordance with legal requirements. Number of traders and their category operating in Bukoba Municipality are wholesale business 30, sub-whole business 230, and rental business 1,760. On the other hand there are 211 different businesses operating as informal sector.

Medium industries

Large and medium scale industrial development is confined to processing of coffee, fish and crop products, the following are the main industrial establishments in Municipality**.**

a. Tanganyika instant coffee -This factory is involved in hulling coffee cherries, roasting, cleaning of coffee and processing of instant coffee for local consumption and export.
b. Coffee curing factory-Bukop -The factory is involved in coffee hulling grading, and packing ready for export.
c. Amir Hamza coffee factory- The factory process and produces coffee for local consumption and export.
d. Fish processing factory export- There is one factory established in 'Nyamukazi' and is for processing fish fillet for export. The first production started in December 2004.

Small industries

Small scale industrial activities play a significant role in the Municipal economy in that it provides employment to about 5% of economically active population. These activities include carpentry brick making, masonry, tailoring, pot making, black smith's tinsmiths bicycle & automobile, while repairing.

Poverty analysis

Per capita income of Kagera region is TZS 409,822 while in Bukoba Municipality per income is 450,000.

Status of poverty in Bukoba Municipality

According to the households budget survey (HBS) which was conducted in 2002, (2012 records are not out yet) revealed that almost 50% of Bukoba urban population live below poverty line because of the following factors**:-**

- Lack of access to basic needs.
- Low incomes
- Subsistence farming
- High fertility rates (population growth is 4% per annum)
- High unemployment rate
- Lack of access to land especially for women**.**

Environmental Resources:

Land
Bukoba urban has a land area of 80 square kilometres, with a population density approaching 1,105 people per square kilometre. The land problem is aggravated by the land tenure whereby each piece of land is under customary ownership. Unplanned development is common in Bukoba.

Recreational areas
Lake Victoria landing beaches are the most important recreational areas. Other recreational facilities are Kaitaba stadium, Uhuru platform, Gymkhana grounds, Kiryoyera, Children play ground and Disco halls.

Air pollution
Air pollution is not yet a big problem in Bukoba. However with increasing number of motor vehicles and motor cycles, air pollution is expected to increase as years pass by and more motorized vehicles are purchased. Tree planting is encouraged to mitigate the threats.

Ground water and aquifers
Bukoba municipality has a raised water table with a great number of springs. There are more than 100 springs within the Municipality. Protection of these water resources is of paramount importance.

Surface water
There is inadequate drainage networking the municipality and hence great amount of runoff water. This causes soil erosion, destruction of road infrastructure and siltation of Lake Victoria**.**

Mineral resources
Mineral resource available includes sand, murram and stones which are commonly used in building industry.

Vegetation
Bukoba Municipality is greenish throughout the year. It is surrounded by planted trees and perennial crops.

Financial institution
There are five Financial Banks namely NMB, CRDB, KFCB, NBC, and POSTAL BANK. Which provide commercial and other banking services**,** other financial institutions available includes micro credits such as FINCA, PRIDE, BAYPORT, FAIDIKA, SACCOS, BUKOBA NYKORBING MORS.

Strengths, Weakness, Opportunity and Threat (SWOT) Analysis

In identifying its capacity to deliver services to the community, Bukoba municipal council applies SWOT analysis.

Strengths
- Commitment of the community in undertaking socio-economic activities.
- Good Governance in place.
- Availability of local revenue sources.
- Capacitated and motivated staff.

- Political willingness**.**

Weaknesses

- Inadequate human resource
- Lack of relevant skills
- Weak by-laws enforcement
- Lack of valid and reliable tax and levy payers data
- Ant-development traditional practices

Opportunities

- Presence of NGOs, CBOs and FBOs
- Availability of government grants
- Conducive Government Policy towards local Government reform
- Existence of development partner
- Existence of public private partnership.
- Favourable climatic condition.
- Existence of Lake Victoria.

Threats

- Unstable economy
- Political interference
- Unfavourable and other natural hazards
- Prevalence of epidemic diseases
- Increasing number of unemployed youth.
- Change of decision making approach from bottom up to top down.

Key issues

Bukoba Municipal Council has a number of key issues to be addressed under the MTEF budget as follows:-

- To address the improvement of educational infrastructure
- To address transportation infrastructure.
- To address good governance
- To address "Kilimo Kwanza" initiatives.
- To address environmental conservation and climatic change mitigation
- To address health delivery services.
- To address gender issues with emphasis on ensuring the provision of equal opportunities to men, women children and those with disabilities.
- To address the problem of HIV/AIDS
- To address the problem of corruption at all and all sectors.

5. Stakeholders Consultation and Public Involvement

5.1 Introduction

Public Participation in the initial stages of the project is of great importance particularly from the initial stages of the project preliminary design to detailed engineering design including stages of environmental assessment, scoping phase as well as preparation of the ESIA report to final stages of implementation of the proposed sewerage system.

Firstly the consultant carried out an identification of stakeholders and analysis followed by identification of the means of public involvement through considering either use of public consultation meetings, advertisements and notices, surveys, interviews and questionnaires, workshops and/or advisory groups. Each of the methods was weighed against each other to come up with the best options for public participation. Public meetings were finally chosen to be the best option for the majority of stakeholders at the project site.

The consultant conducted the public meetings which involved the necessary potential Interested and Affected Parties (I&APs). Public involvement through stakeholders' consultation achieved the following:

- a vehicle for public input and facilitated negotiated outcomes;
- it created trust and partnerships;
- negative impacts are minimized;
- positive impacts are enhanced; and
- It provided an up-front indication of issues that may prevent project continuation, that can cause costly delays at a later stage, or result in enhanced and shared benefits.

The Consultant conducted the public participation for the proposed project to involve as many potential Interested & Affected Parties as possible. Accordingly, issues arising from this public participation process will be incorporated into the subsequent reports and used in determining mitigation measures for the project.

5.2 Stakeholders Identification and Analysis

The consultants identified organization, groups and individuals considered to be regarded as "stakeholders". This identification was based on each ones roles and their relevance in the proposed sewerage system development project in Bukoba Central Business District. Some of the stakeholders such as government authorities, municipality/district level, wards and sub-ward level that might be impacted by or have interest in the project or exercise some influence on the project were predetermined as shown under each level in form of tables.

5.2.1 Authorities or Decision Makers

Table 21: Stakeholders Identification and their roles and responsibilities

Level	Institutions	Roles and responsibilities
National Level	Prime Minister´s Office Regional Administration and Local Government	- Issuing policies - Providing legal frameworks - Issuing licenses, provision of compliance - certificates - Enforcement of laws and regulations

		- Setting operational standards for effluents including wastewater - Project monitoring
	Vice Presidents Office Division of Environment and NEMC,	- Coordination of the Environmental Management Policy, Act and guidelines - Environmental Monitoring and Auditing - Advise to the government on all environmental matters
	Ministry of Water	- Parent Ministry for the Project Proponent - Issuing polices on water resources management and planning - Enforcement of laws and regulations in the water resources planning sector - Setting operational standards - Activities monitoring in planning - Providing legal frameworks in energy
	Ministry of Lands and Human Settlement Development (Sector Environmental Section)	- Authority over the national land including the project area - Authority over national wildlife resources - Enforce law and regulations in the area of influence of the project
	Occupational Safety and Health Authority (OSHA)	- Issuing certificates of compliance and Designated Authority for occupational safety issues
Regional Level	Kagera Regional Administrative Secretary	- Oversee and advise on implementation of national policies at regional level - Oversee enforcement of laws and regulations - Advice on the implementation of development projects and activities at the regional level.
	Regional Land Advisory Committee	- Overall supervision of all activities pertaining to land use in the respective in the region
Municipality Level	Municipal Director's Office	- Chief executive officer for all development activities in municipality level - Land use approval - Oversee and advice on implementation of national policies at municipal level - Oversee enforcement of laws and regulations
	BUWASA	- Project implementation - Consultation with stakeholders

		- Project monitoring and internal auditing
	Municipal Natural Resources Department (forest and Wildlife divisions	- Plan and coordination of community based natural resources - Enforcement of laws and regulations - Overseer of rights to utilize resources in the municipality
	Land and Environment	- Land use planning at municipality level - Environmental management
	Municipal Planning/Health/Community Development Departments	- Baseline data on social and economic conditions - Extension services
	Municipal Engineer	- Overseer of engineering activities in the municipality
	Municipal Environmental Management Officer	- Coordination of environmental matters at the municipal level
Ward Level	Ward Development Committees Ward Environmental Committee	- Oversee general development plans for ward level - Provide information on local conditions and extension services - Project monitoring in their area of jurisdiction
Village level	'Environmental Committee	- Oversee general development plans at village level - Provide information on local conditions and extension services in the village - Project monitoring in their area of jurisdiction

5.2.2 Developer

Level	Institution	Roles and responsibilities
National /Regional level	LVEMP II	- Facilitate EIA study - Project implementation - Project monitoring and internal auditing

5.2.3 Affected Parties (Directly and indirectly affected)

Level	Institution	Course of action
Community	Residents	- Residents at Nyanga village

Level (neighbouring facility site)		- Road side users in the project areas of which there is a nearby road used by residents which could be interfered with project development - Project Monitoring - Project beneficiaries

5.2.4 Interested Parties

Level	Institution	Roles and responsibilities
Community Level	NGOs/CBOs	- Environmental conservation groups - Social well being (SACCOS, HIV/AIDS groups - Project Monitoring - Project beneficiaries

Based on the nature of the project area, some of these stakeholders may turn out to be government employees or private persons operating within the project area.

5.3 Public Participation Process

Issues pertaining to construction of sewerage system and wastewater treatment plant project and its environmental and social consequences were first presented and later discussed with the representative of the key stakeholders, interested institutions, and residents particularly those around working or residing within the areas earmarked for project activities.

Key stakeholders were directly informed of the proposed sewerage system through physical visits in their respective areas and offices from 25th June to 29th June 2012. These offices included;

- Regional Manager-TANROADS
- Regional Manager-NHC KAGERA
- Acting Municipal Managing Director
- Municipal Planner
- Environmental Consultant BMC
- Natural Resource Officer
- Sub-Basin Water Officer
- Municipal Health Officer
- Municipal Engineer
- Laboratory Manager
- Municipal Environmental Officer

Also surrounding communities were sensitized to participate in the process through consultation meetings which were communicated to the respective communities through their Sub-wards Executive Officers who informed the communities to participate in consultation meetings. On 27th June 2012, meetings were held in Miembeni, Bilele, and Bakoba wards while in Kashai, Kahororo wards and Kifungu sub-ward, meetings were held on 29th June 2012 to discuss the proposed development. The minutes and attendances of the meetings are shown in Appendix III and IV.

Since the proposed project is to be implemented in Bukoba Central Business District (CBD) which is surrounded by business centres and offices accommodating a larger number of people, it is anticipated that there will be significant environmental and social impacts affecting various groups socially and economically. It is further anticipated that the communities will have to be protected from any negative impacts, while opportunities to be offered by the project need to be made visible to the communities. Those various groups likely to be affected by the project were consulted and closely involved in raising their concerns of the project. Pictures of public consultation meetings are presented below, from Figure 11 through to Figure. 17.

Figure 11: Consultation meeting at Bilele ward

Figure 12: Consultation meeting at Bakoba ward

Figure 13: Consultation meetings at Miembeni ward

Figure 14: Consultation meeting with the local community at Kifungu subward

Figure 15: Public consultation meeting at Kashai

Figure 16: Consultation meetings at Kahololo ward offices

Figure 17: Another cross section of the consultation meeting at Kahororo ward offices

Further to consultation meetings, various sources were used to gather more relevant information for the proposed sewerage system project. The information gathered included the following;

- Terms of Reference for the assignment.
- Preliminary Environmental Impact Assessment report carried out during the feasibility stage of this project

5.4 Concerns from Stakeholders Consultations and Public Involvement

Public participation process followed the guidelines as stipulated in the Environmental Management Act Cap 191 (No.4 of 2004), part XIV regarding Public Participation in environmental decision-making and also followed EIA and Audit Regulations during the scoping process followed by preparation of the Environmental Impact Assessment reports for the proposed sewerage system and wastewater treatment plant construction project. In order to facilitate an open and transparent process, Interested & Affected Persons were identified and informed of the proposed development when the project consultants visited the site for reconnaissance of the properties and activities taking place at the proposed site and the vicinity of the site. The comments/concerns received during all phases of environmental impacts assessment have been incorporated and are addressed in this draft ESIA Report hereunder.

5.4.1 Comments / Concerns drawn from officials.

a) Municipal Engineer

b) Most of the roads will be disturbed due to crossing but it is for the good cause
c) Currently there is waste water flowing on the side drains of the road and most of this water comes from the toilets. And overflowing septic tanks
d) Floods equally destroy our roads
e) Road fund does not want to pay for the drainage channels either in their periodic, spot or routine maintenance as they (drainage channels) are not in their routine
f) River Kanoni has the following features; there are those cultivating along the river, there are those draining wastewater to the River, there are those who dump solid waste in the River, there is soil erosion along the river, there are those who clean cars in the River and there are trees falling in the river.
g) When flooding occurs, those living closer to the River put Sand bags to stop water from flooding their area which in turn is washed away into the river!
h) Wastewater is drained into the road side storm water drainage channels and therefore it becomes difficult to maintain the channels
   1. Therefore the proposed wastewater sewerage system will improve the road environment.
   2. Storm water channels aid toilets particularly the pit latrines
   3. Cutting and disturbing the road by the sewerage system can be minimized by the mode of crossing the road- there is now horizontal directional drilling which minimized road disturbance also does not interfere with the traffic flow
   4. Market area needs special consideration as there will be three storey buildings
   5. Sewerage system construction should take note of BUWASA water supply pipes
   6. Special consideration should be given to National Housing Corporation as they intend to construct 3-storey buildings, bus stand and private developers as most of the high rise buildings are now in progress.

b) TANROADS- Regional Manager

1. TANROADS has only two main roads under its jurisdiction and these are; Kashozi Road and the road from Custom (from Bukoba Port) joining Bukoba Mutukula)
2. TANORADS have not been involved in the design of the sewerage system
3. We need to be supplied with the layout plans so that we can be able to know the expected interferences from the sewerage system and other services
4. Recommendation TANROADS can offer is to use the last end of the road reserve
5. In case of resettlement, TANROADS must be involved in the design together with the people from the Municipality to harmonize the system of infrastructures
6. On road crossing, TANOROADS shall supervise the construction works and reinstatement to be as before to ensure works are done properly all at the cost of the sewerage system project. The MOU has to be made between BUWASA and TANROADS
7. River training is required on River Kanoni to prevent further deterioration of the river banks
8. The Municipality should introduce some by-laws to prevent people from constructing near the river

c) National Housing Corporation

1. We intend to construct multi storey structures
2. On site disposal systems of almost all national Housing Corporation houses are in pathetic condition
3. The tricky part on our houses is that we have no limits on the number of occupants, therefore many people use these houses
4. Most of the houses were constructed in the 50's therefore most of the sewerage system is very old.
5. Value of land in town is quite high therefore the infrastructure to be constructed will add value to the houses
6. The present houses are old and worn out therefore there are plans that these houses will be demolished to pave the way for new houses
7. Liaise with Department of Business Development at NHC head office in Dar es Salaam for designs of Bukoba CBD.

d) Bukoba Municipal Health Officer

1. Roles of the MHO office is to ensure that liquid waste are well handled from collection to the disposal site
2. To ensure that every house has a good Water Closet
3. To ensure that on-site structures are constructed in accessible areas easy for cesspit emptiers
4. Urban/Land and Engineers must work as a team for the success of the proposed project
5. Sensitization of communities will be required to ensure that each house hold is connected to the sewerage system otherwise more diseases will be there
6. Will LVEMP II buy more cesspit emptiers?

e) KAGERA REMO– Kagera Region Environmental Management Officer

1. Problems emerge in areas where there are other infrastructures such as electricity, Telecommunication, water all in the road reserve. But the 3m of the road reserve are not adequate for all the infrastructures
2. Regional town planner and other experts at the regional level should be involved in the design
3. Most of the area near the site proposed for waste stabilization ponds is the fish breeding site. Therefore we recommend placing the ponds away from this area in order to avoid interfering with the fish breeding site.
4. Lake outfall should equally be assessed in order to safe guard the fish breeding sites.

f) Municipal Urban Planner

1. The site for installation of the sludge disposal facility at Nyanga will be added in the master plan
2. Solid waste to be extended and they secured the area
3. Revision of the master plan is in progress

4. The area for the proposed Bus stand is not in the master plan, however the revision of the master plan is in progress.

5.4.2 Comments/Concerns drawn from Public Meeting and corresponding Response

Table 22: Comment/Issue response table

a) Miembeni Ward	
Comments/Issues raised	Response
1. The project is accepted whole heartedly as it will reduce the problems in Bukoba Town	Comment noted
2. Is there a possibility of getting manure from the waste treatment plant at Kifungu	There is that possibility but it has to be tested before release for use as manure
3. We thank the team for introducing the project and we are waiting for the construction of the project	Comment noted
4. There are those people living close to the water sources. What will be the fate of these people- The answer was given by the sub-ward leader that this is a different project from the project which was recently announced regarding those who reside next the water sources	This is a different project
5. Where will wastewater be taken? To the River?	After treatment it will be discharged into Lake Victoria
6. When the sewerage system is constructed, will the septic tanks continue to be used?	The septic tank will have no use since the wastewater will be connected straight to the central sewer line
7. The member from Msira Island asked if they will equally benefit from the project.	Since the Island is far away and isolated by water it cannot benefit directly from this project through connection, however the issue will be presented to the Municipal Director for consideration if the residents can be considered for another project.
8. It is true that the wastewater from the market passes near the school and the pupils play with that wastewater. Therefore the proposed project will be of great help.	Point appreciated and shows understanding the benefits of the project
9. There are people currently discharging wastewater to the river, therefore when this sewerage system is constructed all wastewater shall be drained into this system.	Yes indeed and it will be mandatory for everybody to connect if we want to achieve the goals of safeguarding the environment of Lake Victoria
10. The sub-ward leader submitted that his area of leadership jurisdiction is on the left hand side of Pepsi up to the Kyaya area. The	Unfortunately the area being referred to is not under consideration during this phase.

water table in this area is high making it difficult for the residents to construct pit latrines! Therefore we are wondering, how will this project help us?	The project will be implemented in phases therefore it will be included in the coming phases.
11. Where will you put waste water from the prisons area?	All this waste water will be drained into the proposed sewer once constructed.
12. Once we are connected to the central sewer system, will there be one payment for connection or it will be monthly charges similar to the water supply system?	The bill is normally combined for water supply and wastewater. Once the connection fees are made there will be monthly bills to ensure sustainability of the project
13. What will you do for those who cannot afford to be connected to the system?	The assessment will be done to see those who cannot afford the system. BUWASA will handle the issue during operation
14. Most of the people are not used to this type and some are not familiar with this system! What sizes of pipes will you use to avoid blockage?	The minimum size is 110mm (4inches). Communities will be sensitized for proper use the new system
15. Those living in Pepsi and Nyamukazi areas are affected by the water from the Vicfish factory! When it rains they discharge all wastewater to the area nearby followed by the stench of rotten fish or wastewater. We reported the matter to the Engineer but nothing has been done?	The representative from the Municipal Council said that Vic fish has a good wastewater system. Follow up will be made by the Municipality authorities.
16. We request what was said here should be dealt with. We know there will be some hardships in the beginning but we will succeed as time pass by.	Comment noted
17. Since the designs are already made and you indicated that there will be a pumping station near Linas Club. That area has water and the water table is quite high. What is the rationale of placing the pump in water logged areas?	The selection of the area was based on surveys of the entire project area. The pumping station has to be located at the lowest point to allow all waste water to flow into it by gravity.
18. You should allow inspection chambers between houses otherwise there will be frequent blockages!	There are specifications for construction of the sewer system and these will guide the designer
19. Will there be any employments for the local community?	Of course, both skilled and unskilled persons will get employment
b) Bakoba Ward	
Opening remarks from the Ward Councillor: 1. The Bukoba CBD is planned for multi storey buildings, therefore the proposed project is the most important infrastructure for any developed town,	Remark noted

2. In Bakoba Ward there is a project aimed at relocating the water source for Bukoba from the present location at Custom to Bunena. The present location has a lot of waste from Bukoba port where most of the water vessels dock. Also it is close to Kanoni River which is draining all the wastewater from those without proper on-site sanitation facilities.	Comment noted
3. We thank the Government for considering to construct the sewerage system for our town,	Comment noted
4. Unfortunately we cannot avoid politics in our projects,	Politics should be for development
5. The project is good on all grounds including health, development, etc.	Yes indeed
6. Regarding compensation, whoever is interfered by the project on his/her properties, there should be fair compensation based on the cost he incurred to put an investment likely to be affected.	The compensation system follows the guidelines in the Land Acts Nos. 4 and 5 of 1999
7. We welcome the project and the compensation must be real.	As said before the compensation follows some guidelines
8. The major problem is compensation, as we draw the reference from the road from Customs. The road reserve is 60 and it is likely to affect most of the properties and so far compensation has turned out to be large.	We are dealing with the sewerage system which will be mainly placed along the road in the road reserve
9. The compensation paid is normally low and it cannot meet the current requirements. The Government should try to reduce the hardship faced by those to be compensated. The compensation should be prompt and it should not take long time.	The procedure followed is as per guidelines issued by the government and according to the law (Land Act No 4 and No 5 of 1999 and Land Acquisition Act Cap 118 R.E. 2002
10. The department of valuation has a shortage of valuation experts and there are no working tools	We will check with the Municipal Directors office for this, otherwise there are private professional Valuers who can be engaged to do the work, just in case
11. The compensation should come first	Yes that is according to the law
12. We should forget the notion that every project comes with an impact, most projects come with blessings.	Overall if you see the impacts of this project compared to the benefits. The benefits outweigh the
13. Most projects have disputes because of politics	Comment noted
14. Employment should be there for the local community not for the Chinese!	This is our wish and the contracts will stipulate so

c) Kashai Ward	
1. Kashai Ward has about 24,000 people, there are 9 sub-wards and Kashai ward is about 2/3rds of the Bukoba Municipality.	Therefore it should be given a high priority in these projects
2. Due to its size, there are areas where the cesspit emptier cannot go and they are not planned at all. This makes the on-site sanitation facilities difficult to construct and attend	The designers will visit the area and come up with the best option including demolition of some houses to cater for the system
3. The main concern is on people's properties and the compensation amount. Valuers should be keen on the exercise and the compensation amount must be matched to the cost of acquiring a new property.	There are guidelines to follow while carrying out valuation to facilitate for compensation. These guidelines come from those who enact laws in the government; therefore our members of parliament should be informed about this requirement.
4. The area in Kashai-Matopeni sub-ward is water logged therefore no one can afford to construct a permanent on-site sanitation facility! The cost of constructing onsite sanitation facility is quite high, very high! Can the project consider constructing permanent facilities in these areas?	Yes, this will be done in the second phase when the respective areas will be considered
5. The owner of the shop asked on what impact will the shop owner experience during project implementation?	Impacts to the shop owner can be in form of a reduced number of customers because in front of the shop there might be an open trench that cannot easily crossed
6. Will the proposed waste stabilization ponds at Kifungu be covered?	No these are meant to be open ponds as the bacteria use oxygen to degrade some of the waste
7. There will be unpleasant smell for those living at Kifungu, what arrangement is there for protection of these communities?	That is why there a plan of relocating all people who are in the project area to avoid such inconveniences
8. How about the mosquitoes in the calm wastewater ponds?	The ponds are constructed in such as manner that they do not become breeding sites for mosquitoes. No vegetation or trees around the ponds to ensure the surface is constantly agitating
9. The information about construction of the system should be given early so that people do not continue to construct in the area earmarked for the project	We are informed the leaders of respective areas have been notified and therefore most of the people are aware of the project.
10. How will the wastewater system be charged because the water supply kiosks have a lot of shortcomings	The wastewater charges are normally added to the water supply bill except that those not connected to water supply will get the separate bill for wastewater

	only
11. BUWASA should install water meters so that water users can pay proper water bill?	The request will be forwarded to BUWASA for action as they are the very people who will be running the Sewerage system
12. The project should not take a long time to implement and proper channels should be applied.	This according to the plan under LVEMP-II works
e) KIFUNGU- Fish Landing Site	
1. The fishing community is also in the Beach Management Unit (BMU) committee, therefore they are aware of the project	Comment noted
2. What distance is required between the wastewater facility and residential areas	The distance is a function of many aspects, you may be told the distance only to find that there are still nuisances (e.g obnoxious smell) coming your way even though you are located in safe distance
3. Where does the access road to this site pass? We want to know the area for the road.	The design shows that the existing driveway truck will be followed
4. Are there any chemicals that will be used in the waste stabilization ponds	No chemicals- the system uses natural purification processes (such as bacteria) to degrade the waste contained in the wastewater
5. The valuation for the access road is not carried out	We have been informed and will convey the message to the Municipal Council Officials
6. It is 2 years now since we were told that we are supposed to move	The project has been in planning for sometime
7. We request the assistance for supply of clean water as the water we use for domestic purposes is not safe; we use lake water for domestic use!	Comment noted and the designers will be informed of the request
8. Water hyacinth has small insects which affect us, one should investigate the effect we can suffer from these insects.	Comment noted the municipal health Office will be informed
9. The project should give us clean water for domestic use.	Comment noted and will be passed to the project proponent
10. Those who will be resettled should be given their compensation before they move.	Yes, indeed this according to the law. Most delays emanate from other sources say the authority person is on safari or attending other important government issues
11. If the project will have impacts, they should not implement it, they should consider the life of human being first	The impacts expected from the project are minimal and they have mitigation measures that can reduce these impacts.
12. What protection is there for the family	There will be sensitization of

from those who will be looking for work?	contractor's employees and also immediate local communities around the project area.
13. The area for the access road is not known, when will we know where the road passes?	The surveyors will come to demarcate the project area including access road to the waste stabilization ponds
14. When will the project start?	When the environmental permit and other design formalities are completed
15. They should start with the road first	Yes, this is very important as most of the heavy construction equipment will need to be brought to site.
f) Kahororo Ward	
Opening remarks from the Ward Councillor: Hon. Chief Karumuna. 1. BUWASA started with the valuation of the properties mainly buildings so that they can do compensation	Compensation is paid from the money collected from water supply service. Little collections cannot allow BUWASA to effect compensation entirely
2. According to BUWASA, we are aware that the modern road will be constructed from Kahororo Secondary School to Kifungu Peninsular	Comment noted and BUWASA confirmed that they had this in their plans
3. When will the project implementation start?	When all the formalities, permits and contract procedures are finalised
4. What will be the quality of the road? Gravel or Bitumen?	Gravel road passable throughout the year as it will allow BUWASA to attend the Waste Stabilization Ponds
5. We are ready for the project	Comment noted
6. The agreements were; firstly the road to the project site, the second was employment as stones, gravel and cement will be from the local communities and thirdly to undertake compensation according to the law of the land	This is according to the laid down procedures
7. BUWASA should fulfil what they promised on the access road and compensation?	Message noted and will be conveyed to BUWASA
8. Recommendation- BUWASA should compensate all the people at Kifungu who were promised to be compensated.	Comment noted and will be passed on to BUWASA

6. Identification, Assessment of Impacts and Project Alternatives

6.1 Introduction

The EIA procedure involves environmental investigation to identify main project positive and negative impacts. The analysis also needs to identify alternatives for the proposed project. Therefore, under this section, it is required that a number of possible proposals and alternatives for accomplishing the same objectives be considered. In principle, these alternatives should include an analysis of the location, timing, input and design alternatives as well as the do-nothing option.

Construction of a sewerage system which includes construction of lateral lines, collector primary and secondary sewer lines, sewage lifting stations, rising (pressure) main to the waste water treatment facility (Waste stabilization ponds in this case) and associated infrastructures, like any other development project in a busy town like Bukoba, a number of minor to major environmental impacts are likely to occur from the planned construction activities ranging from site clearance to transportation of building materials, erection, construction and operation of the sewerage system. Such potential environmental and social positive and negative impacts likely to emerge in different phases of the project are presented under this section;

6.2 Pre-construction, Planning and Design Phase

This phase will involve topographical survey and sewer route selection, identification of suitable areas for camp sites, identification of locations for pumping stations and identification of the pressure main route, geotechnical investigation, identification of sources of natural construction materials (gravel, building sand, aggregates and water) and transportation of construction equipment to site.

a) Positive Impacts

- Creation of employment opportunities

The pre-construction/planning phase creates employment opportunities to various professionals directly or indirectly linked to the project. The proposed project during this phase will create employment to the following teams

- Consulting Engineering teams for concept and design development
- Environmental and social impacts studies teams
- Building economists or Quantity Surveyors to establish quantities of construction materials and assessing project economic viability
- Surveying teams and technicians for topographical and geotechnical investigations
- Local laboratories for construction materials testing.
- Identification of locally available materials will also create employment to local people working on those borrow sites.

The preconstruction phase is envisaged to involve about 150 employees in all cadres

b) Negative Impacts

The negative impacts expected to emanate from the activities during this phase include

- Vegetation loss through clearance – the routes for sewers, site(s) for pumping station, rising pressure main to waste stabilization ponds, access road to waste stabilization

ponds, this route may follow the existing roads up to the Kigunfu area. The vegetation in most of these areas is new due to agricultural activities normally carried out every planting season therefore any disturbance to such vegetation may not be that significant.

- Temporary obstruction of access roads by topographic survey and geotechnical investigation teams.
- Soil Erosion – during geotechnical investigation soils will remain bare and in some areas the soils will become loose due to pits digging to facilitate geotechnical investigations.
- Increase in motor vehicles in the area to facilitate topographic survey and geotechnical investigation
- Noise from geotechnical investigation equipment- hydraulic augers
- Noise from transport of equipment to proposed project site.
- Likely motor accidents with pedestrians from higher speeds by drivers of the topographic and geotechnical investigation teams and transportation of construction equipment.

6.3 Mobilization Phase

- **Vegetation clearance**

Presently the proposed site for sewerage network has no vegetation but the proposed site for pumping stations, WSP and drying beds construction has some vegetation and greenery areas that blend very well with the surroundings. These vegetations will be lost and thus loosing the familiar aesthetic view of the area. Such vegetation clearance will try as much as possible to avoid indigenous species and proper consultation will determine what mitigation measures should be followed. Minimum and necessary clearance will be enforced to reduce vegetation loss.

- **Disturbances to historical and archaeological finds during site clearance**

Based on the nature of the site it is possible that scientific, historical, or archaeological interest or anything of value during excavation works may be encountered. The presence of German monuments in areas near Bukoba Club may indicate that the area may be of historical importance. In any case if this happens and the contractor discovers such finds mitigation measures include;

- **Deterioration of original land use, scenic and visual quality**

The proposed project site particularly for waste stabilization pond is designated as suitable for Wastewater treatment facilities under Bukoba Strategic Urban Development Plan land use master plan and will be consistent with the relevant provisions of the land use plans in the area around. The proposed project will involve construction of waste stabilization ponds, sludge drying beds and other ancillaries all these facilities will change the current land use, scenic and the visual quality of the area.

- **Resettlement and Disturbance to some of the Residents particularly at the area for waste stabilization ponds**

Kifungu area, the site proposed for construction of waste stabilization ponds, there are people living near or within the area earmarked for the project as shown on these pictures below.


Figure 18: Some properties within the area earmarked for construction of waste stabilization ponds

6.4 Construction Phase

- **Disturbances, particularly land scarring at borrow sites or sources of construction materials** (sand, aggregates, stones,) - Borrow materials to be used for construction of the sewerage system will be collected from sources far from the construction site. The immediate impact of borrow areas/sites is land scarring in the course of sourcing materials.

- **Nuisance from noise and vibration during construction** ,
  Noise may pose a problem to the population living or working in places next to areas to be affected by the project during construction work, especially in connections with the activities of construction of structures, relocation or interferences and transportation of fill materials as far as the area will require the use of heavy equipment and vehicles. The intensity of this impact vary according to the degree of severity or sensitivity of those affected, the most sensitive recipients to noise and vibration are schools, hospitals and residential areas. This impact would also affect other species like birds and other organism living near the quarry areas far away from the urban during quarrying and transportation of materials between the storage areas and the working areas.

- **Soil Erosion**
  Soil excavation for the construction water treatment plants and installation of sewerage system will trigger soil erosion which will affect aquatic system on the adjacent Lake Victoria. The removal of trees and other vegetation will accelerate soil erosion, which if not abated it will result into gully erosion. This could also be observed at quarry sites if quarrying activities will not be conducted properly. Soil erosion will consequently affect soil fertility which may result to poor vegetable production at Kifungu sub-ward. Excavated soil from construction sites may also be washed away as runoff if the construction activities will be carried out during rainy season. The runoff has the potential to cause siltation of the aquatic system including Lake Victoria.
  Silt particles increase the water turbidity and reduce its transparency thus causing low light penetration. This affects the photosynthetic organisms as they depend on light for

photosynthesis process. Siltation in aquatic system will therefore reduce aquatic production and it may result to mortality of the affected phytoplankton and benthic algae and other forms of life that depend on primary producers.

- **Increase in traffic levels to the surrounding area**. During construction there will be heavy duty vehicles that come to construction site to deliver various construction materials. This will increase congestion of vehicles in town roads.

- **Contamination of water from leakages of fuels and lubricants from construction equipment**
  Ground water and surface water contamination would also occur if the contractors do not follow pollution control measures. Ground water can be contaminated through leaching of contaminated soil both during construction and operation phases of the project

- **Poor air quality from dust and emissions around the construction site and material hauling routes**

  The potential impacts on air quality will be located mostly in the areas subject to excavation for trenches, pits or ponds, in the circulation area for vehicles and other equipment used at construction areas. Re-suspension of dust may occur as a result of land cleaning, demolitions, formation of pavement base and sub-base, paving and circulation of vehicles on non-paved roads, either next to the working faces or in the way to support areas. This is likely to happen when these activities are developed within relatively long time under dry weather conditions.
  Atmospheric pollution due to fuel combustion during construction may also occur as a consequence of the flow of vehicles and equipment on work, operation of industrial facilities (i.e. concrete plants) which may be implemented or outsourced to supply material inputs to the project, and due to increase of vehicular missions associated with temporary mean speed reduction on the roads directly affected and in the surrounding road network.

- **Possible injuries to neighbours from falling into trenches and open pits** for inspection chambers and pumping stations.
  Trenches have to be excavated for sewer lines, pumping station sumps, rising pressure main to ponds etc. Once these trenches are dug, pipes cannot be laid in them immediately, they have to wait to ensure that the pipes are laid in a required slope and the bed material will not consolidate or swell to change the slope of the pipe. All these activities take time and it is this duration that may pose a danger to the neighbours who may want to cross them for any reason.

- **Generation of construction solid and liquid wastes**
  Since the sewerage system involves clearing the vegetation and excavation of trenches some unexpected issues may emerge, such as encountering bad soil which is not even suitable for use in backfilling the trenches, one may also encounter collapsible soils such that timber for supporting the walls is required. All these works result into generation of

wastes in all forms (liquid or solid). These wastes will eventually need to be handled with care otherwise they can be a nuisance to the neighbours.

- **Socio-economic Impacts**

- **Spread of diseases (HIV/AIDs, STIs or STDs)** among members involved in construction - The construction site will be a place of work where job seekers and other service providers such as food vendors commonly known as "Mama Lishe" will gather for the sole purpose of work and services. Such gatherings will allow contacts that cannot be avoided.

- **Safety during Construction**

Construction of sewerage system, like any other development sites, are inherently dangerous places and safety of the people around, who may not be aware of the hazards, must be assured, particularly at the vicinity of the construction equipment such as front wheel loaders, back hoe excavators, rollers and compactors . Children and grownups are always eager to see construction equipment at work!!

- **Safety at Work Place**

All employees working on the construction site will be sensitized to use Personal Protective Equipment (PPE) when at work to avoid occupational risks. Such equipment include hard hats, ear plugs or ear muffs, dust coats or overalls, gloves, dust masks, goggles for eye protection, hard toed boots, safety harness etc.

- **Risk to life**

Once the construction site is active, there are chances that many people may come to respective places prospecting for employment. While this is their right but roaming or wandering the construction site can be dangerous to these people in case of any accident such as falling into open sewer pipe trenches.

6.5 Demobilization Phase of Construction Activities

Demobilization activities will involve activities related to completion of the construction phase of the sewerage system project and will include the following activities:

- Removal/demolition of temporary infrastructures that were installed to support the construction phase, removal of installations and equipments from the workshop and campsite
- Dismantling and transporting of equipment such as bulldozers, front wheel loaders, excavators etc
- Rehabilitation of the campsite, workshop, stockpile yard, to match the surrounding conditions of the project site
- Clearing and disposal of various waste including used hydrocarbons, sewage, solid wastes (plastics, wood, metal and plastic crates, packaging materials, papers, etc)
- Disposal of wastes to authorized dumping place

The main impact from these demobilisation activities is generation of wastes

6.6 Operation Phase

- **Poor safety of employees and neighbours from overflowing sewage in the streets**
  Poor management of sewerage system may result to sewerage overflowing which may later find its way to water sources used by residents in the proposed site. This may result into eruption of water borne diseases such as cholera. The presence of WSP may also affect the visual aesthetic value of the site off course including objectionable foul smell from wastewater draining to WSP which will eventually affect the people living near the proposed site if they will not be resettled.

- **Pollution to the nearby water sources-Lake Victoria**
  If sewerage system does not function as planned, there may be a significant impact of polluting soil and leaching to groundwater sources. Failure of WSP may also cause significant impact to Lake Victoria which is the receptor of treated water from the maturation ponds thus endangering the aquatic life and the ecosystem as whole.

Positive impacts of the proposed project

- Improved quality of health from proper management of faecal matter that would otherwise be dumped haphazardly and drain into rivers where others may become in contact.
- Improved water quality in rivers and subsequent reservoir downstream- Lake Victoria
- Increased fish catch from depleted nutrients which support the growth of water hyacinth and algae. The growth of the two plants has the tendency of depleting light and oxygen, respectively in the water bodies detrimental to the life of fish and other aquatic life.
- Employment and trading opportunities will be direct benefits to the neighbouring communities during the construction and operation phase of the project. This is likely to boost the household incomes and improve the living standards of the local community and other populations from the neighbouring and other areas.
- The government coffers will equally benefit from statutory contributions made by the contractor for his employees. Sales from construction materials will have value added tax that goes to the government.
- It is also anticipated that properly treated sludge can be re-used as fertilizer to increase agricultural productivity. The use of decomposed sludge (compost) can also minimize the use of chemical fertilizers, which are potential pollutants of Lake Victoria. Similarly, the properly treated supernatant overflow from sludge digestion process can be used for land irrigation.

6.7 Analysis of Alternatives to the Proposed Project

6.7.1 Introduction

As stated before under the introduction of section 6, the EIA procedure stipulates that the environmental impacts assessment needs to identify main project alternatives for any proposed development. Therefore, it is required that a number of possible proposals or alternatives for accomplishing the same objectives be considered. In principle, these should include an analysis of the location, timing, input and design alternative as well as the Do- Nothing option.

6.7.2 Alternative Project Location

The sewerage system construction project in Bukoba municipality is one of LVEMP II initiative to improve management of the transboundary natural resources mainly to reduce pollution of Lake Victoria by reducing discharge of untreated effluent from municipal waste through implementing off-site sanitation system. In view of the above requirement, it should be noted that during initial phases of the assessment exercise, the investigation on project site/location alternatives was limited to the earmarked existing location specifically based on municipal land use plan and its environmental implications.

Land uses adjacent to the proposed site for sewer lines are a combination of institutional and commercial buildings requiring the proposed project. Pumping stations are proposed to be constructed in the areas adjacent to the rivers to be able to drain the wastewater from the area in case of the system failure. The rising main will pass through the area mainly along the shore line of Lake Victoria crossing the recreational beach areas, airstrip, fish landing sites, temporary camps for green grasshopper "senene" and some subsistence agricultural sites for vegetables. All these areas are not marked as social and environmental sensitive areas; these areas will only receive project development impacts that can be mitigated to acceptable levels.

6.7.3 Location of Waste Water Treatment Plant (WWTP)

The WWTP is proposed to be constructed at Kifungu peninsular in the shore of lake Victoria. This is also the site which was proposed by the Feasibility Study Report, 2004.
The Environmental impacts assessment team re-evaluated the site and confirmed that site is ideal for the proposed works due to the following considerations;

- Based on the location, the site is the only technically feasible area in the municipality for construction of a WWTP. The other possible site near VIC Fish Ltd which seemed to be adequate had already been acquired by Nyanshenye Islamic Secondary School.
- According to the master plan, this is the area allocated by the municipal council for future waste water treatment works
- There might be minimal social disruption as the area is not settled, although there are temporary constructed fishing and grasshopper ("senene") catching camps.

6.7.4 Alternatives Sources for Construction Materials

Gravel, hardcore stones, aggregates and sand for construction activities will be extracted from the existing parches of rocks which are currently used as borrow sites for construction materials. No other borrow areas will be opened unless the existing ones are depleted and there is an agreement with the regional and the responsible district authorities.

Sand will equally be extracted from existing sources with adequate supply as will be determined during the detailed assessment of the project area. Water for works mainly for preparation of concrete, curing and other construction activities may be drawn from the nearby streams unless it is determined beyond doubts that the characteristics of the water and it is thus unsuitable for construction works. The samples from this nearby river will be tested for suitability.

6.7.5 Wastewater Treatment and Management Options

6.7.5.1 On-site sanitation design options (Pit latrines, Septic tank system etc)

On-site sanitation is often (and should be) the first option when considering a sanitation intervention. Such systems have very distinct advantages, not least because they are individual systems, so the disposal of faecal material is transported over a wide area, and not centralized as with a conventional sewage treatment works. One of the main disadvantages with centralized facilities is that when something goes wrong (e.g. pumps), the resulting problems can be very acute. From a health point of view, there is not much difference between any of the different options for sanitation (either on or off-site) so as long as they are all functioning properly. It is largely a question of convenience as wastes should be managed by the property owner.

6.7.5.2 Off-site sanitation (Sewerage system comprising of collectors, trunk mains, pumping stations, rising mains and waste stabilization ponds)

In an off-site sewerage system wastes are flushed off the owner's property conveniently as it gets rid of the problem from the owner's property. There are instances, however, where off-site sanitation is deemed necessary because of unsuitable ground or housing conditions for on-site systems, or because of a community's commitment to an off-site system. There is a certain amount of prestige in having an off-site connection; peer pressure is often a significant motivating force. Once the decision has been made to implement an off-site system, sewers become a necessity. Water has a large dispersion, dilution and carriage capacity, and is therefore, used as the carriage medium in most sewer systems. Usually, potable water is supplied to the house and is used for flushing toilets and as much as 40 per cent of household water is used for this purpose.

Some countries do use dual supply systems where non-potable water (often sea water) is used for toilet flushing, but such a system requires more infrastructures and has obvious capital cost implications and it is also difficult to be used to a place like Bukoba where there is no nearby seawater. Therefore, most sewer systems are heavy users of precious potable water supplies, which should be a factor when considering their implementation, especially in water-poor areas, unlike Bukoba Municipality. Regarding the nature of Central Business District the off-site sanitation system is more important instead of the current on-site sanitation system that has much health implications due to poor faecal sludge disposal. Sludge is poorly disposed due to high cost of emptying septic tanks through cesspits emptier thus wastewater is directly disposed to the nearby streams including Lake Victoria and sometimes septic tanks are emptied during rain and carried on with municipality runoff. This accelerates the increase of water borne diseases in Bukoba municipality; therefore it is recommended that sewerage system comprising of collectors, trunk mains, pumping stations, rising mains and waste stabilization ponds should be implemented rather than on site sanitation system such as pit latrines practice in such housing conditions of Central Business District. After all Bukoba has had an on-site wastewater disposal system for years and the situation is continuously getting worse.

6.7.6 Technology Alternatives

The construction technologies can only be considered in two forms namely; mechanized and labour based techniques.

Mechanisation of construction works became necessary to replace labour which was becoming ever more expensive and scarce. However, in many third world countries labour is now abundant and prepared to work for low wages. Moreover, construction equipment and some of the inputs needed to keep it working need be imported, diverting scarce foreign exchange from more vital purposes. In such circumstances it is not surprising that efforts began some twenty-five years ago to develop construction techniques more appropriate to the economic and social conditions in developing countries.

Labour-based techniques do not imply the complete elimination of machinery but rather selective replacement. Certain tasks, for example, long distance transportation of say fill material or heavy pre-cast concrete structures, compaction of the embankment of ponds are better done mechanically by trucks and compactors. Both of the latter have the advantage of being multi-use which is essential in the country where specialised equipment tends to be underused.
For other tasks, simple machines have been developed which can be used to save labour if wages or scarcity justify it.

Unfortunately, labour-based works have not had the success. Changing a well-established technology requires a multi-level approach as well as the time to learn. It cannot be done piecemeal and hurriedly. Putting aside the profound shifts in attitude which must be induced, they require extensive retraining of construction works managers and engineers and given the trend towards private sector involvement, technical and financial assistance to construction firms. These in turn can only survive if they can be guaranteed a steady flow of similar work, which can only be assured by a global approach.

Their relative simplicity permits decentralisation to local level management. However, again we are confronted with the need to train and supervise their implementation to ensure that the acquired knowledge will continue to be used after the project is over. Too often works have been carried out without adequate training and supervision and have been of poor quality. In other cases, managers and enterprises have been trained and equipped but could not continue subsequently to apply their skills and have found unemployed or bankrupt or fail to utilize available natural resources for development.

Labour-based works can be introduced within a high level commitment to privatisation, decentralisation, employment creation and poverty alleviation. Labour-based works can be powerful policy instruments to support these objectives. However, without a real rather than rhetorical commitment of government and donors they will not realise their potential.

6.8 The Do-Nothing Option

Under the No-Action Alternative, the Sewerage System in the CBD would not be constructed and operated, environmental and socio-economic impacts described in the previous section would not occur. The do-nothing alternative assumes that future developments would comply with the existing requirements for the project area, which includes increased and continuous environmental pollution especially pollution of the nearby streams, soil and water pollution including waters of Lake Victoria through open dumping of municipality wastewater. Pending the proposal of other significant development within the area, population growth and other

developmental activities that influence environmental pollution would likely continue on the same trend that currently exists which may later worsen the situation.

Based on preliminary assessment of issues, it is evident that the site in question is not located in any sensitive place as the proposed area is planned and built up area in dire need of a sewerage system as contained in Bukoba Master Plan 2020; the existing land uses adjacent to the proposed site for sewer lines are a combination of institutional and commercial buildings. Pumping stations are proposed to be constructed in the areas adjacent to the rivers. The rising main will pass through the area mainly along the shore line of Lake Victoria crossing the recreational beach areas, airstrip, fish landing sites, temporary camps for grasshoppers "senene" catching and some subsistence agricultural sites for vegetables. The plantations that exist include exotic trees such as eucalyptus and cypress. Therefore there would not be any significant loss of habitats for both common flora and fauna.

Since the earmarked area has not been protected, there might be some localized impacts, but these impacts are not of sufficient importance to stop the proposed project. Accordingly, the consideration of do-nothing option can be justifiably dismissed as an alternative for the following reasons.

- Need and desirability of the project to avert environmental pollution from open faecal sludge dumping. The current pathetic situation cannot be improved by doing nothing!
- The environmental impacts expected by the proposed project can be mitigated to acceptable / satisfactory standards and
- The potential environmental impacts will be much localized as the construction of sewerage system will not interfere with human settlement and their daily activity routine in the sub-ward.

Based on the discussion above, Environmental BENCHMARK seconds the proposal of the proponent that the proposed project on the proposed site should proceed on the conditions that proper planning is implemented and the project adheres to all proposed mitigation measures presented in this ESIA Report. The precautionary approach presented will reduce the impacts on the socio-economic systems in the project area.

7. Environmental and Social Mitigation Measures

7.1 Introduction

Construction related activities, the world over, generally cause some alteration to the biophysical and social environment. The proposed sewerage system project is not an exception as it will involve land preparation in form of vegetation clearance, excavation for trenches to lay pipes, excavation of pits to construct pumping station sumps, excavation to build waste stabilization ponds, cut and fills to construct an access road to ponds area, followed by construction of sewerage system appurtenances. In the previous section a thorough understanding of the extent of potential environmental and social impacts assessment from the proposed project has been developed and therefore effective management strategies and mitigation means are presented in this section.

The mitigation measures for the impacts likely to be caused by the proposed project will focus on key potential impacts identified in section 6 during different phases of the project development. The list of potential impacts are listed below

Pre-construction, Planning and Design Phase

- Vegetation loss through clearance
- Temporary obstruction of access roads by topographic survey and geotechnical investigation teams.
- Soil Erosion
- Disturbances from increased motor vehicles in the area to facilitate topographic survey and geotechnical investigation
- Noise from geotechnical investigation equipment- hydraulic augers
- Noise from transport of equipment to proposed project site.
- Likely motor accidents with pedestrians

Mobilization and Construction Phase

- Vegetation loss through clearance
- Disturbances to historical and archaeological finds during site clearance
- Deterioration of original land use, scenic and visual quality
- Resettlement and Disturbance to some of the Residents particularly at the area for waste stabilization ponds
- Disturbances, particularly land scarring at borrow sites or sources of construction materials
- Nuisance from noise and vibration during construction ,
- Soil Erosion
- Increase in traffic levels to the surrounding area. During construction there
- Contamination of water from leakages of fuels and lubricants from construction equipment
- Poor air quality from dust and emissions around the construction site and material hauling routes
- Possible injuries to neighbours from falling into trenches and open pits for inspection chambers.
- Generation of construction solid and liquid wastes

The construction sites will be places of work where job seekers will gather looking for employment and for those who secure jobs will be mingling with others including the

resident community. In so doing there will be some social impacts emerging as the result of socializing. These impacts will include

Socio-economic Impacts

- Spread of diseases (HIV/AIDs, STIs or STDs
- Safety during construction
- Safety at Work Place
- Risk to life
- Unruly behaviour among workers

Operation Phase

- Poor safety of employees and neighbours from overflowing sewage in the streets
- Air pollution /Obnoxious smell from the treatment plant area
- Pollution to the nearby water sources-Lake Victoria

7.2 Mitigation Measures for Negative Impacts during Pre-construction Phase

Table 23: Impacts and Mitigation measures during pre-construction phase

S/No	Impact	Mitigation measures
1.	**Vegetation loss through clearance –**	- Geotechnical Investigations and other engineering surveys will be limited to very small areas meant for receiving permanent works of the project. Therefore limit vegetation clearance to the area required for topographical survey and geotechnical investigation only. - Vegetation clearance along the access road to the wastewater treatment plant will follow the way-leave already acquired for use of the project
2	**Temporary obstruction of access roads by topographic survey and geotechnical investigation teams.**	- Signage to direct drivers to alternative free routes shall be placed at all areas or routes due to be surveyed or subjected to geotechnical investigations. - Community sensitization shall be carried out before these activities start (geotechnical investigation and topographical survey.
3	**Soil Erosion**	- Earthworks for geotechnical investigation may be carried out during the dry season to prevent soil from being washed away. - Implementation of erosion control measures on disturbed surfaces such as planting vegetation that hold soils together, terracing in steep slopes and securing the available vegetated area (surfaces not required for works shall not be disturbed)
4	**Disturbances from increased motor vehicles in the area to facilitate topographic survey and geotechnical investigation**	- allow only necessary traffic for works - Disruption of traffic movement during survey and geotechnical investigations should be minimised by introducing traffic management plan - institute speed limit (40km/hr) to all project vehicles within the project area to be surveyed and subjected to geotechnical investigations
5	**Noise from geotechnical investigation equipment- hydraulic augers**	- where the noise is from the geotechnical investigation equipment- it shall be well maintained and fitted with noise silencers such as mufflers - Noise levels should be monitored and where it happens to be higher than 85dB (A), PPE in form of ear muffs or ear plugs shall

		be provided to all those working near the equipment including the operators.
6	**Noise from transport of equipment to proposed project site.**	- These are noise for a very short duration similar to all other vehicles passing by on other activities. However efforts shall be made to ensure that the transport trucks are fitted with sound mufflers
7	**Likely motor accidents with pedestrians**	- Sensitise drivers of project vehicles to observe speed limits in all area and institute punishment to traffic rules offenders

7.3 Mitigation Measures for Negative Impacts during Mobilization and Construction Phase

Table 24: Impacts and Mitigation measures during mobilization and Construction phase

S/No	Impact	Mitigation measures
1	**Vegetation loss through clearance**	- Vegetation clearance shall be limited to the area necessary for permanent works) some trees on the edge shall be left intact - Clearance of vegetation around the sites for pumping stations shall be replaced with the natural vegetation on completion of the works
2	**Disturbances to historical and archaeological finds during site clearance**	- Notify the Engineer giving the nature and location of the findings. The Engineer will consult the National Museum. - The Contractor shall exercise necessary care so as not to damage artefacts or fossils uncovered during trench excavation operations and shall provide such cooperation and assistance as may be necessary to preserve the findings for removal or other disposition by the employer. - Where appropriate by reason of a discovery, the Engineer shall order delays in the time of performance or changes in the work, or both. If such delays, or changes or both are ordered, the time of performance and contract price shall be adjusted in accordance with the applicable clauses in the general Conditions of Contract.
3	**Deterioration of original land use, scenic and visual quality**	- Operations house at the ponds and pumping stations buildings will be designed to blend well with the surrounding buildings. - Landscaping will be carried out to match the existing surroundings.
4	**Resettlement and Disturbance to some of the Residents particularly at the area for waste stabilization ponds**	- Carry out valuation of the properties within the project areas and effect compensation
5	**Disturbances, particularly land scarring at borrow sites or sources of construction materials**	- The borrow sites are the ones used for sourcing all other construction materials for projects in Bukoba. Therefore the project will only contribute to land scarring and will not be the sole project causing this problem. - Since all the borrow areas are privately owned, the contractor employed by the Project Proponent will be buying the construction materials and thus contributing towards restoration of the borrow sites - Part of the charges for purchase of construction materials shall channelled back for the rehabilitation or reinstatement of the borrow areas.
6	**Nuisance from noise and vibration from**	- Use of properly serviced and well maintained equipment

	construction equipment	- Silencers (mufflers) to be used to minimize noise on otherwise noisy equipment such as generators and compressors - Sensitization of the adjacent communities on likely vibrations and increased noise resulting from construction activities - Where noise levels will be beyond 85dB(A), ear muffs and plugs shall be provided to all those working within the area with high noise levels
7	**Soil Erosion**	- Protection of steep slope with reinforcement - Provision of silt trap to prevent sedimentation - Construction activities especially land excavation should be carried out during dry seasons
		- Avoid excessive clearance of trees and enhance tree planting and landscaping
8	**Nuisance and inconveniences from increase in traffic levels**	- Only essential traffic will be allowed to the project area during traffic peak hours. After all Bukoba Town has not come to a stage where traffic is a problem - Sensitization of the nearby communities about the increased traffic - Materials hauling to tipping site and vice versa will be carried out during off peak periods during the day. - Alternatively finished materials such ready-made concrete, pre-cast elements or pre-assembled materials can be delivered at site when the need arises.
9	**Contamination of water from leakages of fuels and lubricants from construction equipments**	- Dripping pans to be used to contain all hydrocarbon leakages on construction equipment - Re-fuelling on designated areas - In case of hydrocarbon spills, the contaminated soils will be collected and treated to remove the hydrocarbon and prevent the hydrocarbons from being washed away in storm water to the nearby water bodies.
10	**Poor air quality from dust and emissions around the construction site and material hauling routes**	- Water sprinkling to reduce the dust at the construction sites - Use of dust masks to operators and those working in the dusty areas - Use of goggles for all operators - Construction machines/equipment will be well maintained to ensure total fuel combustion. All vehicles involved in construction works will be frequently checked and well serviced during the whole construction period so that the level of exhaust emissions is reduced - Speed of vehicles hauling construction materials shall be reduced and the construction materials will be covered with tarpaulins.
11	**Possible injuries to neighbours from falling into trenches and open pits for inspection chambers.**	- Construction sites shall be provided with barricades to protect neighbours and those passing-by
12	**Spread of diseases (HIV/AIDs, STIs or STDs)**	- Sensitization and health awareness campaigns to all involved in the project including service providers - Construction workers to undergo health screening according to the National HIV/AIDs Policy, - Project will assist the nearby health facility in sensitization of those involved in a project
13	**Poor public safety during Construction**	- Therefore the public particularly the children shall not be allowed to come closer to the swing area of excavators or other equipment at site.

		- In places where there are vehicles transporting construction materials and also at turning places towards the construction site, appropriate warning signage shall be posted.
14	**Poor Safety at Work Place**	All employees working on the construction site will be sensitized to use Personal Protective Equipment (PPE) when at work to avoid occupational risks. Such equipment include hard hats, ear plugs or ear muffs, dust coats or overalls, gloves, dust masks, goggles for eye protection, hard toed boots, safety harness etc.
15	**Risk to life**	- Sensitization and training of the surrounding communities regarding the risks associated with construction activities, - In case of trenches, and excavated sewer lines, proper barricades have to be applied to warn and protect the people of impending dangers of falling into open trenches. - Constant surveillance from security to make sure that there are no "uninvited guests" in the project area.
16	**Generation of construction solid and liquid wastes**	- Site housekeeping to minimise solid and liquid wastes generated from construction and other related activities such as food vending and petty businesses - Allocate a special area for petty business such as food stalls provided with garbage bins - Post appropriate signage such as "DO NOT LITTER" or "USITUPE TAKA" at all strategic sites. - Assign Contractor's Environmental or Safety Officer the responsibility to ensure that the surroundings are kept clean. - All excavated spoil should be well managed through levelling or tipped into low lying areas or borrow areas which are no longer useful. - Trash and waste shall be well collected and removed from the site to municipal sanitary land fill. - Consult the Municipal Council about the suitable trash/waste dumping site - The community should instruct people to stay away from scavenging at dumping sites - Solid wastes generated from land clearing shall be collected and disposed off in municipal sanitary land fill at authorised site. - Decomposable materials shall be collected and combined with city wastes to the municipal sanitary landfill; plastics and other recyclable materials will be collected and sent out for recycling

7.3 Mitigation Measures for Negative Impacts during Operation Phase

Table 25: Impacts and Mitigation Measures during operation phase

S/No	Impact	Mitigation measures
1	**Poor safety of employees and neighbours from overflowing sewage in the streets**	- Sewer pipe blockage or ruptures on the pressure main shall be monitored to avoid overflowing sewage - Safety of employees and tenants from overflowing sewage shall be ensured from proper use of Personal Protective Equipment (PPE)
2	**Air pollution /Obnoxious smell**	- Ensure that the treatment plant units are properly attended to avoid incidents such as accumulating dirt in the receiving chambers from

	from the treatment plant area	blockage of screen bars
3	**Pollution to the nearby water sources-Lake Victoria**	- Close monitoring of the facility to ensure it functions as planned, this involve water quality monitoring to the receiving bodies and to ensure facility effluent comply with the national effluent standards.

7.4 Positive Impacts and Enhancement Measures

The significant positive impacts expected from the design and construction phase of the proposed sewerage system include

- Visual enhancement of the project area
- Improved local socio-economy through supply of consumables to project personnel
- Creation of employment opportunities
- Improved government revenue in the form of taxes

7.4.1 Aesthetic Enhancement of Kifungu Peninsular and other places in town

Visual quality of the project area such as Kifungu Peninsular will completely change as the present condition is partly bushes and partly as seen on the picture below.

Figure 19: Part of Kifungu Peninsular -the area earmarked for construction of the waste stabilization ponds

7.4.2 Improved local socio-economy

Some stakeholders acknowledged that the proposed project will contribute towards improvement of the investment opportunities in Bukoba once a central sewerage system in constructed. It is not evident but there is a hidden concept that most investors were shying away from erecting multi-storey structures due to concerns of handling the resulting wastewater. Obnoxious smell from full pit latrines and overflowing sewage in some streets will become history! Some stakeholders felt that the construction of the central sewerage system will bring about, among other benefits listed during public consultations, the following socio-economic benefits.

- Employment of local workers during the construction and operation phases of the project;

- Increased business opportunities around the project site due to the presence of project workforce during construction and also during operation of the sewerage system and the treatment plant at Kifungu.

On the whole, it is anticipated that the project will improve health as most of the diseases were emanating from overflowing sewage, where children and adults were coming in contact with thus contracting all sorts of diseases.

7.4.3 Creation of Employment Opportunities

Construction and development projects, the world-over, create employment opportunities for all cadres of staff directly or indirectly linked to the project. The proposed sewerage system project, upon receipt of respective environmental permits and implementation will have directly employed as a minimum, the following groups;

- Project concept developers;
    - Environmental Impact Assessment experts;
    - Designers teams in preliminary and detailed architectural and engineering designs;
    - Supervising engineering team;
    - Contractors' staff (managerial, skilled and unskilled labour force);
    - Suppliers of plants, machinery, materials, and essential services;
    - Construction monitoring personnel from various government agencies.

7.4.4 Improved Government Revenue in Terms of Taxes

Material to be purchased and services to be provided on the proposed central sewerage system project will all be subjected to the value added tax. This evenly goes into the government coffers. Companies and employments will equally give their share to the statutory contributions to the government. Overall, this is a positive impact from the proposed project that require enhancement through respective environmental permit upon submission of this Environmental Impact Assessment.

8. Environmental and Social Management Plan

8.1 Introduction

An Environmental and Social Management Plan (ESMP) can be defined as "*an environmental and social management tool that can be used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented; and that the positive benefits of the projects are enhanced".* ESMPs are therefore important tools for ensuring that the management actions arising from Environmental Impact Assessment (EIA) processes are clearly defined and implemented through all phases of the project life cycle

The objectives of this Environmental and Social Management Plan (ESMP) are to describe;

- ✓ the legislative and administrative frameworks in the country on Environmental Impact Assessment Management,
- ✓ implementation arrangements for the ESMP,
- ✓ the environmental monitoring programme and reporting arrangements and
- ✓ Design consideration regarding environmental, health, safety and social impacts.

In Tanzania the Environmental Assessment framework is guided by the following two key national legislations:

- The Environmental Management Act (EMA) Cap 191 (No. 4 of 2004)
- The Environmental Impact Assessment and Audit Regulations, 2005

Environmental Impact Assessment of the proposed development of the sewerage system for some parts of Bukoba Municipality is like any other development projects which are under the Vice Presidents' Office, where the Minister of Environment falls. Therefore for environmental assessments including the proposed sewerage system, the main players are the following:

- Minister of Environment who approves the EIA and gives the environmental permit,
- NEMC, who arranges for EIAs, undertakes enforcement, compliance, review and monitoring of EIA.

8.2 Implementation Arrangement of the ESMP

The project proponent of the proposed sewerage system project is the Ministry of Water through its Lake Victoria Environmental Management Project (LVEMP II) who will be assisted by the design and supervision consultants. These two bodies will ensure that the contractor and sub-contractors who will win the tender for implementing the sewerage system project adhere to the laid down procedures for construction and commissioning of the sewerage system. To be able to minimize potential environmental and social negative impacts, the project will require the support of various institutions in the project area. Table 26 below outlines the actions of the ESMP. The organizational framework for the ESMP is designed to evolve as the project progresses through detailed engineering design, construction, commissioning and operation phases.

8.3 Reporting Arrangements

The Ministry of Water Environmental Section (Sector Environmental Coordinator), the and Consultant's Appointee to deal with Environmental Management will cooperate with other experts in Bukoba Municipality such as Municipal Land Officer and Municipal Environmental Management Officer to provide the Regional Environmental Management Expert (REME) under the Regional Secretariat with environmental reports of the project implementation as part of the progress reports and annual environmental monitoring reports. The Regional Environmental Management Expert is the link person between the region and the Sector

Ministry Environmental Section (Sector Environmental Coordinator) and the Director of Environment as well as the Director General of NEMC.

8.4 Cost estimates for ESMP

The costs for implementing the mitigation measures have been estimated based on previous similar projects and engineering judgment. The actual costs will be as presented by the successful contractors during bidding exercise. The priced bills of quantities for environmental and social impact mitigation measures shall be made part of the contract for these mitigation measures to be effective.

Table 26: Environmental and Social Management Plan

Pre-construction Phase							
Impact	**Management Measures**	**Responsible for mitigation**	**Time Frame**	**Target level / standard**	**Reporting to**	**Estimated Cost (USD)**	**Remarks**
Vegetation loss through clearance –	- Limit vegetation clearance to the area required for topographical survey and geotechnical investigation only. - Vegetation clearance along the access road to the wastewater treatment plant will follow the existing road already acquired for use of the project	Design Engineer	One month from start of activities	Vegetation lost in necessary areas only	Bukoba Municipal Natural Resources Offices	5,000	Part of Design engineers cost
Temporary obstruction of access roads	- Signage to direct drivers to alternative free routes away from areas subjected to geotechnical investigations. - Community sensitization	Design Engineer	At the start of the project	Ensure no complaints from road users	Bukoba Municipal Engineer	3,000	
Soil Erosion	- Earthworks for geotechnical investigation carried out during the dry season to prevent soil from being washed away. - Implementation of erosion control measures on disturbed surfaces	Design Engineer	At the start of the project	Soil erosion is controlled	Bukoba Municipal Environmental Engineer	3,000	Part of the project cost
Disturbances from traffic for topographic survey and geotechnical investigation	- allow only necessary traffic for works - Minimise disruption of traffic movement during survey and geotechnical investigations - institute speed limit (40km/hr) to all project vehicles	Design Engineer	Once every week during pre-construction	No complaints	Municipal Engineer	2,500	
Noise from geotechnical investigation equipment-hydraulic augers	- maintenance of equipment for geotechnical investigation and fitted with noise silencers such as mufflers - Noise levels should be monitored and where it happens to be higher than 85dB (A), PPE in form of ear muffs or ear	Design Engineer	Once every week	Noise within set limits	Municipal Health Officer	2,500	

	plugs.						
Noise from transport of equipment to proposed project site.	- These are noise for a very short duration similar to all other vehicles passing by on other activities. However efforts shall be made to ensure that the transport trucks are fitted with sound mufflers	Supervising Engineer / Contractor	Once every week	Noise within allowable limits (<60 dB(A)	Municipal Health Officer	1,500	Project cost
Likely motor accidents with pedestrians	- Sensitise drivers of project vehicles to observe speed limits in all area and institute punishment to traffic rules offenders	Design Engineer	Every day during investigations	No motor vehicle accidents	Traffic police in case of accidents	2,000	
Construction phase							
Impact	**Management Measures**	**Responsible for mitigation**	**Time Frame**	**Target level / standard**	**Reporting to**	**Estimated Cost (USD)**	**Remarks**
Vegetation loss through clearance	- Vegetation clearance limited to area for permanent works - Replant vegetation around the sites for pumping stations on completion of the works	Contractors	At the beginning of the project On completion of the project		Municipal Natural Resources officer	5,000	
Disturbances to historical and archaeological finds during site clearance	- Notify the Engineer giving the nature and location of the findings. The Engineer will consult the National Museum. - The Contractor shall exercise necessary care so as not to damage artefacts or fossils uncovered during trench excavation operations and shall provide such cooperation and assistance as may be necessary to preserve the findings for removal or other disposition by the employer. - Where appropriate by reason of a discovery, the Engineer shall order	Contractor	During extraction of construction materials	As set in the EMP for borrow sites	Mining License Holder	3,000	

	delays in the time of performance or changes in the work, or both. If such delays, or changes or both are ordered, the time of performance and contract price shall be adjusted in accordance with the applicable clauses in the general Conditions of Contract.						
Deterioration of original land use, scenic and visual quality	- Operations house at the ponds and pumping stations buildings will be designed to blend well with the surrounding buildings. - Landscaping will be carried out to match the existing surroundings.	Lead Consultant/ Contractor	During construction of the project	Ensure design and construction blends well with surroundings	Municipal Architect	3,400	
Resettlement and Disturbances at area for waste stabilization ponds	- Carry out valuation of the properties within the project areas and effect compensation	Project Proponent	Before the project starts	Ensure all affected personnel are compensated and leave the area before start of initial project activities.	Municipal Land Officer	56,000	Actual figures as contained in Valuation report
Disturbances, particularly land scarring at borrow sites or sources of construction materials	- Ensure old borrow sites are used for sourcing all other construction materials - Since all the borrow areas are privately owned, the contractor employed by the Project Proponent will be buying the construction materials and thus contributing towards restoration of the borrow sites - Part of the charges for purchase of construction materials shall	Contractor	During sources of construction materials	As set in the EMP for borrow pits/sites	Mining License Holder	2,500	

	channelled back for the rehabilitation or reinstatement of the borrow areas.						
Nuisance from noise and vibration from construction equipment	- Use of properly serviced and well maintained equipment - Silencers (mufflers) to be used to minimize noise - Sensitization of the adjacent communities on likely vibrations and noise from equipment - Use ear muffs and plugs where noise levels >85dB(A),	Contractor	Once every week	Noise within set limits	Municipal Health Officer	1,500	
Soil Erosion	- Protection of steep slope with reinforcement - Provision of silt trap to prevent sedimentation - Construction activities especially land excavation should be carried out during dry seasons - Avoid excessive clearance of trees and enhance tree planting and landscaping	Contractor	Measures applied as construction works proceed otherwise once every month during construction	All loose soils and bare soils protected from erosion	Municipal Natural Resources Officer	5,000	Part of the contractor BOQ
Nuisance and inconveniences from increase in traffic levels	- Traffic management plan - Sensitization of the nearby communities - Transport materials during off peak periods	Contractor	Once every week	No complaints	Municipal Engineer	2,000	
Contamination of water from leakages of fuels and lubricants from construction equipment	- Dripping pans to be used to contain all hydrocarbon leakages on construction equipment - Re-fuelling on designated areas - In case of hydrocarbon spills, the contaminated soils will be collected and treated to remove the	Contractor	Once every day	No spillage of lubricants	Municipal Environmental Officer	1,500	

	hydrocarbon and prevent the hydrocarbons from being washed away in storm water to the nearby water bodies.						
Poor air quality from dust and emissions around the construction site and material hauling routes	- Water sprinkling to reduce the dust at the construction sites - Use of dust masks to operators and those working in the dusty areas - Use of goggles for all operators - Construction machines/equipment will be well maintained to ensure total fuel combustion. All vehicles involved in construction works will be frequently checked and well serviced during the whole construction period so that the level of exhaust emissions is reduced - Speed of vehicles hauling construction materials shall be reduced and the construction materials will be covered with tarpaulins.	Contractor	Once every month	Within limits	Municipal Environmental Officer	2,500	
Possible injuries to neighbours from falling into trenches and open pits for inspection chambers.	- Construction sites shall be provided with barricades to protect neighbours and those passing-by	Supervising Engineer/ Contractor	Every day	Zero injuries	Municipal Health Officer /OSHA	3,500	

Spread of diseases (HIV/AIDs, STIs or STDs)	- Sensitization and health awareness campaigns to all involved in the project including service providers - Construction workers to undergo health screening according to the National HIV/AIDs Policy, - Project will assist the nearby health facility in sensitization of those involved in a project	Contractor	Once every week on weekends	All employees sensitized and examined	Municipal Medical Officer	20,000	Part of HIV/AIDS sensitization program
Poor public safety during Construction	- Therefore the public particularly the children shall not be allowed to come closer to the swing area of excavators or other equipment at site. - In places where there are vehicles transporting construction materials and also at turning places towards the construction site, appropriate warning signage shall be posted.	Contractor	Once every week	Zero incidents	Municipal Medical Officer/OSHA	2,500	Barricading the project areas and signage
Poor Safety at Work Place	All employees working on the construction site will be sensitized to use PPE to avoid occupational risks. Such equipment include hard hats, ear plugs or ear muffs, dust coats or overalls, gloves, dust masks, goggles for eye protection, hard toed boots, safety harness etc.	Contractor	Once every week	Zero incidents	Municipal Medical Officer/OSHA	3,500	PPE provision
Risk to life	Sensitization and training of the surrounding communities regarding the risks associated with construction activities, In case of trenches, and excavated sewer lines, proper barricades have to be applied to warn and protect the people of	Contractor	Once every week	Zero incidents	Municipal Medical Officer/OSHA	2,500	Barricading the project areas and signage

	impending dangers of falling into open trenches. Constant surveillance from security to make sure that there are no "uninvited guests" in the project area.						
Generation of construction solid and liquid wastes	- Site housekeeping to minimise solid and liquid wastes generated from construction and other related activities such as food vending and petty businesses - Allocate a special area for petty business such as food stalls provided with garbage bins - Post appropriate signage such as "DO NOT LITTER" or "USITUPE TAKA" at all strategic sites. - Assign Contractor's Environmental or Safety Officer the responsibility to ensure that the surroundings are kept clean. - All excavated spoil should be well managed through levelling or tipped into low lying areas or borrow areas which are no longer useful. - Trash and waste shall be well collected and removed from the site to municipal sanitary land fill. - Consult the Municipal Council about the suitable trash/waste dumping site - The community should instruct people to stay away from scavenging at dumping sites	Supervising Engineer. Contractor	Every day	Good house keeping	Municipal health officer	7,500	Project cost

	- Solid wastes generated from land clearing shall be collected and disposed off in municipal sanitary land fill at authorised site. - Decomposable materials shall be collected and combined with city wastes to the municipal sanitary landfill; plastics and other recyclable materials will be collected and sent out for recycling						
Total Cost for Environmental and Social Management during Construction Phase						**156,400**	
Operation phase							
Impact	**Management Measures**	**Responsible for mitigation**	**Time Frame**	**Target level / standard**	**Reporting to**	**Estimated Cost (USD)**	**Remarks**
Poor safety of employees and neighbours from overflowing sewage in the streets	- Sewer pipe blockage or ruptures on the pressure main shall be monitored to avoid overflowing sewage - Safety of employees and tenants from overflowing sewage shall be ensured from proper use of Personal Protective Equipment (PPE)	Project Operator (BUWASA)	Monthly during operation	No sewer blockage	Municipal Environmental Health Officer	2000/ month	Budget to salaries to attendants
Air pollution /Obnoxious smell from the treatment plant area and sludge	- Ensure that the treatment plant units are properly attended to avoid incidents such as accumulating dirt in the receiving chambers from blockage of screen bars - Ensure proper testing of sludge before use as for soil conditioning	Project Operator (BUWASA)	Daily during operation	Ensure normal plant smell non-objectionable	Municipal Environmental /Health Officer	1000 per month	Budget for attendant

Pollution to the nearby water sources-Lake Victoria	- Close monitoring of the facility to ensure it functions as planned, this involve water quality monitoring to the receiving bodies and to ensure facility effluent comply with the national effluent standards.	Project Operator BUWASA					
Total Budget for Environmental and Social Management during operation						**36,000**	**Total Cost for the first year**

9. Environmental and Social Monitoring Plan

9.1 Introduction

Monitoring of the sewerage system environmental related activities is the long term process that should begin at the start of the project construction and continue throughout the life of the project. Its purpose is to establish environmental benchmarks so that the nature and magnitude of anticipated environmental impacts are continually assessed. Monitoring involves the continuous or periodic review of mitigation activities to determine their effectiveness. Consequently, trends in environmental degradation or recovery can be established and previously unforeseen impacts can be identified and dealt with during the sewerage system life.

Environmental audits are also usually carried out some few years after completion of the project. These audits assess the relevance, efficiency and impact of any mitigation measures administered. The project proponent, MOW/LVEMP II in collaboration with BUWASA may initiate such audit processes to cover all its projects activities.

The sewerage system contractor should prepare an Environmental and Social Monitoring Plan which will cover the mobilization, construction, commissioning and demobilization phases of the project. Tasks to be covered and monitored during each phase are presented below.

Monitoring during Pre-construction Phase

- If appointment of the Health, Safety and Environment (HSE) Officer is carried out and carries out his/her responsibility.
- If maintenance and checking of construction equipment ready for work at site and during the actual works;
- If training and sensitization of the staff on safety aspects and environmental issues is carried out;
- If HIV/AIDS sensitization campaign have been planned and will actually be carried out;

Monitoring during Construction Phase

- If mitigation measures are implemented;
- HIV/AIDs sensitization campaigns are done in regular periods
- Occupational health and safety measures (conditions at materials storage places, borrow sites, equipment, personal protective equipment (PPE), etc,) are implemented.
  Data collection and analysis of baseline data on air and water quality, noise levels and socio-economic aspects as indicated in the EIA study are carried out

Commissioning phase

- If the sewerage system is performing as designed and constructed in term of water quality and smell around the sewerage system is within limits
- If solid and liquid wastes generated are taken care in the manner specified in the environmental management plan
- If mitigation measures are effectively mitigating the impacts identified before the project start

Demobilization phase of the Contractor

- If the resulting debris is managed in planned order

9.2 Environmental and Social Monitoring During Operation

MOW/ LVEMPII/BUWASA will be responsible for monitoring the environmental and social impacts after construction and handing over of the sewerage system project by the contractor. The Environmental Specialist at the Bukoba Municipal Office together with the Municipal Land Officer can be in-charge of the environmental and social monitoring of issues related with the sewerage system if it is meeting all the statutory requirements.

Among other things, the appointed Municipal Environmental Management Officer should deal with

- monitoring water quality from various pollutants from the sewerage system; monitoring if collector lines are functioning as required
- monitoring air pollution from the obnoxious smell at various locations including sewer manholes, pumping station and at the waste stabilization ponds
- Monitoring any nuisance from the sewage pumping stations
- environmental degradation control measures such as soil erosion;
- risk to sewage overflow from gravity sewer lines from blockages and pressure main in case there pipe rupture ;
- changes in socio-economic status;

9.3 Environmental and Social Monitoring Plan and Cost Estimates for Monitoring

Table 27: Environmental and Social Monitoring Plan

Project Phase - Pre-construction					
Impact	**Monitoring Action**	**Monitoring Frequency**	**Responsible for monitoring**	**Parameter / Target Level**	**Estimated Cost (USD)**
Vegetation loss through clearance –	Clearance limited to areas for geotechnical investigations only	Once before investigations	MoW/BUWASA	Vegetation loss Target – Only area necessary for geotechnical investigation works	500
Temporary obstruction of access roads	Traffic jam is eased at locations near investigation sites	Daily during geotechnical investigation	MoW/ BUWASA	Smooth traffic flow	300
Soil Erosion	Erosion control measures in place	Once a week during geotechnical works	MOW / BUWASA	No soil erosion	300
Disturbances from traffic for topographic survey and geotechnical investigation	Traffic jam is eased at locations near investigation site	Daily during surveys and geotechnical investigation	MOW/ BUWASA	Ordinary traffic level	400

Noise from geotechnical investigation equipment-hydraulic augers	Registered complaints	Once a week	MOW / BUWASA	Noise< 60 dB(A)	400
Noise from transport of equipment to project site.	Reported incidents	Daily during surveys and geotechnical investigations	MOW/ BUWASA	Noise< 60 dB(A)	400
Likely motor accidents with pedestrians	Traffic rules are observed	Daily and continuously during geotechnical investigation	MOW / BUWASA	Zero incidents	400

Construction Phase

Impact	Monitoring Action	Monitoring Frequency	Responsible for monitoring	Parameter / Target Level	Estimated Cost (USD)
Vegetation loss through clearance	Ensure cleared vegetation is on area to receive permanent works	Once before construction after demarcating area for permanent works	MOW/ BUWASA	Vegetation loss Target -necessary for permanent works	800
Disturbances to historical and archaeological finds during site clearance and construction	As provided for in Antiquities Act 1964, with Amendments in 1979	Once during clearance for excavation	MOW/ BUWASA	No artefacts are damaged No disturbance exerted on chance finds of archaeological discoveries	1,500
Deterioration of original land use, scenic and visual quality	Ensure construction blends well with surroundings	Once a week during construction	MOW/ BUWASA	Match new developments with surroundings	600
Resettlement and Disturbances at area for waste stabilization ponds	Ensure valuation and compensation to all PAPs	Once before start of construction of sewerage project	MOW/ BUWASA	No PAP still on site during construction	700
Disturbances, particularly land scarring at borrow sites or sources of construction materials	Ensure construction materials are from regular old borrow pits	Once during purchase of construction materials before haulage to site	MOW/ BUWASA	Materials sourced from operating borrow sites	350
Nuisance from noise and vibration from construction equipment	Registered complaints	Once a month	MOW/ BUWASA /OSHA	Noise < 60 dB(A)	350
Soil Erosion	Erosion control measures in place	Once a week during construction	MOW/ BUWASA	No soil erosion	600

Impact	Monitoring Action	Monitoring Frequency	Responsible for monitoring	Parameter / Target Level	Estimated Cost (USD)
Nuisance and inconveniences from increase in traffic levels	Traffic jam is eased at locations near construction site	Daily during construction of the sewerage system	MOW/ BUWASA	Smooth traffic flow at all construction sites particularly road crossing	400
Contamination of water from leakages of fuels and lubricants from construction equipment	Monitor soundness of equipment	Once a week during construction	MOW/ BUWASA	Ensure no leakages and spills	700
Poor air quality from dust and emissions around the construction site and material hauling routes	Ensure mitigation action are in place	Daily during construction	MOW/ BUWASA	Air Quality as per TZS4: 1979	350
Possible injuries to neighbours from falling into trenches and open pits for inspection chambers.	No open trenches that are not barricaded	Daily during construction	MOW/ BUWASA	Ensure backfilling trenches on daily basis or barricading on open trenches	1,500
Spread of diseases (HIV/AIDs, STIs or STDs)	Monitor pre-employment testing, sensitization (HIV/AIDS) education and treatment programmes	Once a month for 6 months	MOW/ BUWASA	Employees screening Target – Every employee screened and treated for ailments	3,000
Poor public safety during Construction	Ensure sensitization is carried out to neighbouring communities	Once a week during construction	MOW/ BUWASA / OSHA	No injury incidents	4,500
Poor Safety at Work Place	Monitor use of PPE Monitor use of tagging and signage	Weekly	MOW/ BUWASA	Use of PPE Target – all use PPE all places needing tags are	600
Generation of construction solid and liquid wastes	Monitor handling and removal of solid and liquid wastes from construction sites	Weekly during construction	MOW/ BUWASA	Collection of waste and trash- Ensure tidy environments	800

Operation Phase					
Impact	**Monitoring Action**	**Monitoring Frequency**	**Responsible for monitoring**	**Parameter / Target Level**	**Estimated Cost (USD)**
Poor safety of employees and neighbours from overflowing sewage in the streets	Monitor use of PPE Ensure constant surveillance of overflows	Daily	MOW/ BUWASA	Use of PPE Target – all use PPE at all places of work operation	600
Air pollution / Obnoxious smell from the treatment plant area	Monitor quality of air	Once a week during operation	MOW/BUWASA	Air Quality as per TZS4: 1979	800
Pollution to the nearby water sources-Lake Victoria	Sample and test effluent to Lake Victoria Ensure proper management of the sludge	Once a week during operation Once during desludging (every desludging)	MOW/BUWASA	Ensure Discharge limits are met Ensure sludge meets the	1,500 1,500
			Total Monitoring Cost (USD)		23,850

10 Resource Evaluation / Cost Benefit Analysis

10.1 Introduction

Resource Evaluation of Cost Benefit Analysis is a tool used either to rank projects or to choose the most appropriate project option. The ranking or decision making associated with the projects is based on the expected economic costs and benefits. The general rule is that the project should be undertaken if lifetime expected benefits exceed all expected costs mainly environmental costs.

The aim of Environmental Cost Benefit Analysis (ECBA) is to present the lifetime costs and benefits of a project as a single number that can be compared to either the interest rate prevailing or the costs and benefits to the environment. To get this indication, the stream of net benefits (benefits minus costs) is discounted.
The process of conducting the environmental cost benefit analysis involves

- Description of the project and corresponding capital costs.
- Identification of the project consequences in time frame order and obtain their monetary values.
- Determination of the type of Environmental Cost Benefit Analysis

In the following sections, the environmental cost benefit analysis of the proposed Bukoba sewerage system project is presented.

10.2 Investment Costs and Associated Environmental and Social Costs

The project preliminary investment costs to meet the design requirements up to the year 2020, are presented on table 28 below

Table 28: Project preliminary investment costs

Description	Investment Cost in USD
	2020
Civil Works	3,295,243
Pipe works	2,699,108
Electrical and Mechanical Works	297,600
Tools, plant and Equipment	18,600
Vehicles	25,000
Connections	1,021,507
Total	**7,357,060**

The project negative impacts during pre-construction, construction; commissioning and operation of the sewerage system were presented under Section 6.

In estimating the costs for each of the impacts, various known environmental and social costs valuation techniques were considered, each with its advantages and disadvantages as presented below;

1. Market Price Method – This technique estimates economic values for ecosystem products or services that are bought and sold in commercial markets. However, the market price method does not deduct the market value of other resources used to

bring ecosystem products to market, and thus may overstate benefits. Secondly, the market data are only available for a limited number of goods and services provided by an ecological resource and may not reflect the value of all productive uses of a resource. Therefore, this method was not considered as a measure for estimation of environmental and social costs in this project area. The major consideration of the project area especially Kifungu area was its nature, that it had not been a protected there are normal plants which are neither vulnerable nor in the list of endangered species. Therefore, if the Kifungu area has any ecological value, this value had been disturbed due to the use of the area for miscellaneous activities including cultivation and used as grasshopper catching camps.

2. Productivity Method – The method estimates economic values for ecosystem products or services that contribute to the production of commercially marketed goods. Since not all services may be related to the production of marketed goods then the inferred value of a particular impact may understate its true value to society. Therefore based on this limitation the method was not considered for use in estimating the environmental economic value of the proposed project area.

3. Hedonic Pricing Method – This method estimates economic values for ecosystem or environmental services that directly affect market prices of some other goods. Most commonly applied to variations in housing or residential accommodation prices that reflect the value of local environmental attributes. In other words this method uses real estate prices. The logic is that the land or house prices or rents of houses near the project area may go up or down due to their closeness to proposed project. While considering using this method, it was noted that the land value in Kifungu could not increase due to the nature of the proposed project. Nuisance from smell of waste water may significantly contribute towards reducing the value of the area. Therefore the cost considered here was a land loss towards facilitation of the project. Therefore this method was reasonably used in combination with the other methods in estimating the environmental cost of the project.

4. Travel Cost Method – The method estimates economic values associated with sites that are used for recreation. Since this sewerage system site was not used for recreation activities, then the time and travel cost expenses that people incur when visiting the site does not represent any revealed willingness to pay to come to site. The facts gathered on site demonstrated that this is not a recreational area rather it is an area used as a fish landing site and some seasonal camps for catching grasshopper 'senene', a delicacy for some of Bukoba residents. Therefore this method was also not adopted for use in this analysis.

5. Damage Cost Avoided, Replacement Cost, and Substitute Cost Methods – These methods estimate economic values based on costs of avoided damages resulting from lost ecosystem services, costs of replacing ecosystem services, or costs of providing substitute services. This method was considered for use in the evaluation of the costs for improved health of the people since the lake will not be receiving the wastewater. Also damage of the lake will be avoided as most of the wastewater will be treated in the ponds. Therefore this method was used in estimating the environmental costs emanating from this project.

6. Contingent Valuation Method – This estimates economic values for virtually any ecosystem or environmental service. The most widely used method for estimating

non-use, or "passive use" values. The method involves asking people to directly state their willingness to pay for specific environmental services or their willingness to accept compensation for destruction of the resource based on a hypothetical scenario. The difference between these two is relevant when an allocation of property rights or a redistribution of income is a project feature. Since the project land is legally owned by the Municipal Council- a government institution, the usefulness of this method seems to be of low value even though there are a few people who will be compensated to pave the way for works. However, this method was used in combination with the other methods (e.g. damage cost avoided) in the estimation of the costs of the impacts.

7. Contingent Choice Method – The method estimates economic values for virtually any environmental service. Based on asking people to make tradeoffs among sets of ecosystem or environmental services or characteristics. The method major attribute does not directly ask for willingness to pay—this is inferred from tradeoffs that include cost as an attribute. The limitations of this method include
    i. Some tradeoffs are difficult to evaluate, because they are unusual.
    ii. The respondents' behaviour underlying the results of a contingent choice study is not well understood. Respondents may resort to simplified decision rules if the choices are too complicated, which can bias the results of the statistical analysis.
    iii. When presented with a large number of trade-off questions, respondents are likely to lose interest or become frustrated.
    iv. Contingent choice may extract preferences in the form of attitudes instead of behavioural intentions.
    v. By only providing a limited number of options, the method may force respondents to make choices that they would not voluntarily make.
    vi. Contingent ranking requires more sophisticated statistical techniques to estimate willingness to pay.
    vii. Translating the answers into dollar values, may lead to greater uncertainty in the actual value that is placed on the good or service of interest.
    viii. Although contingent choice has been widely used in the field of market research, its validity and reliability for valuing non-market commodities of environment is largely untested.

    Therefore this method was also not adopted for use in this project.

8. Benefit Transfer Method – The method estimates economic values by transferring existing benefit estimates from studies already completed for another location. There was information of the similar project implemented at Mwanza but this information could not be made available at the time of the assessment. Therefore this method was equally not adopted for use in this assignment.

    Based on the combination of adopted methods the cost of these impacts (including investment, management and monitoring costs estimated under Chapter 9, all worth about less than ten million dollars as estimated below on Table 29.

Table 29: Cost estimates for Investment, Environmental and Social Impacts Mitigation measures

Item description	Unit Rate (USD)	Quantity	Total (USD)
1. Loss of vegetation through clearance at ponds area - The vegetation was in small patches but half of the whole area has been assumed to be covered with vegetation.	3,500	5.04 ha	17,640
2. Deterioration of familiar scenic and visual quality (environmental cost based on willingness to pay for loss)	1,500	5.04 ha	7,560
3. Noise and vibration (cost of PPE per person and sensitization)	50	75 people	3,750
4. Poor air quality (Cost of sprinkling per month)	2,000	6 months	12,000
5. Contamination of water (based on cost of preventing contamination – equipment service/month	500	24 months	12,000
6. Waste and trash generation (based on cost of removal and cleaning	2,000	24 months	48,000
7. Poor health and safety (based on cost of health insurance for 75 employees/year)	500	1 years insurance	37,500
8. Increased potential for accidents, construction hazards and social interractions (based on cost for signage, First Aid Kit, training and sensitization of employees/month)	3,000	12	36,000
9. Poor health standard during construction (cost based on sensitization, screening and treatment	Combined under item 8 above		
10. Safety hazards and occupational injuries at work place (Cost for PPE and Training)	200	75 employees	15,000
11. Risk to spread of diseases from newly recruited staff	Combined under item 8 above		
12. Add monitoring costs under Chapter 9			35,300
13. Add Environmental and Social Management Costs			182,400
14. Add estimated construction costs			7,357,060
Total Costs of Investment, Environmental Remedy and Avoided Costs			**7,764,210**

10.3 Lifetime Expected Benefits of the Proposed Project

Proper sanitation is a necessity for any known and developing town; otherwise the town environment we live in will not worth a name! A sewerage system is meant to convey the waste water away from the human dwellings and treat it for final disposal where there are minimum impacts to the human beings and the surrounding environment. A town like Bukoba which was built so many years ago, still misses this important infrastructure. The

existing on–site sanitation facilities in Bukoba Municipality presented under chapter 5 are the ones that have resulted into some of diseases recorded in the municipality. If the costs implication of these diseases were to be singled out over the lifetime of the project, then the reason for implementing the sewerage system project would be straight forward and evident on the table!

In Bukoba Municipality there are plans of improving the water supply. The improvement in supply of clean running water signifies the presence of wastewater and therefore without the efficient central sewerage system, the on–site sanitation facilities will not be able to cope! This will be a major factor in further spread of poverty-related waterborne diseases in the municipality and increasing air pollution from the stench of overflowing on-site sanitation facilities.

11. Decommissioning

11.1 Introduction

Decommissioning is the final phase in the life cycle of the project after sitting, design, construction, commissioning and operation. Most often, it is a process involving operations such as dismantling and demolition of the used structures, and management of resulting materials. All these activities take into account of the environmental health and safety requirements for the operating personnel, the general public and any implications to the environment.

The sewerage system is not like manufacturing facilities whereby the methods used to manufacture some products are increasingly replaced by modern technology or process! The demolition of the sewerage system after its useful life can be thought of in terms of replacement of the defective sections of sewer line, replacement of the manholes and inspection chambers, replacement of pumps and parts of the rising main to the waste stabilization ponds or repairs and maintenance of the ponds. The life span of plastic pipes and concrete structures for manholes, waste stabilization ponds and pumping can live up to 25 years or so. Therefore in this project as long as human beings are there and they continue to use water, sewerage systems will always be required. Therefore decommissioning the sewerage system is not seen as an activity which will be needed in a near future besides improvements.

Alternatively if at any time, parts of the sewerage system become obsolete, life threatening or unsafe to a state where demolition is necessary, may be to pave a way for improvement or construction of a new sewerage system project, then a new environmental impact assessment study will be required as provided for in the Environmental Management Act Cap 191.

11.2 Reinstatement

The decommissioning plan considered here will be removal of the obsolete items such as damaged plastic pipes, demolition of the manholes and inspection chambers structure, removal of concrete debris from these sewer appurtenances, replacement of the present sewer fittings and returning the area closer to the original form through planting grass and other natural vegetation to match the surroundings.

The major result of demolition for replacement of sewer lines and will be pipes and large volume of concrete debris. This debris will need to be handled through collection, loading and transportation to the final disposal site. Wastes must be disposed off according to the procedure drawn up during the replacement plan to become due about two years before the actual replacement activity. NEMC who will approve the detailed rehabilitation or replacement plan can provide further guidance on the management of the resulting waste. Disposal of all wastes must be in accordance with the "Duty of Care" and the conditions of the environmental performance bond.

11.3 Replacement or Improvement Budget

Replacement or rehabilitation of the sewerage system is envisaged to involve large sums of money. The project proponents will therefore set aside a budget estimated to about USD 8,000,000 to facilitate replacement and/or rehabilitation, reinstatement of the area to match the surroundings. The estimated budget of replacement will be raised from charges that will be set to the users of the sewerage system.

12 Summary and Conclusions

12.1 Summary

This ESIA report is intended to offer an objective assessment on the concerns that were raised during the scoping phase of the study as well as those noticed by the assessment team in the project area based on the technical expertise that lies within Environmental BENCHMARK's consultants. The purpose of this report is to identify and assess the potentially significant environmental and social issues and environmental impacts. Ultimately, the report should give NEMC and other interested stakeholders the opportunity to make an informed decision regarding the proposed sewerage system project and its various options.

The construction and operation of the proposed sewerage system can result in a variety of impacts on the natural environment as well on the neighbours in the vicinity of areas where trenches will be dug to install the sewer pipes. The issues related to the proposed sewerage system were identified with various stakeholders, discussed with the technical personnel and assessed by the ESIA consultants. Mitigation measures were listed and the possible remedial options reviewed. The issue of an alternative to proposed project was discussed as either to remain with the on-site sanitation system which involves pit latrines, septic tanks and soak away pits, under sub-section 6.3.4 for wastewater management options. Equally important, the consideration of "Do-Nothing Option" was discussed in sub-section 6. 4. The "no-project" can be justifiably dismissed as an alternative due to the need and desirability of the sewerage system. The on-site sanitation system for Bukoba municipality is in pathetic condition and it really needs uplift. It is evident that the experience gained so far from diseases outbreak and the pathetic conditions of Lake Victoria and need to safeguard it are the reasons that lead to the present proposal. If there were ready made numerical figures to know how much damage the poor on site sanitation facilities have caused, then these figures would have given the decision of getting sewerage system immediately and at any cost.

12.2 Conclusion

The findings of environmental impact assessment of the proposed sewerage system are positive overall on the health and social–economic environment of the country. However, the impact of the project on the bio-physical environment is potentially slightly negative in pre-construction, construction commissioning and operation phases of the project.

In addition to this, the environmental impacts expected from the proposed development can be mitigated to an acceptable/satisfactory standards except those associated disturbances during construction, which are rated to be of low significance. However, the impacts mentioned in here are not of sufficient importance to stop the proposed sewerage system project. The management of the identified negative impacts will require implementation of the necessary mitigation measures detailed within Section 7 of this document and in the Environmental Management Plan, EMP prepared under section 8 of this draft EIS report. With adequate management of the identified impacts, as required by the EMP, the environmental risks and impacts of the proposed project can be minimized to acceptable levels.

Furthermore, in order to ensure that the construction of this proposed development does not result in to potential negative impacts on site and in the surrounding area, a

detailed engineering design must be carried out taking into consideration of the concerns raised by the neighbours particularly on safety of the people and amicable resolve of the outstanding issues such as resettlement of those at Kifungu peninsular and compensation of those who will be affected by the access road to the waste stabilization ponds at Kifungu Peninsular. Also a Community Liaison Office (CLO) must be established and must comprise of the following key stakeholders:

- Three members of from each of the wards of the Bilele, Bakoba, Kashai, and Kahororo Wards Development Committees.
- Contractors HSE officer
- Municipal Environmental Management Officer
- BUWASA Project Administrative Officer

During construction the committee must continue to function as the key role player to ensure that the contents of the EMP are complied with. This committee will also be responsible for dealing with or addressing any issues associated with the proposed sewerage system project. The composition of the committee must be changed during operation to suit the conditions of the site based on its use and this will ensure the good co-existence of the sewerage system with the surrounding resident communities.

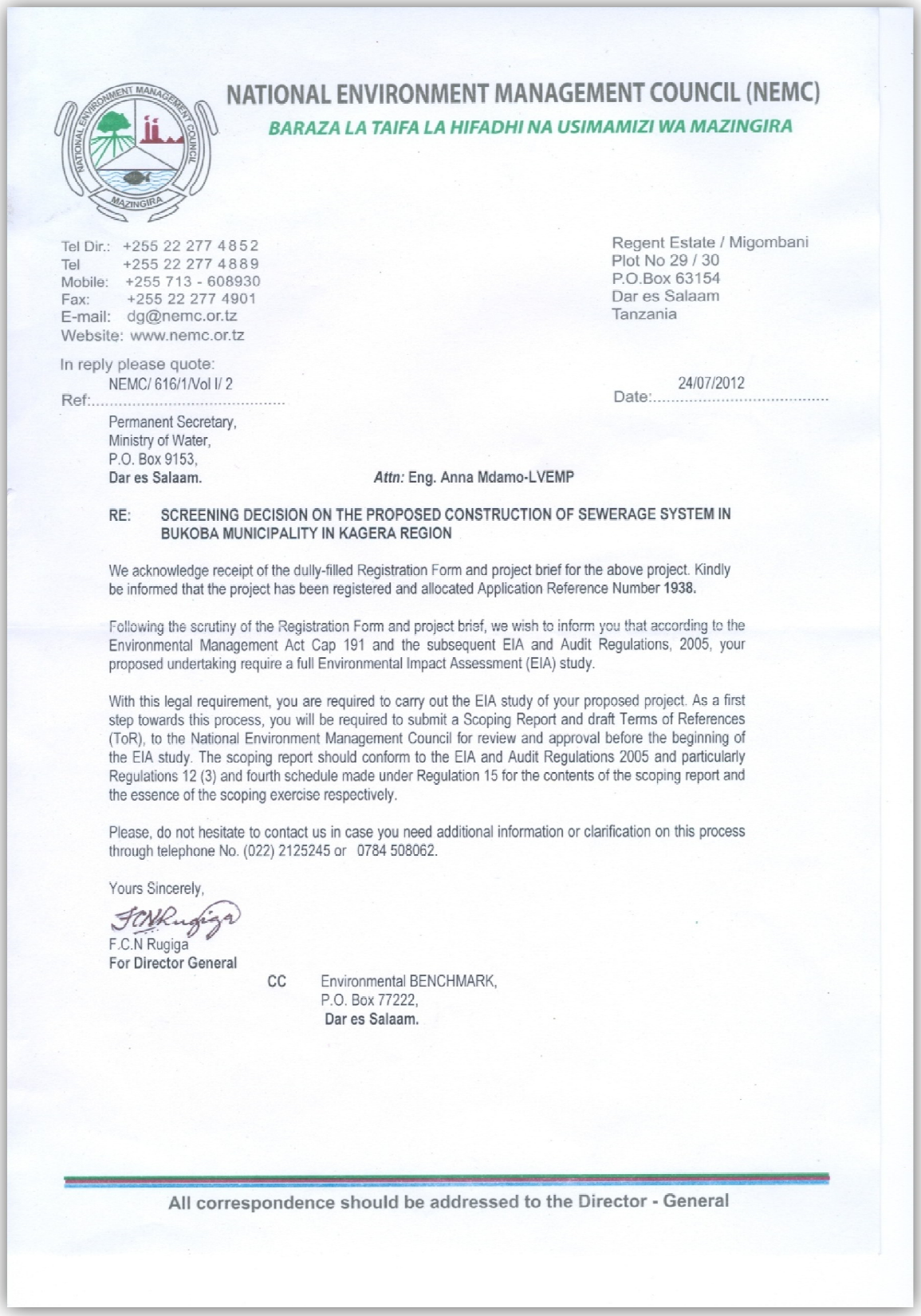
Reference Materials

1. Basel convention on the control of Trans boundary movements of Hazardous Waste and their Disposal, 1989
2. Brownlie and Willemse (1996), First Step Assessment Criteria for evaluation of Environmental Impacts,
3. DEAT (2004) Cost Benefit Analysis, Integrated Environmental Management, Information Series 8, Department of Environmental Affairs and Tourism (DEAT), Pretoria,
4. District Executive Director –Bukoba Municipal Council Profile – Bukoba Municipal Council – 2011,
5. Environmental Impact Assessment (EIA) procedures (March 2002)
6. Heinzerling & Ackerman (2002)- Pricing the Priceless: cost Benefit Analysis of Environmental Protection – Georgetown University,
7. Lusaka Agreement on cooperative enforcement operations Directed at illegal Trade in Wild Fauna and Flora (1994).
8. Nairobi Convention for the protection, management and development of the Marine and Coastal environment of Eastern African Region, 1985 and the related protocols.
9. National Bureau of Statistics; 2012 Population and Housing Census, March 2013
10. Protocol on Liability and compensation on Damage resulting from Trans boundary movement of Hazardous waste and their disposal, 2000
11. Subsidiary Legislation (Suppl. No. 16 of 4th May 2001,
12. Tanzania Bureau of Standards – National Environmental Standards Compendium (NESC),
13. The Cartagena Protocol on Bio safety to the convention on Biological Diversity (2000)
14. The convention concerning the Protection of World Cultural and Natural Heritage, Paris, (1972)
15. The Convention of Biological Diversity, (1992) ratified by Tanzania in 1996).
16. The convention of Wetlands of International Importance especially as water fowl Habitat (The Ramsar Convention) (1971) ratified by Tanzania in 1998).
17. The convention of Wetlands of International Importance especially as water fowl Habitat (The Ramsar Convention) (1971) ratified by Tanzania in 1998)
18. The convention on International Trade and Endangered species of Wild Fauna and Flora (CITES), Washington (1973)
19. The Convention on the conservation of Nature and Natural Resources, 1968 Algiers, (1968)
20. The convention on the prevention of Marine Pollution by dumping of Wastes and other wastes, London, (1972)
21. The convention on the prevention of Marine Pollution from ships (MARPOL) (1973)
22. The Convention to combat, desertification, particular Africa, Paris 1994
23. The Land Acquisition Act of 1967,
24. The Montreal protocol on substances that deplete the ozone layer, Montreal, 1987
25. The National Land Policy (1996),

26. The United Nations Framework convention on climatic change (1992)
27. UN-HABITAT (2010), Bukoba Strategic Urban Development Plan. Nairobi Kenya
28. United Nations convention on the Law of the sea, Montego Bay, (1982)
29. United Republic of Tanzania, Cultural Policy (1997)
30. United Republic of Tanzania, Environmental Impact Assessment and Audit Regulation of 2005
31. United Republic of Tanzania, Forest Act No. 14 of 2002
32. United Republic of Tanzania, Land Act Cap. 113, (No. 4 of 1999)
33. United Republic of Tanzania, Land Use Planning Act No. 6 of 2007
34. United Republic of Tanzania, National Construction Industry Policy (2003)
35. United Republic of Tanzania, The Contractors Registration Act No. 17 of 1997 R.E. 2002
36. United Republic of Tanzania, The Engineers Registration Act No.15 of 1997, R.E. 2002
37. United Republic of Tanzania, The Environment Management (Water Quality Standards) Regulations, 2007
38. United Republic of Tanzania, The Environmental Management Act (EMA), Cap 191 (No. 20 of 2004)
39. United Republic of Tanzania, The Land (Forms) Regulation 2001
40. United Republic of Tanzania, The Land Acquisition Act, Cap 118 of 2002
41. United Republic of Tanzania, The Local Government (Municipal/District) Authorities Act No. 7 of 1982
42. United Republic of Tanzania, The Mining Act No. 14 of 2010
43. United Republic of Tanzania, The National Employment Policy (1997)
44. United Republic of Tanzania, The National Environmental Policy, NEP (1997)
45. United Republic of Tanzania, The National Land Policy (1996)
46. United Republic of Tanzania, The National Policy on HIV/AIDs (2001)
47. United Republic of Tanzania, The National Water Policy (2002)
48. United Republic of Tanzania, The Occupational Health and Safety Act No. 5 of 2003
49. United Republic of Tanzania, The Public Health Act (2009)
50. United Republic of Tanzania, The Roads Act No. 13 of 2007
51. United Republic of Tanzania, The Surface and Marine Transport Regulatory Authority Act No. 9 of 2001
52. United Republic of Tanzania, The Village Land Act, Cap 114 (No. 5 of 1999)
53. United Republic of Tanzania, The Water Resources Management (Water Abstraction, Use and Discharge) Regulations, 2010
54. United Republic of Tanzania, The Water Resources Management Act No. 11 of 2009
55. United Republic of Tanzania, Water Supply and Sanitation Act No. 12 of 2009
56. United Republic of Tanzania, Wildlife Conservation Act, No. 5 of 2009
57. United Republic of Tanzania, Women and Gender Development Policy (2000)
58. United Republic of Tanzania; Protected Public Places and Recreation Areas Act No. 38 of 1969

Appendices

Appendix I: NEMC's Screening Decision



NATIONAL ENVIRONMENT MANAGEMENT COUNCIL (NEMC)

BARAZA LA TAIFA LA HIFADHI NA USIMAMIZI WA MAZINGIRA

Tel Dir.: +255 22 277 4852
Tel +255 22 277 4889
Mobile: +255 713 - 608930
Fax: +255 22 277 4901
E-mail: dg@nemc.or.tz
Website: www.nemc.or.tz

Regent Estate / Migombani
Plot No 29 / 30
P.O.Box 63154
Dar es Salaam
Tanzania

In reply please quote:
Ref: NEMC/ 616/1/Vol I/ 2

Date: 24/07/2012

Permanent Secretary,
Ministry of Water,
P.O. Box 9153,
Dar es Salaam.

Attn: **Eng. Anna Mdamo-LVEMP**

RE: SCREENING DECISION ON THE PROPOSED CONSTRUCTION OF SEWERAGE SYSTEM IN BUKOBA MUNICIPALITY IN KAGERA REGION

We acknowledge receipt of the dully-filled Registration Form and project brief for the above project. Kindly be informed that the project has been registered and allocated Application Reference Number **1938.**

Following the scrutiny of the Registration Form and project brief, we wish to inform you that according to the Environmental Management Act Cap 191 and the subsequent EIA and Audit Regulations, 2005, your proposed undertaking require a full Environmental Impact Assessment (EIA) study.

With this legal requirement, you are required to carry out the EIA study of your proposed project. As a first step towards this process, you will be required to submit a Scoping Report and draft Terms of References (ToR), to the National Environment Management Council for review and approval before the beginning of the EIA study. The scoping report should conform to the EIA and Audit Regulations 2005 and particularly Regulations 12 (3) and fourth schedule made under Regulation 15 for the contents of the scoping report and the essence of the scoping exercise respectively.

Please, do not hesitate to contact us in case you need additional information or clarification on this process through telephone No. (022) 2125245 or 0784 508062.

Yours Sincerely,

F.C.N Rugiga
For Director General

CC Environmental BENCHMARK,
P.O. Box 77222,
Dar es Salaam.

All correspondence should be addressed to the Director - General

Appendix II: Sample of copy of invitation letter to consultation meeting

Environmental BENCHMARK
Consulting Engineers
EBM
P. O. Box 77222 - Dar es Salaam
Tel : 0754 / 0784 / 0715 - 353954 & 022 2775058
E-mail: admin@environmentalbenchmark.com

Kumbu Yako: **LVEMP II WORKS**	Kumbu Yetu .: **EBM/BDC-2012/282**
Tarehe: **26 Juni 2012**	Tarehe: **26 Juni 2012**

Mkurugenzi Mtendaji
Halmashauri ya Wilaya ya Bukoba
S.L.P. 284,
Bukoba

Yahusu: Tathmini ya Athari za Miradi ya Ujenzi wa Miundombinu ya Maji Taka na Mabaki ya Maji Taka katika Manispaa ya Bukoba

Tafadhali rejea kichwa cha barua hapo juu

Wizara ya Maji kupitia katika mradi wake wa kuhifadhi Mazingira yaliyokaribu na Ziwa Viktoria inakusudia kutekeleza miradi miwili katika manispaa ya Bukoba inayohusisha ;

1. Ujenzi wa Mfumo wa Maji Taka katika mji wa Bukoba
2. Ujenzi wa Dampo la Mabaki ya Maji Taka (Sludge Disposal Facility).

Ili kufanikisha zoezi hili, Wizara ya Maji imeiteuwa kampuni ya Wahandisi Washauri wa Mazingira ya Environmental BENCHMARK ifanye tathmini ya athari za miradi hii kwa mazingira na maisha ya jamii.

Kwa barua hii tunaiomba Ofisi yako ya Manispaa ya Bukoba itutambulishe kwa watendaji wa kata za Miembeni, Bakoba, Bilele, Kahororo, Kashai, Nyanga na Nyakato ili tuweze kukutana na wadau katika maeneo husika kwa ajili ya zoezi zima la tathmini ya athari za miradi hii.

Tunategemea kufanya mikutano hiyo kama ratiba inavyoonyeshwa kwenye jedwali hapo chini

Na	Kata	Siku, Muda na Tarehe	Eneo la Mkutano
1.	Miembeni	Jumatano Saa 4 Asubuhi , Tarehe 27/06-2012	Ofisi ya Kata Miembeni
2.	Bilele	Jumatano Saa 8 Mchana, Tarehe 27/06-2012	Ofisi ya Kata – Bilele
3.	Bakoba	Jumatano Saa 10 Jioni ; Tarehe 27/06-2012	Ofisi ya Kata- Bakoba
4.	Kashai	Alhamisi Saa 4 asubuhi ; Tarehe 28/06-2012	Ofisi ya Kata - Kashai
5.	Kahororo	Alhamisi Saa 8 Mchana; Tarehe 28/06-2012	Ofisi ya Kata- Kahororo
6.	Nyanga na	Alhamisi Saa 10 Jioni; Tarehe 28/06-2012	Ofisi ya Kata - Nyanga
7.	Nyakato	Ijumaa Saa 4 Asubuhi; Tarehe 29/06-2012	Ofisi ya Kata- Nyakato

Tumepanga ratiba hii bila kuzingatia ratiba za wadau husika katika shughuli nyinginezo. Kama itawezekana mkajua utaratibu wa ratiba zao tungefurahi kupata mapendekezo ya ofisi yako kwa ajili ya mafanikio ya miradi husika.

Tunatanguliza shukrani.

Wako,

Venant RWENYAGIRA
Mkurugezi Environmental BENCHMARK- Wahandisi Washauri.

Appendix III: Officials Consulted in Bukoba

Stakeholders' Consultation for Environmental and Social Impacts Assessment for LVEMP II Works for Construction of Sludge Disposal Facility and Sewerage System in Bukoba Municipality, Kagera Region

OFFICIALS CONSULTED

NO.	DATE	NAME	POSITION	MOBILE NO./EMAIL	SIGNATURE
1.	26/6/2012	REGTORI KWELA	Dy MD	0754-358606 0767-358906	
2.	26/6/2012	MARCO R. VITTA	LAB. MANAGER	0755 929292 0784834479	
3.	26/6/2012	JOHN NDALAHWA	SUB-BASIN WATER OFFICER	0754888275 0785 339966	
4.	26/06/2012	Arch. Hamza R. Kambuga	Architect Afisa Mazingira	0784472705 hkambuga@yahoo.co.uk	
5.	28/6/12	Engr. STEPHEN NIMZIHARA	MUNICIPAL ENGINEER	0784-633252 stephenmsanga@yahoo.com	
6.	28/6/12	ENG. JOHNNY DIE KALUPALE	REGIONAL MANAGER TANROADS	0754295337 kalupale@yahoo.com	
7.	28/6/12	DAMAS NGOLYA	REGIONAL MANAGER NHC KAGERA	0754/071973 0784 dngoiya@nhctz.co.	
8.	28/6/2012	Dr. R. KIUCA	MMOH	0734 895391 raphaelkiula@yahoo.co	
9.	28.6.2012	LADISLAUS PAUL OISSO	Municipal Health Officer	0754958890 ladislausoisso@yahoo.com	
10.	27-29.6.2012	CORIN SCHWAB	Env. consultant BMC	0685 399 505 corin.schwab@interteam.ch	
11.	29/6/2012	TAFARI A. OMARI	NATURAL RESOURCE OFFICER	0787211036 0764604449 jao1709@yahoo.com	
12.	29/06/12	CATRES RWEGASIRA	MUNICIPAL PLANNER	0754623938 crwegasira2001@yahoo.com	
13.					
14.					

OFFICIALS CONSULTED

NO.	DATE	NAME	POSITION	MOBILE NO./EMAIL	SIGNATURE
1.	25/06/2018	Eng. CHAGGAKA J.A. KALIMBIA	MD	0787860591 0784860591 buwasabukoba@yaho.com	
2.	11	CHARLES M. CHIBUGA	O&M Engineer	0754-513364 chibuga1@yahoo.com	
3.	26/4/20	ENG. PHILBERT ISHENGOMA	NCTA(T2)	UN-HABITAT	
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					

Appendix IV: Attendance and Minutes for public meetings

Miembeni Ward Attendance

MAHUDHURIO KATA YA MIEMBENI

NA	TAREHE	JINA	MTAA	SAHIHI
1	27/6/2012	WILSON BARUTI	MIEMBENI	
2	27/6/2012	GERMANICUS EUSEBIUS	MIEMBENI	
3	27/6/2012	PASCHAL GIZO	MIEMBENI	
4	27/6/2012	EVELIUS -LYMO	MHEMBE	
5	27/6/2012	HOSSEIN ABDALA	MIE MBEN	
6	27/6/2012	Corin Schwab	BMC	
7	27/06/2012	Arch. Hamza R. Kambuga	BMC	
8	27/06/2012	REVERIAN J. KAZIHURA	WEO	
9	27/06/2012	JACKSON NAMALA		
10	27/06/2012	INOCENT E BANYENZA	MIHEMBENI	
11	〃	JULIANA K. MELLO	JAMHURI	
12	〃	VENANTI GODFREY	JAMURI	
13	27-6-2012	PUBLIUS O. MUGASHWA	MJUMBE MIAM	
14	27-6-2012	CHARLES POLEDOLE	〃	
15	27-6-2012	YUSUFU ABDALLAH	MJUMBE-PEMA	
16	〃	S.P. LUBAYA	B/AFMA	
17	27/06/2012	HILDA F. NDIHUNGILAHI	M.E.O	
18	27/06/2012	GODWINI LASA		
19	27-6-2012	EVORD R. BARNABA	PWANI	
20	27/06/2012	GODWIN M. JOHN	JAMHURI	
21	27/06/2012	JESCA KASENENE	JAMHURI	
22	27/6/2012	LEONIDAS MUGASHE	M/MASENA	
23	27/06/2012	AMINA ABAS	MKAZI	

1/2

MAHUDHURIO – KATA YA MIEMBENI

NA	TAREHE	JINA	MTAA	SAHIHI
24	27/6/2012	DAUDI KAIJAGE	JAMHURI	Daudi
25	27/6/12.	RASHID MFURUKI	MWBNI	
26	276/12	DOMINA BARIFAZAL	PWANI	Domina
27	27/06/2012	Zawadi Nkunga	Jamhuri	
28.	27/06/2012	Nadina Warini	"	M. Warini.
29	27/06/2012	ABDULLAH KAZUMUNA	"	
30.	27/06/2012	Zaina ABBAS	Jamhuri	ABBAS

2/2

Miembeni Ward Minutes of the Consultation meeting

KIKAO CHA MRADI WA MIFEREJI WA MAJITAKA

1. MRADI WA MAJI MACHAFU – KUJENGA MIFEREJI
2. MRADI WA MAJI TAKA

KATA YA MIEMBENI

(1) KIKAO KIMEFUNGULIWA.
(2) UTAMBULISHO
(3) MRADI WA MAJI MACHAFU
(4) MRADI WA MAJI TAKA
(5) KUFUNGA KIKAO

Mwenyekiti amefungua kikao kwa kuwakaribisha wajumbe waliohudhuria kikao kisha akaanzisha utambulisho.
Kikao kimefunguliwa rasmi Mnamo wa Saa 4.00 Asubuhi.
Kikao kimefunguliwa rasmi.
UTAMBULISHO: Kila mmoja amejitambulisha na Mahudhurio yapo waliohudhuria ni watu therasini (30).
MRADI WA MAJI TAKA: Mwezeshaji Ameelezea juu ya Madhara ya Mradi wa Maji taka: Kujenga mifereji ya kutunza maji machafu kwa kuweka dawa ya kuzuia vijidudu.
Anaweza kuonyesha michoro ya Mifereji ya Maji machafu.

Ametaja kata ambazo zitaweza Kutengeneza Mifereji Ni kata ya Miembeni, Bilele zitakuwa ni kata za mjini kwanza ndizo zimepewa kipaumbele.

Mradi unaokusudiwa kujengwa una athari mbalimbali ambazo ni chanya na Hasi.

Kwa nyumba ambazo zitapitiwa kujenga Mifereji hiyo watafidiwa. Mkandarasi atapitia kupima na watajulishwa.

Ajira chanya - kupata kipato kwa vijana

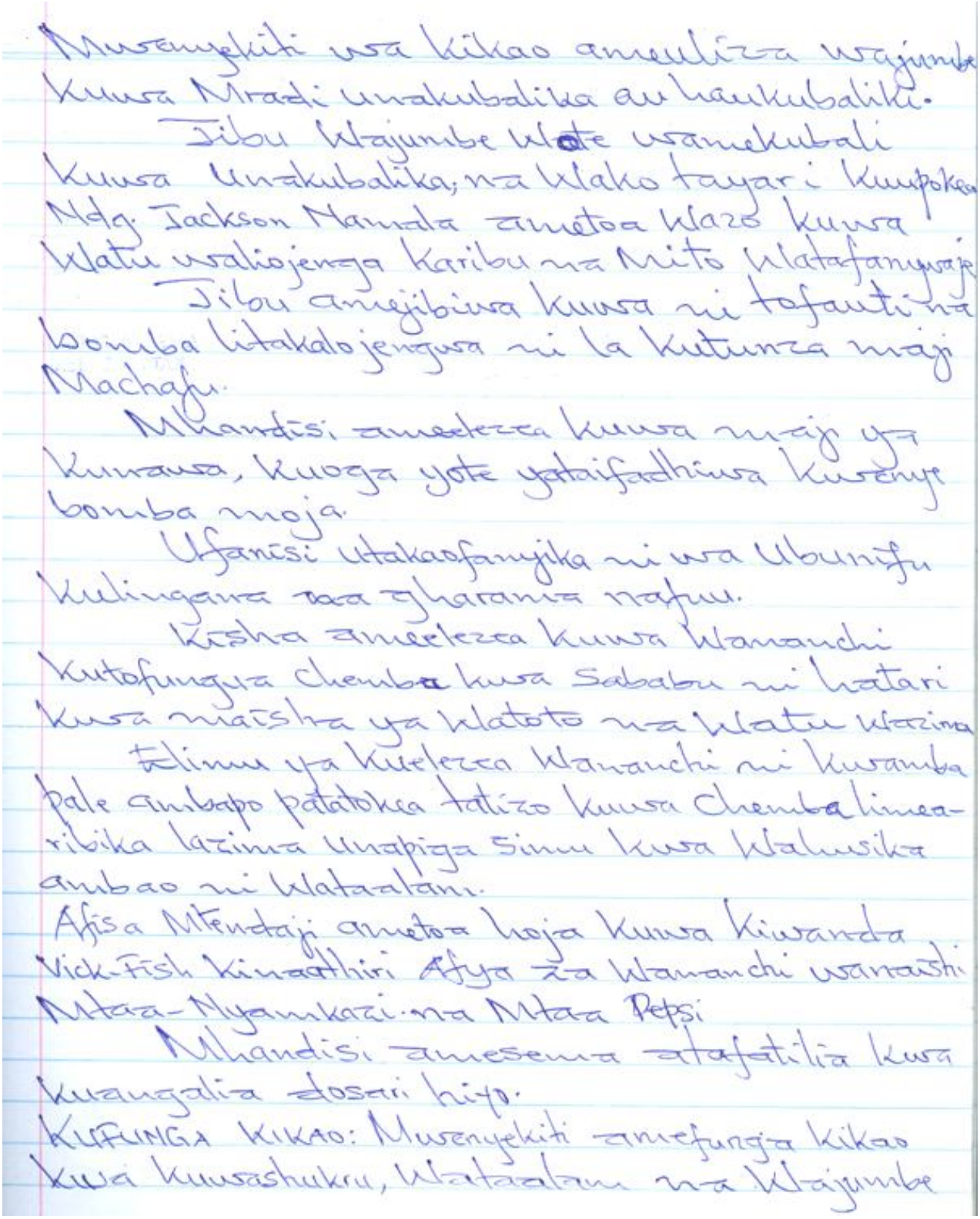
Ufafanuzi: Mradi wa Majitaka na Mradi wa Maji Machafu vyote vinafanana.

Mhandisi ambaye pia ni Afisa Mazingira wa Manispaa:

Ameeleza kwa bomba la kuifadhi Maji Machafu litaelekea kyakairabwa na Kahororo

Ameeleza kwa Mwananchi atalipia gharama za kufunga kutoka kwake. Ameeleza athari Hasi, ambazo wananchi kutobisha choo kwenye mito na kwa babisha Magugumaji kuota kwa wingi.

Afisa Mazingira amechangia hoja kwa mji wa Bukoba unazidi kukua sana na watu watanufaika na Mradi huu.



Mwenyekiti wa kikao ameuliza wajumbe kuwa Mradi unakubalika au haukubaliki.

Jibu Wajumbe wote wameukubali kuwa Unakubalika, na Wako tayari kumpokea Ndg. Jackson Nanala ametoa Wazo kuwa Watu wasiojenga Karibu na Mito Watafanywaje

Jibu amejibiwa kuwa ni tofauti na bomba litakalojengwa ni la kutunza maji Machafu.

Mhandisi, ameeleza kuwa mradi ya kuwawa, kuoga yote yatafadhiwa kwenye bomba moja.

Ufanisi utakaofanyika ni wa Ubunifu kulingana na gharama nafuu.

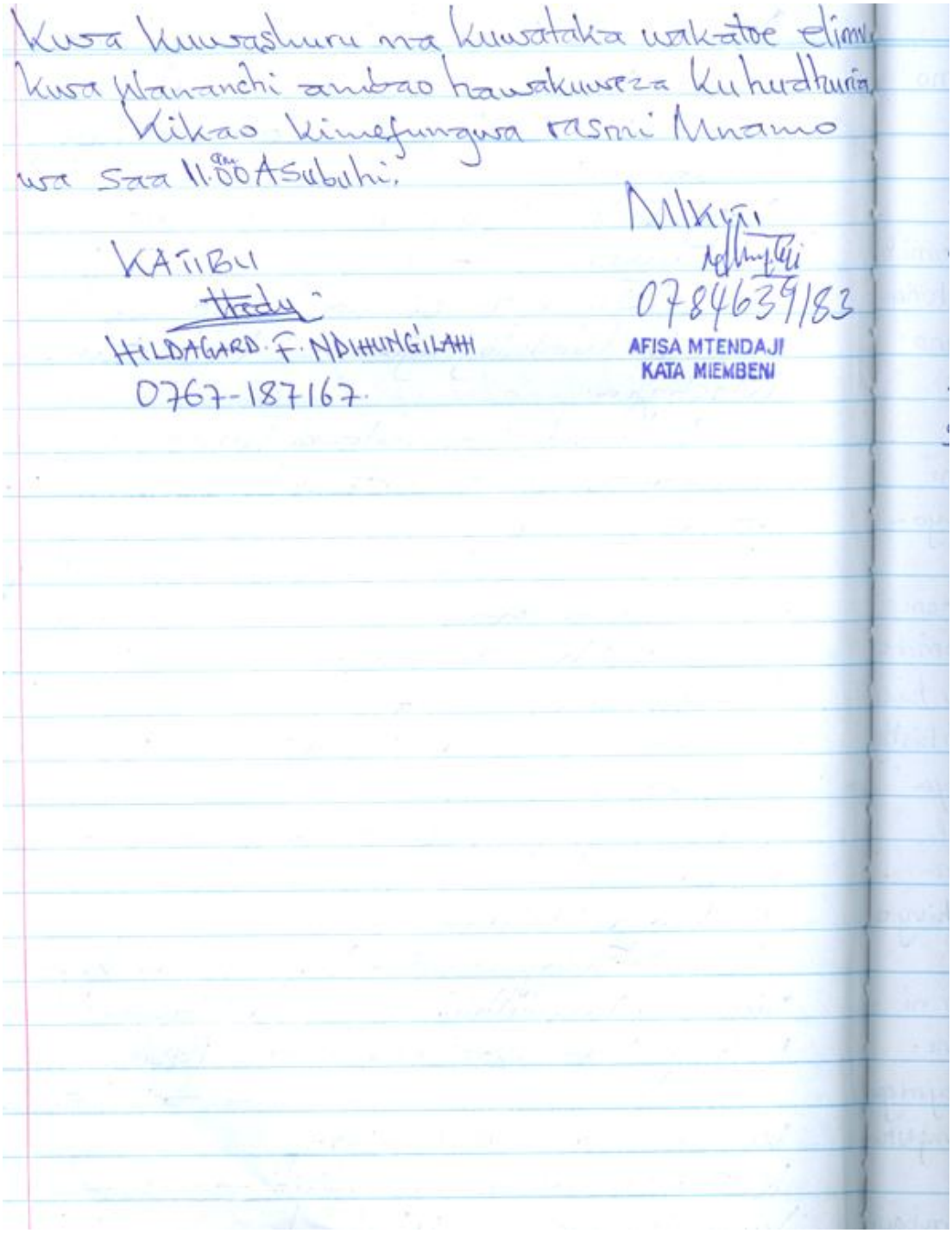
Kisha ameeleza kuwa Wananchi kutofungua Chemba kwa Sababu ni hatari kwa maisha ya Watoto na Watu wazima

Elimu ya kueleza Wananchi ni kwamba pale ambapo patatokea tatizo kuwa Chemba limearibika lazima Unapiga Simu kwa Wahusika anbao ni Wataalam.

Afisa Mtendaji ametoa hoja kuwa Kiwanda Vick-Fish Kinaathiri Afya za Wananchi wanaishi Mtaa-Nyamkazi na Mtaa Pepsi

Mhandisi amesema atafatilia kwa kuangalia dosari hiyo.

KUFUNGA KIKAO: Mwenyekiti amefunga kikao kwa kuwashukuru, Wataalam na Wajumbe


Kwa kuwashuru na kuwataka wakatoe elimu
kwa Wananchi ambao hawakuweza kuhudhuria
Kikao kinefungwa rasmi Mnamo
wa Saa 11.00 Asubuhi.

KATIBU
HILDAGARD F. NDIHINGILAHI
0767-187167

0784639183
AFISA MTENDAJI
KATA MIEMBENI

Bilele Ward Attendance

MAHUDHURIO - KATA YA BILELE

NA	TAREHE	JINA	MTAA	SAHIHI
1	27/06/2012	MARIAM KANJARA	ZAMZAM	
2.	— " —	SHARIFA IBRAHIMU	JAMHURI	
3	—"—	ABDIA AHMADA	NJUMBE	
4	—"—	J. Ruhasha	B/W/AFYA	
5.	- " -	C. Bashabi	- " -	
6	"	Leonidas Mugasha	M/MAFYA	
7.	27/06/2012	Arch. Hamza R. Kambuga	Bmc	
8	—" —	Fulgence Kasimbazi	B/W/AFYA	
9	"	Uddi I. Miruko	UHURU	

AFISA MTENDAJI
KATA - BILELE
MANISPAA YA BUKOBA

Biblele Ward Minutes of the Consultation meeting

MUHTASARI WA KIKAO CHA WADAU WA MRADI WA MITSREJI WA MAJI TAKA KATA BILELE KILICHOTANYI KA TAREHE 27/06/2012.

AGENDA ZA KIKAO.

1. KUFUNGUA KIKAO.
2. UTAMBULISHO.
3. MRADI WA MAJI MACHAFU
4. MRADI WA MAJI TAKA.
5. KUFUNGA KIKAO.

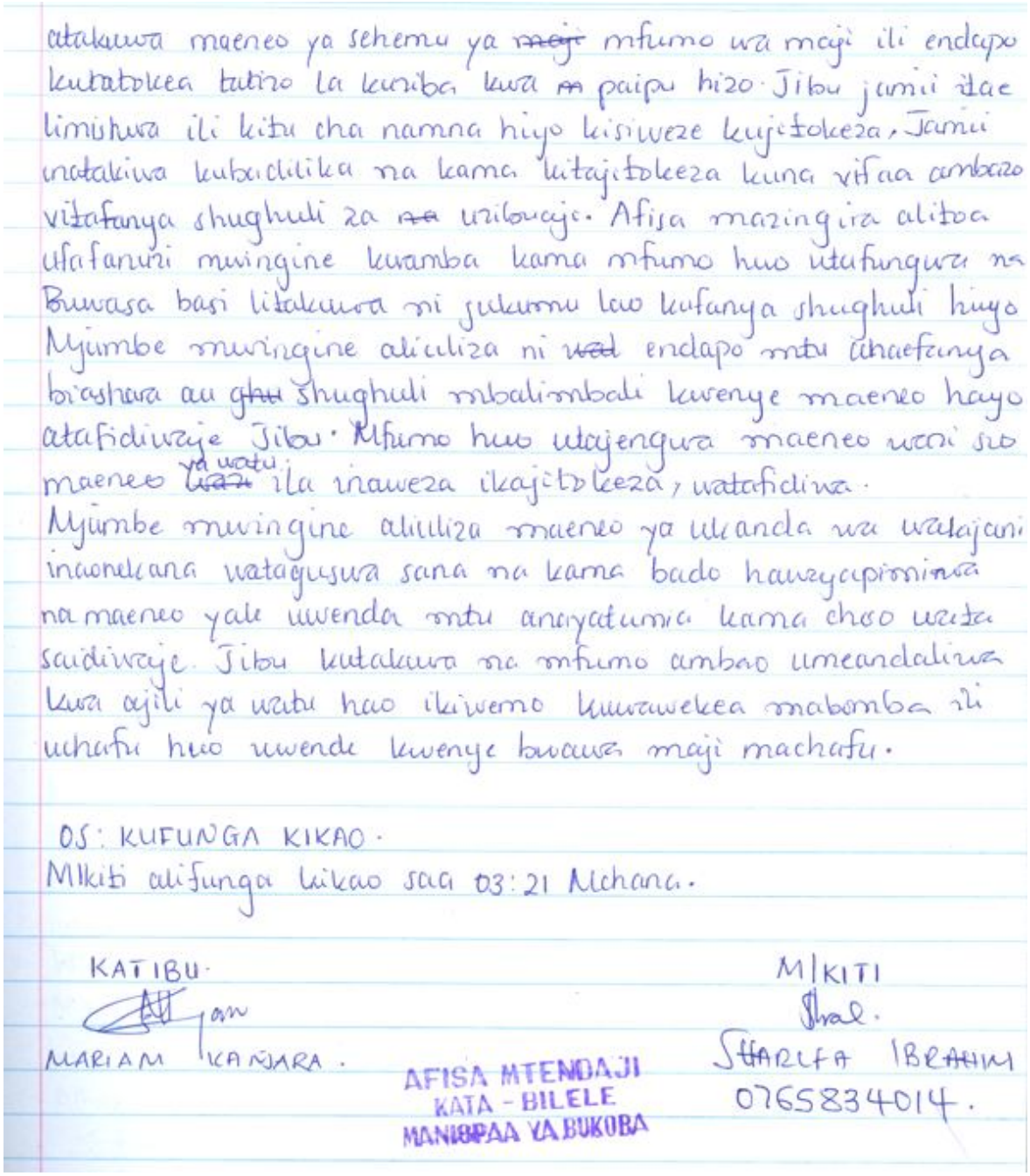
01. KUFUNGUA KIKAO.
Mkiti wa Kikao Ndugu Shanfa Ibrahim amefungua kikao saa 02:33 Mchana.

02: UTAMBULISHO.
Mkiti wa kikao aliwaomba wageni waliokuja waanze kuji tambulisha ambapo ndo wenyeji wafuate. Wageni hao waliji tambulisha. Na baadae wageni

03. MRADI WA MAJI TAKA.
Ndugu Venant Lwenyagira Alianza kwa kutoa ufafanuzi juu ya mradi wa ujenzi wa mfereji wa maji taka maeneo ya kata Nyanga. Ndugu hujo ameelezea athali na adha zitaka zo weza kukumba wananchi wa maeneo ya mradi zikiweno bugudha. Ndugu hujo ameelezea kwamba maji haya yatakuwa na mfumo wa kukusanywa eneo moja ambalo liko kata Miembeni maeneo ya Lindo. Lengo ni kukusanya

maji yote ili kuepukana na amatatizo mbalimbali ikiwemo magonjwa, uchafuzi wa ziwa victoria.

04: MRADI WA MAJI MACHAFU.
Mtaalam ameelezea kwamba baada ya maji safi kutumika kwenye maeneo ambayo yanaingia kwenye ziwa victoria. (Jambo ambalo yanajaa maingira) Pia ameelezea adha-chanya ikiwemo ajila kwa vijana watakuja wataalam na watu mbalimbali kutoka maeneo mbalimbali,
Mtaalam ameelezea adhali za mradi hasi ambazo ni kelele kwa wananchi ambao wako kwenye maeneo hayo ya mradi.
Hatua za mradi zitakazo chukuliwa. Ni pamoja na ramani kutoa nafasi kwa watu au eneo mahali mradi utakaoende shwa ikiwemo kuwaondoa watu kwenye maeneo na watu hao watapewa fidia. Baada ya maelezo ya mtaalam alikaribisha Maswali Mjumbe mmoja aliulizas kwanini badala ya kuanba barabara kwa kuchimba kwa nini wasitumie underground Jibu inawezekana kile kina kinachohitajika ni kirefu sana hivyo inatakiwa kuchimba kwa ulalo hivyo gharama zinakuwa kubwa zaidi.
2. Kwa nini pampu likipendekezwa liwe linaz wakati ni sehemu yenye maji na maji yale yanakwenda ziwani.
Jibu: inategemea ni utaalam gani unaotumika hivyo litajengwa ukuta. na maeneo yale sio kwamba maji yanapita alionyesha ramani ya maeneo yale, kwa ufafanuzi zaidi.
Mjumbe wa pili aliuliza swali kutakuwepo na mtu ambaye



atakawa maeneo ya sehemu ya ~~maji~~ mfumo wa maji ili endapo kutatokea tatizo la kuziba kwa ~~a~~ paipu hizo. Jibu jamii itae limishwa ili kitu cha namna hiyo kisiweze kujitokeza. Jamii inatakiwa kubadilika na kama kitajitokeza kuna vitaa ambazo vitafanya shughuli za ~~za~~ uzibuaji. Afisa mazingira alitoa ufafanuzi mwingine kwamba kama mfumo huo utafungwa na Buwasa basi litakuwa ni jukumu lao kufanya shughuli hiyo Mjumbe mwingine aliuliza ni ~~wal~~ endapo mtu atafanya biashara au ~~gha~~ shughuli mbalimbali kwenye maeneo hayo atafidiwaje Jibu. Mfumo huo utajengwa maeneo wazi sio maeneo ~~wazi~~ ya watu ila inaweza ikajitokeza, watafidiwa.
Mjumbe mwingine aliuliza maeneo ya ukanda wa wafanyakazi inaonekana watagusuwa sana na kama bado hawajapimiwa na maeneo yale uwenda mtu anayatumia kama choo wataa saidiwaje. Jibu kutakuwa na mfumo ambao umeandaliwa kwa ajili ya watu hao ikiwemo kuwawekea mabomba ili uchafu huo uwende kwenye bwawa maji machafu.

OS: KUFUNGA KIKAO.
Mkiti alifunga kikao saa 03:21 Mchana.

KATIBU.
MARIAM KANJARA.

AFISA MTENDAJI
KATA - BILELE
MANISPAA YA BUKOBA

M/KITI
Shal.
SHARIFA IBRAHIM
0765834014.

Bakoba Ward Attendance

MAHUDHURIO KATA YA BAKOBA

NA	TAREHE	JINA	MTAA	SAHIHI
1	27/06/2012	FELICIAN BAGAMBO	MJINI	[illegible]
2	27/06/2012	RESPICIUS W. MCHUNGUZI	KAFUTI	Mchunguzi
3.	27/06/2012	JUSTINIAN KAMUGISHA	BUYEKERA ASILI	[illegible]
	27/06 ISSACK	ISSACK S. MAINGA	KAFUTI	Mainga
4	27/06/2012	SITIVINI S. RUPAPULO	KAFUTI	[illegible]
5	27/06/2012	JOVITA KIASADON	KAFUTI	[illegible]
6	27/6/12	Matovu JOHN	KAFUTI	[illegible]
7	—"—	DEOGRATIASK ACOT	BAKOBA	[illegible]
8.	—"—	OLIVA LAURENT	FORODHANI	Olaurent
9.	—"—	SELINA JAMES	—"—	Selina
10	—"—	PHILBERT - MASABALA	KAFUTI	[illegible]
11	—"—	Godwin Kilibardi	KAFUTI	[illegible]
12	—"—	VITALIS - MICHAEL	KAFUTI	[illegible]
13	—"—	HAMISI - K. MANYANZA	KAFUTI	Himery
14	—"—	EDISON MSHUMBUS	MAFU	[illegible]
15.	—"—	ABDULRAHIM KASSIM	MJONI	[illegible]
16.	—"—	RACHEL E. DAMATIUS	BIASILI	[illegible]
17	—"—	ALISIDES KIMWNZE	MJONI	[illegible]
18.	—"—	Patricia P. Kaizilege	FORODHANI	[illegible]
19	—"—	LEONIDAS MUBASA	—"—	[illegible]
20		Adivra		

AFISA MTENDAJI
KATA - BAKOBA
MANISPAA YA BUKOBA
27/06/2012

Bakoba Ward Minutes of Consultation Meeting

27. 06. 2012

MUHTASARI WA KIKAO CHA WADAU WA MRADI WA MIFEREJI YA MAJI TAKA KATA BAKOBA KILICHOFANYIKA TAR. 27. 06. 2012

AGENDA ZA KIKAO.

1. KUFUNGUA
2. UTAMBULISHO
3. MRADI WA MAJI MACHAFU
4 MRADI WA MAJI TAKA
5. KUFUNGA KIKAO

01. KUFUNGUA:
A/Mtendaji kata Bakoba amefungua kikao majira ya saa 10. 18 jioni

02. UTAMBULISHO:
A/Mtendaji wa kata amemkaribisha Afisa Mazingira kutoka Manisp, ili aweze kuwatambulisha wageni ~~wa~~ kutoka Manisp. Afisa Mazingira amesema kuwa ameambatana na wageni kutoka Dar Es Salaam Kampuni ya Invornmental Bench Mark amesema kuwa wamekuja kutathimini Mradi.
Wiaara ya Maji 'inatathimini Miradi ya Maji (i) Machafu na Maji Taka. Maeneo yatakayofanyiwa bazi ni Mto~~a~~ kanoni kwa kukusanya maji na kuyaweka kwenye tanki la Maji Athari za Mbolea inayoongezwa kwenye Ziwa
i) Kuota kwa Magugumaji
ii) Samaki kushindwa kuzaliana kutokana na kukosa hewa

3.4 MRADI WA MAJI MACHAFU + TAKA

Lengo la hii miradi ni kuboresha maji; kwa kutumia mizundo Mbinu ili tuweze kupata magonjwa.

Kujenga Miradi: yatakayojitokeza ni kuchimba mitaro, athari zitakazotokana na Mradi:

i) Athari Chanya

ii) Athari Hasi – kuathiri shughuri

i) Athari Chanya: Ni shughuri zitakazofanyika kando kando ya mitaro inapochimbwa na kufaidisha wananchi mf: kupika chakula na kuwalisha wafanyaka zi, kuuza Maji n.k.

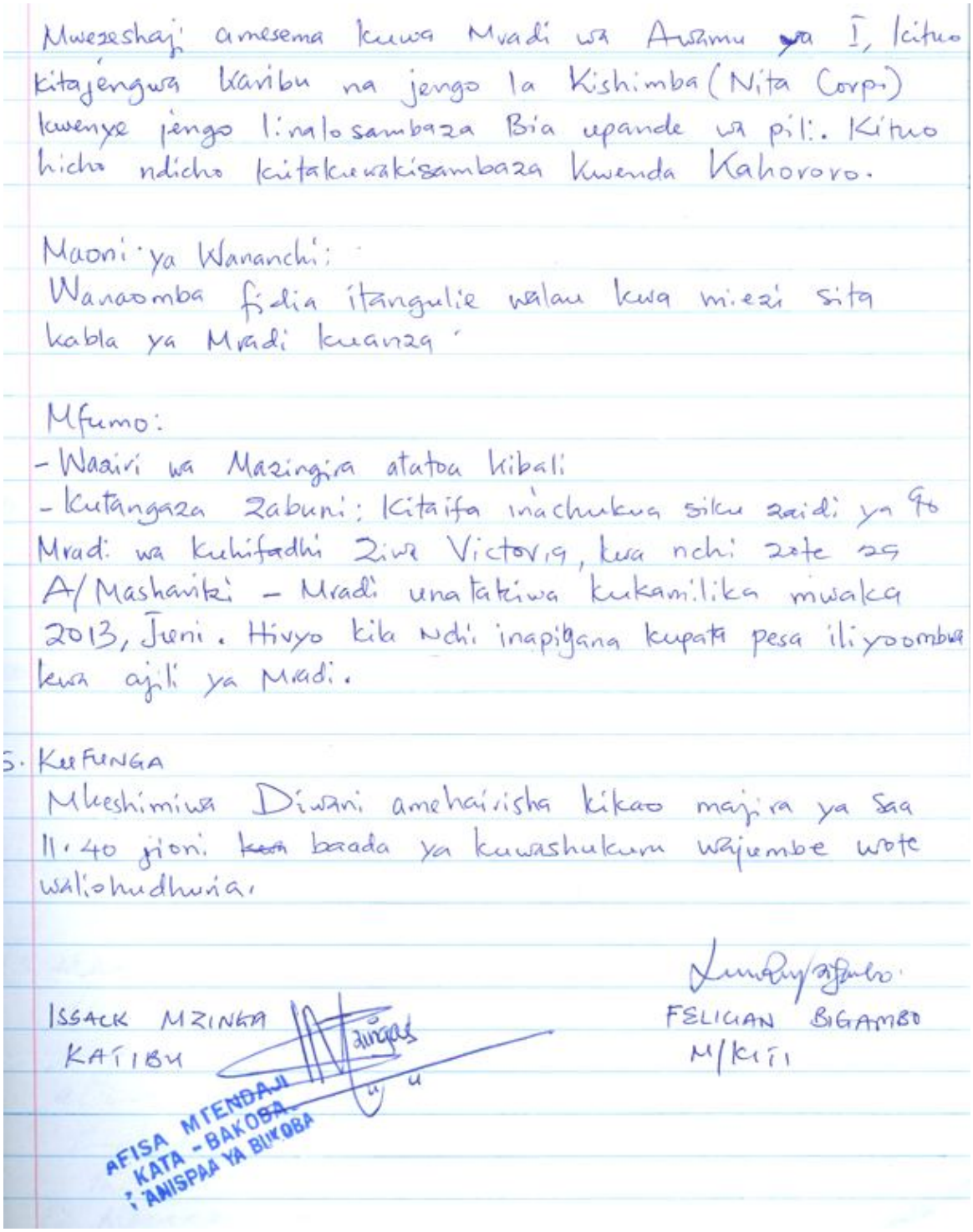
ii) Athari Hasi: Shughuri zitakazoathiri mazingira mfano kuchimba mitaro wa Maji Machafu ukaanza kuenea.
- Mitaro kuchimbwa bila kufukiwa na kutiririsha udongo/mboka ikaingia ziwani na kuua mazalia ya Samaki.

Mradi Awamu I: Utaanzia maeneo ya Uwanja wa Ndege hadi Kanoni

Uchangiaji:

Maoni: M/kiti Bugekera atakayeondolewa kwa ajili ya kutekeleza Mradi alipwe fidia kulingana na thamani ya mali yake kwa mujibu wa Sheria.

Mwezeshaji amefafanua kuwa kama Mradi utapita Barabara kwa yeyote atakayeguswa atalipwa kulingana na Sheria na kanuni za Barabara.



Mwezeshaji amesema kuwa Mradi wa Awamu ya I, Ichuo kitajengwa Karibu na jengo la Kishimba (Nita Corp.) kwenye jengo linalosambaza Bia upande wa pili. Kituo hicho ndicho kitakuwakisambaza kwenda Kahororo.

Maoni ya Wananchi:
Wanaomba fidia itangulie walau kwa miezi sita kabla ya Mradi kuanza.

Mfumo:
- Waairi wa Mazingira atatoa kibali
- Kutangaza Zabuni; Kitaifa inachukua siku zaidi ya 90
Mradi wa kuhifadhi Ziwa Victoria, kwa nchi zote za A/Mashariki - Mradi unatakiwa kukamilika mwaka 2013, Juni. Hivyo kila Ndi inapigana kupata pesa iliyoombwa kwa ajili ya Mradi.

5. KUFUNGA
Mkeshimiwa Diwani amehairisha kikao majira ya saa 11.40 jioni baada ya kuwashukuru Wajumbe wote waliohudhuria.

ISSACK MZINGA
KATIBU

AFISA MTENDAJI
KATA - BAKOBA
ANISPAA YA BUKOBA

FELICIAN BIGAMBO
M/KITI

Kashai Ward – Attendance to Consultation meeting

MAHUDHURIO – KATA KASHAI

NA	TAREHE	JINA	MTAA	SAHIHI
2	29-6-2012	JASINTHA L. TEFURUKWA	WEO-KASHAI	
3		MWENGE D. MAITHAI	WLFO	
4		NURUHUPER D. KABAGY	KACHEMP	
5.		DEOGRATIAS BURERWA	K/HEWA	
6		PROSPER KYARUZI	M/KIT.	
7		JOVINARY RUYOBYA	M/kit.	
8		SIMONI W. RWIZA	MKIT.	
9		CHRISTOPHER BASHABO	HPA	
10		P. BASHUBE		
11		Richard Joseph	BUWASA	
12		PONSIAN KAMALA	RWOME	
13		EBONIA P. KAMUGISHA	K/RWAMISO	
14		MUSSA WILOTI	K/HALISI	
15.		KURUTHUM ABDALLAH	MEO NHC/Kas	K. Abdallah
16.		PRUDENCI FRANCIS	KATATORWAMISO	
17		BIBIANA BIKONGA	KESHENE	
18		PRUDENCE FRANCIS	1	

AFISA MTENDAJI KATA KASHAI

Kashai Ward Minutes of Consultation Meeting

MUHTASARI WA KIKAO CHA WADAU WA MRADI WA MIFEREJI YA MAJI KATA YA KASHAI. KILICHOFANYIKA TAREHE 29/06/2012

AGENDA

1. KUFUNGUA KIKAO
2. UTAMBULISHO
3. MRADI WA MIFEREJI YA MAJI MACHAFU
4. MRADI WA MAJI TAKA
5. KUFUNGA KIKAO.

1. KUFUNGUA KIKAO

Afisa mtendaji wa kata kashai ndugu JASINTHA TEFURUKWA ambaye ndiye alikuwa mwenyekiti wa kikao hicho alikifungua kikao hicho majira ya saa 3:30 asubuhi akiwakaribisha wageni waliofika pamoja na wajumbe wa WDC.

2. UTAMBULISHO

Mwenyekiti wa kikao aliwaomba wageni kujitambulisha pamoja na wenyeji wao ambao ni wajumbe wa WDC kata ya kashai. Utambulisho huo ulifanyika kwa mmojammoja pamoja na cheo chake

3. MRADI WA MAJI MACHAFU NA TAKA

Mwezeshaji aliwaelezea wajumbe maana ya maji machafu na jinsi ya kuyatibu mpaka yakawa masafi hasa kwa kutotosa harufu mbaya

Mwezeshaji aliwaelezea kuwa mfereji mkubwa utajengwa eneo la Bukoba CLUB na Sehemu hiyo inaitwa STORO na eneo la mwisho ni KIFUMBIRA. Pia mwezeshaji aliwaeleza athari za mradi ambazo ni:-

- Kukatwa baadhi ya maeneo ya ardhi zetu hivyo jamii ikubaliane nayo, ambayo ardhi hiyo itatumika kujengewa mifereji.

MAJIBU

Wajumbe waliuliza maswali na maswali yote yalijibiwa na wote waridhika na majibu yaliyotolewa na mwezeshaji. Na maswali yalihusu -Maeneo yasiyofikiwa magari itakuwaje

- fidia za maeneo ya watu
- Sehemu ya kumwaga maji taka kabla ya kutibiwa itakuwaje. Je mazalio ya mbu
- Sehemu zisizo na vyoo vya kudumu itakuwaje

Pamoja na majibu yaliyotolewa na mwezeshaji pia aliulizwa maswali mwakilishi wa mkurugenzi wa BUWASA naye pia alisema maswali hayo atayafikisha kwa mhusika mkuu ambaye ni mkurugenzi wa BUWASA na majibu yatakuja kupitia kwa mtendaji wa kata.
-Mwezeshaji aliwaelezea wajumbe kuwa, maoni yatakayotoka kwa wananchi ilapelekwe - BUWASA.

AFISA MTENDAJI
KATA KASHAI
MANISPAA YA BUKOBA

-2-

KUFUNGA.

Afisa Mtendaji wa Kata aliwaomba wageni pindi wakipata nafasi waje wawatembeze wahusika wa maeneo ili waje mradi huu utapita wapi. Na baada ya hapo aliwaomba wajumbe kuwapa ushirikiano pindi mradi utakapoanza na mwisho aliwashukuru wageni pamoja na wajumbe kwa kuhudhuria na kuwatakia kheri pindi wakifanyapo makazi.

AFISA MTENDAJI KATA KASHAI MANISPAA YA BUKOBA

Jina: [illegible]
AFISA MTENDAJI WA KATA KASHAI
SIMU NO 0784370300

Kahororo Ward – Attendance to Consultation Meeting

MAHUDHURIO – KATA YA KAHORORO

NA	TAREHE	JINA	MTAA	SAHIHI
1. ~~CHI~~				
1	29.6.2012	CHIEF. A. KARUMUNA	KYAYA	
2	–11–	AGNES M. BISHANGA	RWAZI	
3	–11–	~~AUDAX~~ - LEONIDAS I	MAKONGO	
4	–11–	COSIMAS RWABIGENE	BUKANGOMA	
5	–11–	LYDIA . W. KWETAMBA	BUSHWA	
			AFISA MTENDAJI KATA - KAHORORO	

29/06/2012

KIKAO CHA WADAU WA MRADI WA MAJI TAKA KATA KAHORORO

UTAMBULISHO: Mh Diwani wa Kata Kahororo amewa tambulisha wenyeji wa Kata hii waliohudhuria Kikao hiki. Na Wageni toka Wadau wa Mradi wa maji machafu na Mabwawa.

UFUNGUZI. Kikao Kimefunguliwa na mnamo Saa 3.03 na MDAU wa mradi. Kwa Kusema Kuwa wame Kuja Kwa ajili ya miradi miwili ambayo ni maji taka ikiwa lengo ni Kuzuia uchafu Kuingia Ziwani hivyo watajenga mifereji ambayo itapeleka maji machafu Kwenye ~~mabwa~~ mabwawa ambayo yatajengwa eneo la Kitungu Kata Kahororo. Lengo ni Kupunguza Uchafu ambao Utaanzia bwawa la Kwanza mpaka la mwi sho itakuwa uchafu umepungua Sana. Alieleza mmoja wa Wataalam.

Faida zake Kwenye eneo litakalohusika ni Kupatikana - Kwa ajira, Kwa Kujengwa pia Barabara Ktk eneo husika
Mradi wa pili ni wa utupaji taka ngumu ambao - Katika Manispaa ya Bukoba upo Kata Nyanga.

Pia mtaalam amesema Kuwa Kuna athari zitakazojitokea ambazo ni pamoja na harufu mbaya toka Kwenye Mabwawa yatakayojengwa. Nyingine maeneo Kutwaliwa.

Mh Diwani ahitaka Kujua Kama wenye maeneo watalipwa fidia ya maeneo yao au la?

Vilele ~~ni~~ alitaka kujua barabara hiyo itajengwa au la Mtaalam alijibu kuwa swala zima la mradi LEVEMP na Wasimamizi wakuu ni BUWASSA. Swala la Barabara tutalichukua kama kero ya Wananchi.

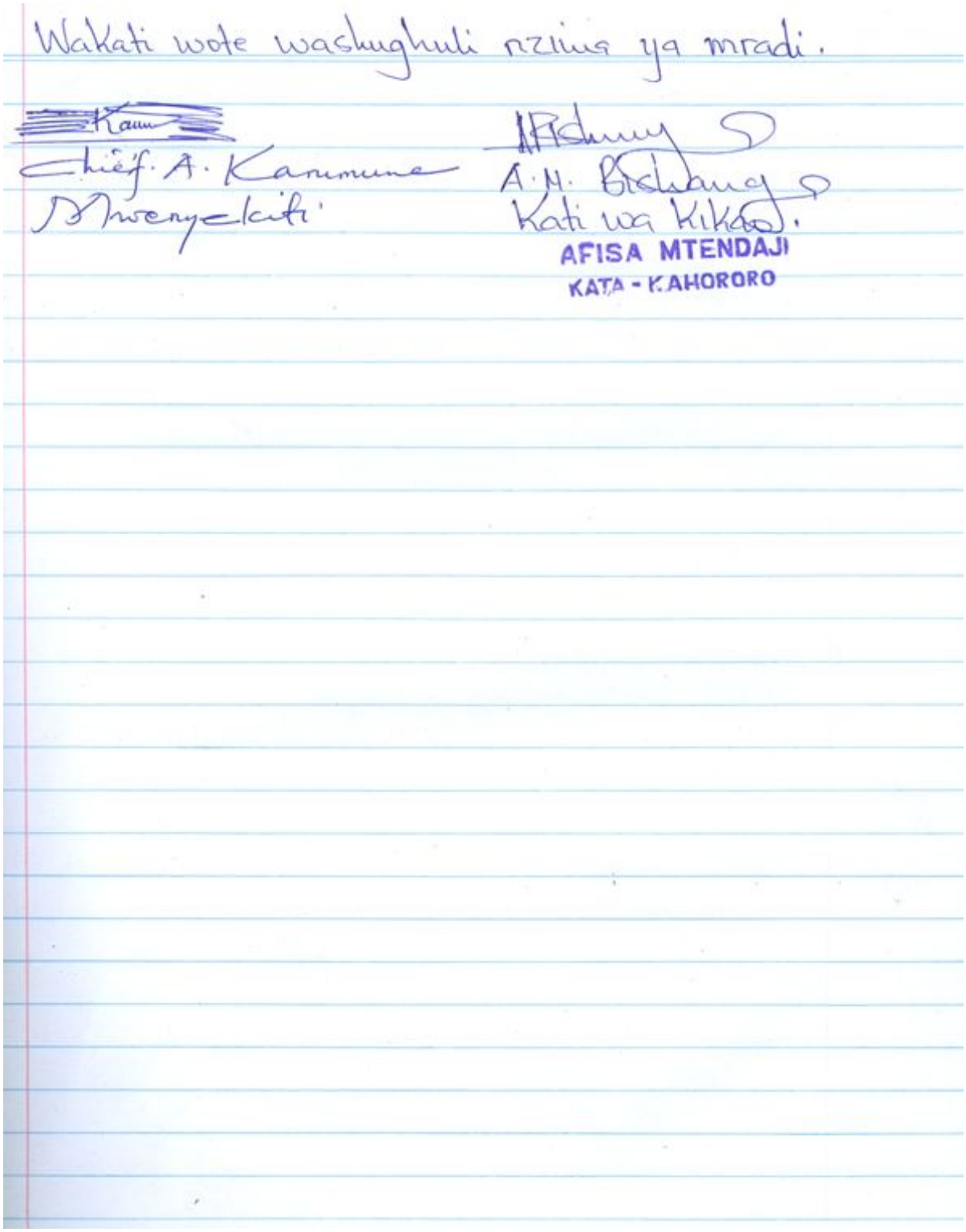
Swala la fidia kwa wenye ardhi itakayopitiwa na barabara zitazingatia Sheria ya ardhi Na 3, 4 za mwaka 2009. LEVEMP hawajihusisha na malipo ya Fidia bali BUWASSA kwa sababu Mchoro wa Mradi haujonyesha barabara itapitia wapi.

Faida zitakazopatikana ni nyingi na za Manispaa nzima mfano kupungua kwa magonjwa yanayoenea kwa uchafu, vile vile kupungua kwa kutapakaa kwa uchafu na vinyesi.

Vile vile kupatikana kwa ajira wenyeji wa eneo hus iko Mtaalam amependekeza wapewe kipau mbele, vile vile ujenzi wa makazi hautaitaji septek tank mradi utaunganisha mabomba na kusafirisha uchafu moja kwa moja nayo iyo ni faida moja wapo.

Mkiti ameshauri kuwa watu wenye maeneo yatakayopitiwa na Barabara wajulishwe kuwa watalipwa au la na kama hawatalipwa inaweza ikakwamisha mradi.

KUFUNGA: Mh Diwani amefunga kikao hiki mnamo saa 3.45 uchana kwa kuwashukuru wataalam toka LEVEMP na kuwasisitiza kuwa na ushirikiano mzuri na wenyeji.


Wakati wote washughuli nzima ya mradi.

Chief. A. Kanumuna
Mwenyekiti

A.M. [illegible]
Kati wa Kikao.

AFISA MTENDAJI
KATA - KAHORORO

Kifungu Sub-ward Part of Kahororo Ward – Attendance to Consultation Meeting

SEHEMU YA MTAA WA KYAYA
MAHUDHURIO – KIJIJI CHA KIFUNGU

NA	TAREHE	JINA	MTAA	SAHIHI
1	29.6.2012	CHRISTOPHER . W. NAMBOGA	KYAYA	[illegible]
2	29.6.2012	Monica Rupia	Kyaya	[illegible]
3	YUSUFU	AMADA Mujuni	Kyaya	[illegible]
4	MORLI	MORLI JAKONAE		[illegible]
5		DAMIANI KABUHAYA		DAMIANI
6		SWAIBU TWAIBU		Swaib
7		RWEGASIRA RUGAIMUKAMU		Rwe
8		NELSONI MUSSA		NEBL
9		KABYEMERA ROBERT		KABE
10		JOVINI JOSEPH		JOVIN
11		GODWINI PIUS		GOD
12		Rosemary Bazily		[illegible]
13		NURU MAHAMUDU		NURU
14		KAMUGISHA PETRO		KAMU
15		GRELISON JACKISONI		GRELSON
16		WINIFIRIDA JOHN		WINI
17		EDIMUNDI MISHOSHO		[illegible]
18		LAMADHANI ASUMANI		LAMA
19		WILIAMU WALIOBA		WILIAM
20		GREBI NURU		GRES
21		VESTINA PANKARASI		VESTINA
22		KOKUSHUBIRA WILIBADI		KOKUSHUBI

OFISI YA M/KITI BMU
MTAA WA KIFUNGU

MAHUDHURIO KIJIJI CHA KIFUNGU

NA	TAREHE	JINA	MTAA	SAHIHI
	29/06/2022	IMAKURATA RADISIRAUSI		
23		BAHATI EZIAS		BAHATI
24		WAGIDA RUGASIRA		WAGIDA
25		RADISIRAUS SILAS		
26		PASKAZIA DAMASENI		PASKAZIA
27		FELISIA RUBANZA		F. Rubanza
28		ABOGASTI RAURENI		
29		PIUS PAULO		
30		WILISONI JUSTINIANI		WILISON
31		JASONI REVELIANI		JASONI
32		WINIFRIDA FERDINAND		Winifrida
33		SALA HAMIDU		
34		HAKIMU ISSHAKA		
35		FIRIMONI BANDIAI		
36		NURUDINI JOVITHA		
37		FELISIANI KAIZA		Fkaiza
38		ELIASI BUSUMABN		ELIASI
39		RUGAMALILA ALFRED		RUGAMALILA
40		JUSTINIAN KAIZA		
41		MULOKOZI PIUS		PM
42		EMANUELI SIMONI		
43		Adventina Cugemalila		
44		HAMIDU ABDUL		

KATIBU WA MKUTANO

MAHUDHURIO KUJIJI CHA KUFUNGU

NA	TAREHE	JINA	M'TAA	SAHIHI
	29/06/012	DAMASENI ANATORY		
		DIKSIH MZUEE		DIKSIH
		JOHANES STANSILAUS		
		SIRYACUS MIKITI BMJ	KYAYA	
		MWAKILISHI WA MTUNGI.		

Kifungu Sub-ward Minutes of Consultation Meeting

29 JUNE, 2012

MUHTASARI WA KIKAO NA WADAU WA MRADI WA MABWAWA YA ~~UFUGAJI SAMAKI~~ MAJI MACHAFU MWALO KIFUNGU, MTAA KYAYA KATA KAHORORO, HALMASHAURI YA MANISPAA BUKOBA.

AGENDA:

1. UTAMBULISHO:
2. UFUNGUZI:
3. MAELEZO YA MRADI WA ~~UFUGAJI SAMAKI~~ MABWAWA WA YA MAJI MACHAFU:
4. MAONI NA MASWALI:

UFUNGUZI:

M/kiti wa B.M.U Bwana Christopher W. Wandiba alifungua kikao rasmi saa 12:44pm. Na baada ya ufunguzi aliwataka wanachama waliohudhuria kuwa wasikivu na kuwasikiliza wataalamu kwa utasaha.

UTAMBULISHO:

M/kiti wa B.M.U aliwatambulisha wageni kutoka manispaa mmoja mmoja baadaye aliwatambulisha wajumbe wa kamati tendaji ya B.M.U na kwa pamoja walisimama kwa kujitambulisha

MAELEZO YA MRADI

Utakuwepo mradi wa mabwawa ya kusafishia maji machafu ambayo yatajengwa katika mwalo wa Kifungu maeneo ya Lubembe.

Lakini pia mtaalamu huyo alitoa maelezo ya athari za mradi huo kuwa ni pamoja na kutoa harufu mbaya ambayo itakuwa inatoka kati ka mabwawa hasa mawili ya mwanzo katika hay o mabwawa manne ya mradi.

Lakini pia mtaalam alibainisha pia faida zitakazokuwepo wakati wa utekelezaji wa mradi huo wa maji taka kuwa ni pamoja na :-

⇒ Ajira kama vile :- vibarua vya kujenga
- Kufyeka mjani na vichaka maeneo ya mradi.

⇒ Kujiajiri kama - kuwa mradi wa Hotel
- Aina yoyote ya Biashara.

⇒ Lakini pia kaimu afisa mazingira wa manispaa bi corin schwab vile vile alitoa ufafanuzi kuwa mradi huo ni faida kwa manispaa nzima lakini athari kubwa ni kwa wakazi wa mwalo wa kitung[illegible]

⇒ Lakini pia mtaalam Bwana Venant Rwenyagira aliwafahamisha wananchi kuwa faida ni nyingi na vile vile kunapunguza maambukizi ya magonjwa yatokanayo na maji machafu..

MAONI NA MASWALI:

C. W. WANDIBA: Aliuliza maswali matatu kama ifu[illegible] tavyo:-

A) Umbali kutoka maeneo yo mradi hadi kufikika makazi yo watu karibu:-
⇒ Kaliba hili mtaalamu alisema hawezi kuzungumzia hilo kutokana na kuwa maeneo yo mradi yanaweza kuongezwa kutokana na ukubwa wa mradi.

B) Uwepo wa ajira wa Barabara na je itapita wapi?
⇒ Kwa bahati mbaya mchoro huu wa mradi haujaonyesha eneo la kupatikana barabara.

C) Uwepo wa kemikali/Baari za kusafishia maji taka hayo athari kwa binadamu.
⇒ Katika mradi huu wa mabwawa yo maji machafu hakutakuwa na kemikali zozote za kuweza kuathiri afya yo binadamu. Hivyo basi huu ni mradi rafiki wa jamii nzima.

JOVINI JOSEPHAT: Aliomba BUWASA wajenge mradi wa maji safi na salama kabla yo kuanza kutekeleza huu mradi wao wa maji machafu.

ROSEMARY BAZIL: Aliuliza kuwa ni kwa nini BUWASA inataka kutekeleza mradi wake kabla yo hajawajali wakazi wa maeneo husika?

MURUBIN J. NGEMELA: Ameomba kujua mda wa ujenzi

wa barabara na itapita wapi ili wananchi wajue na
hivyo kuishi kwa kujipanga kimaendeleo badala ya kuk
aa kusubiri bila kujiendeleza kitaaluma katika maen
eo husika kwani maendeleo ya kisasa (kmq) (ujenzi
wa nyumba za kudumu <MAKAZI BORA>)

⇒ Mtaalam Bw. Venant Rwenyagira amesema kuwa ufidiaji wa
ardhi kwa watakaopitiwa na barabara utazingatia
sheria ya ardhi no. 3, 4 za mwaka 2009 ambazo zimezi-
ngatia taratibu zinazopaswa kusimamiwa na kushughulik
wa kwa manufaa ya jamii husika.

KUFUNGA:

M/kiti wa B.M.U Bwana Christopher .W. Wandiba alifunga
kikao na kuwataka wa wananchi kuwa wavumilivu-
na kusubiri maamuzi ya maoni yao. Kikao kimefu
ngwa rasmi saa

[signature] [stamp: ... M/KITI BMU ... MWALO WA KIFUNGU]
CHRISTOPHER W. WANDIBA
M/KITI B.M.U KIFUNGO KYAYA
29/6/2012

[signature]
SIRYACUS .C. MWEBESI
KATIBU B.M.U KIFUNGU.
29/06/2012

Appendix V: Approved Terms of Reference for Undertaking ESIA

a Introduction

In Bukoba Municipality 100% of households rely on onsite sanitation. Domestic and Institutional wastewater is discharged in septic tanks, cesspits or in pit latrines. Industrial wastewater and wastewater from non-domestic sources is discharged on land or directly into river that eventually drain into Lake Victoria.

Generally management of faecal sludge especially collection and haulage have immense problems in urban centres including Bukoba Municipality. The Major challenges include indiscriminate dumping in urban environment and reuse of untreated faecal sludge, which leads to terrestrial and aquatic environment (i.e. Lake Victoria), contaminated by excreta with high risks of transmission of gastrointestinal infections and morbidity and mortality rates and increased Lake Victoria quality deterioration.

Among part of many initiatives to overcome the above challenges including controlling further deterioration of the Lake, the Government of Tanzania through the Ministry of Water under its Lake Victoria Environmental Management Project (LVEMP II) intends to construct the Sewerage System for Bukoba Municipality. The proposed sewerage system will mainly serve the Central Business District (CBD), bordered by the airstrip on the northern side and Kanoni river on western and southern sides, all draining to a central pumping station near the location where Kanoni River joins Lake Victoria. The proposed system will also include a pressure rising main from the pumping station to the Waste Stabilization Ponds on the northern part of Bukoba Town.
In order to carry out this assignment the Consultant M/s Environmental BENCHMARK, Consulting Civil-Environmental Engineers has been commissioned by the Ministry of Water (MoW) through LVEMP to undertake Environmental & Social Impact Assessment for proposed LVEMP II Works in Lake Victoria Basin pursuant to these Terms of Reference (ToR).

b Environmental Assessment Requirements

The ESIA will be prepared consistent with the requirements of Tanzania National Environmental laws as well as the World Bank's safeguard policy on Environmental Assessment, OPBP 4.01. The Environmental Management Act (EMA) Cap 191 of 2004 requires that ESIA be undertaken for all new projects that may cause adverse environmental and social impacts. Under the Environment Impact Assessment and Audit Regulations, 2005 the proposed project is categorized as an ESIA obligatory project for which a full EIA is required.
On the other hand, the core requirements for the triggered World Bank safeguard policy include: screening early for potential impacts and selecting appropriate instruments to assess, minimize and mitigate potential adverse impacts. OP/BP 4.01 is triggered if a project is likely to have potential environmental risks and impacts in its area of influence. The policy covers impacts on the natural environment (air, water, land and noise); human health and safety; physical cultural resources; and transboundary and global environment concerns.

c Objectives of ESIA

The objectives of the Environmental and Social Impact Assessment are:

- To establish baseline information on both natural and built environment including socio-economic conditions of the proposed project area.
- To identify, predict and evaluate foreseeable impacts, both beneficial and adverse, of the proposed project; and
- To develop mitigation measures that aim at eliminating or minimizing the potential negative impacts and promote positive ones.

- To develop management clauses and monitoring aspects to be observed during project implementation.

The key findings and recommendations from the ESIA study will be incorporated into the detailed design, engineering drawings and specifications of the proposed construction of Sludge Disposal Facility.

d Scope of Work

The ESIA should assemble and evaluate baseline data on the biophysical and socio-economic characteristics of the project area and areas of influence. The baseline information should include: any changes anticipated before project commences; an identification of operationally relevant issues that may affect project design, implementation and outcomes. Specifically the following task will be carried out

Task 1: Description of the Proposed Project

The Consultant shall give details of:

- Location of all project-related development and operation sites
- General layout of facilities - diagrams of structures, design basis, size, sources of utilities;
- Pre-construction activities, construction activities; and post construction activities; and
- Organizational relationships, mandates and interactions among the different parties to be involved in the project

Task 2: Description of the Environment

The Consultant shall:

- Provide general description of the project environment and sources of information for anyone requiring a more extensive description (especially the ESIA reviewers).
- Identify those features that are particularly important in the project area and other areas related to the project in Bukoba Municipality maps at appropriate scales to illustrate the surrounding areas likely to be environmentally and socially affected.
- Identify areas that require special attention during different phases of the project implementation.

Task 3: Legislative and Regulatory Considerations

The Consultant shall: Describe pertinent local, national and international regulations and standards governing environmental quality, health and safety, land use control which the project developer is required to observe during the implementation of the project activities.

Task 4: Determination of Potential Impacts of the Proposed Project Activities

Under this activity the consultant shall:

- Identify and evaluate significant environmental and social impacts (positive and negative) and risks, identify indirect, residual and cumulative impacts that may be anticipated , predict and assess in quantitative terms probability, magnitude, distribution and timing of expected impacts; and proposed alternatives (e.g. technology, structure and size, sites, routes, etc

Task 5: Estimation of the significance of the impacts

The consultant shall:

- determine which environmental and social components are mostly affected by the project or its alternatives;

- list issues raised by the public and classify them according the level and frequency of concern whenever possible;
- list regulatory standards, guidelines etc. that need to be met; and
- Rank predicted impacts in order of priority for avoidance, mitigation, compensation and monitoring.

Task 6: Developing an Appropriate Environmental Management System/Plan (EMP) Based on Impacts Identified

The consultant shall:

- determine appropriate measures to avoid or mitigate undesirable impacts;
- assess and describe the anticipated effectiveness of proposed measures;
- ascertain regulatory requirements and expected performance standards;
- determine and assess methods to monitor impacts for prediction accuracy remedial measures for effectiveness;
- determine and assess methods to monitor for early warning of unexpected effects;
- re-assess project plans, design and project management structure;
- describe follow-up scheme and post-project action plan for achieving ESIA objectives; and
- Assess the level of financial commitment by the project proponent for the management and monitoring plan, and follow up activities

The environmental management plan should also outline how the project will be run (equipment/building material stored etc to avoid environmental damage) during implementation and how it will be cleared up after construction.

The consultant shall be guided by the cost-effectiveness principles in proposing amelioration measures. Estimation of costs of those measures shall be made. The assessment will provide a detailed plan to monitor the implementation of the mitigation measures and impacts of the project during construction and operation.

Task 7: Institutional Set-up for the Implementation of EMP

The Consultant shall review the institutional set-up - community, ward, Municipal/ Regional and national levels - for implementation of the ESMP and EMP recommended in the environmental assessment. The ESMP and EMP shall identify who should be responsible for what and when.

Task 8: Drawing Recommendations

The consultant shall:

- highlight key environmental and social concerns/ issues that should be considered for incorporation into the detailed design architectural and engineering drawings and specifications for the proposed office building;
- Determine resources requirements for implementing recommendations;
- determine capacity and resourcefulness of the client to meeting such commitment;
- explain rationale for proposed development and benefits and costs vis-à-vis the no-project option;
- Ascertain degree of public acceptance of or reaction to recommendations.

Task 9: Production of an Environmental Impact Statement (EIS)

The assessment shall result into an EIS focusing on findings of the assessment, conclusions and recommended actions, supported by summaries of data collected etc. This shall be a concise document limited to significant environmental issues. The report format will be as per The Environmental Impact Assessment and Audit Regulations No.349 of 2005 managed by the National Environment Management Council (NEMC).

Task 10: Review

The review report from NEMC may require further input (data collection, consultation inputs etc.). The consultant shall undertake to provide extra information and inputs until the project review is satisfactorily concluded.

Task 11: Public Consultations

The assessment shall establish the level of consultation of the affected stakeholders before designing the project, level of involvement in the running and maintenance of the project facilities as this is an important aspect for both environmental and project sustainability.

The assessment will provide a framework:

- for coordinating the environmental impact assessment with other government agencies, and
- For obtaining the views of affected groups, and in keeping records of meeting and other activities, communications, and comments and their disposition.

The consultants shall provide record of the names of organizations, government and departments and individuals whose views were obtained. The record will also provide description of views and information that will be obtained. These will be additional consultations to what will conducted during the scoping study.

Task 12: The Consultant shall take all necessary steps to ensure that permission (Certificate) to proceed with other stages of the project from National Environment Management Council (NEMC) is obtained within short period of time as agreed and stated in the consultants work plan.

e Time Scale

Unless suggested otherwise at the screening stage of EIA process, the study has to be 'Comprehensive' in nature and hence shall involve data collection, analysis and results within 10 weeks from the date of the signing of the contract. This period accommodates registration for the project; follow up of the review with NEMC, and obtaining certificate on behalf of the Client. However, the effective consultancy period will be determined by the consultant based on the timeline for deliverables.

f Consultant Firm Requirements

The firm must have at least five years of working experience in similar assignment; must be registered with NEMC. The firm should also show evidence having carried out similar assignments including references from previous clients. The key personnel shall have the following Qualifications.

Team Leader (Environmental Specialist): the Team Leader shall be a professional environmental scientist with prove experience in the preparation of environmental and social management plans. The Team Leader shall have a minimum M.Sc. in Environmental Engineering, Environmental Economics or related fields. The Team

Leader shall have a minimum 8 years experience on similar environmental and social management plans preparations. He must as well be registered by NEMC as Environmental Expert.

Environmental Engineer: The Environmental Engineer shall have proven experience in the EIA of water resources. The Environmental Engineer shall have a minimum BSc degree qualification in science or engineering as well as relevant post graduate qualifications in Environmental management. The Environmental Engineer shall have a minimum of 5 years experience relevant experience on environmental assessment. He must as well be registered by NEMC as Environmental Expert.

Sociologist: The sociologist shall have proven experience in the social impact assessment of water resources and resettlement matters in large projects. The sociologist shall have a minimum bachelor degree qualifications in sociology or applied anthropology as well as relevant post graduate qualifications. The sociologist shall have a minimum of five years experience on social assessment.

Water Engineer: She/he shall be a professional water engineer with proven experience in the EIA of water resources. The Water Engineer shall have a minimum BSc degree qualification in a relevant field as well as post graduate qualifications in demand EIA. She/he shall have a minimum of 5 years in relevant experience and professional registration with Tanzania ERB or equivalent professional body.

Land Use Planner: She/he shall have proven experience in land use planning and resettlement matters. The Land Use Planner shall have a minimum bachelor's degree qualification in land use planning as well as relevant post graduate qualifications. The land use planner shall have a minimum of 5 years in relevant experience.

g Reporting

The following are the main reports and deliverables expected from the consultant.

S/No	Reports	Content	Timeframe
1	Inception Report	A review of the documents and pre-meetings and interviews. Confirmation of the work plan and timing of deliverables together with a description of key challenges and issues which must be addressed by the client to enhance completion of the assignment on time and at an acceptable quality	Two (2) weeks after start of the assignment
2	Interim Report	Findings and recommendations for the detailed environmental impact assessment	Four (4) weeks after start of the assignment
3	Final Report	Final report on the detail environmental impact assessment	Ten (10) weeks after start of the assignment.

Reports should be prepared according to the National EIA Regulations (2005), two reports are to be submitted to NEMC, the initial Scoping report and the EIS. Both scoping and the EIS shall be presented in formats prescribed by the National EIA Regulations (2005).

h Services, Facilities and Materials to be provided by the Client

The client will provide necessary services, facilities and materials to the Consultant including:

- Providing relevant reference documents as on the reference list, including the proposed design for rehabilitation works
- Organizing stakeholders meetings to validate consultancy reports

i Deliverables

The consultant shall prepare and present of reports at various milestones in the ESIA process and as per the time schedule mutually agreed. Deliverables by the consultant shall include:

- Prepare and submit project brief to NEMC for registration;
- Undertake scoping study and submit report together with the Terms of Reference for full ESIA to NEMC;
- Draft ESIA/EIS report for submission to Technical Advisory Committee (TAC); and
- Final ESIA/EIS report.
- Certificate from NEMC

The consultant will be required to submit to the client six (6) bound hard copies and four (4) softcopies of each work. All the reports shall be in Standard English language, neatly bound with an attractive outlay and shall contain the main text and annexure, with designs, figures/frameworks, illustrations and/or logical flow diagrams. The softcopies shall be in MS Office on CDs/DVDs. The Consultant shall also make 15 copies for the review process as stipulated in the EMA 2004 (the costs for making such copies will be included in the budget for the assignment).

The Consultant will prepare and submit a work plan for undertaking the ESIA, activities that would be carried out and methods that shall be used, timeframe, deliverables, etc.

A scoping study which will involve literature review, identification of stakeholders, conducting a scooping exercise around the construction site and identification of alternatives, will precede the full ESIA study. The scoping exercise will further enrich these Terms of Reference for the full EIA including suggesting the likely expertise required for the assignment.

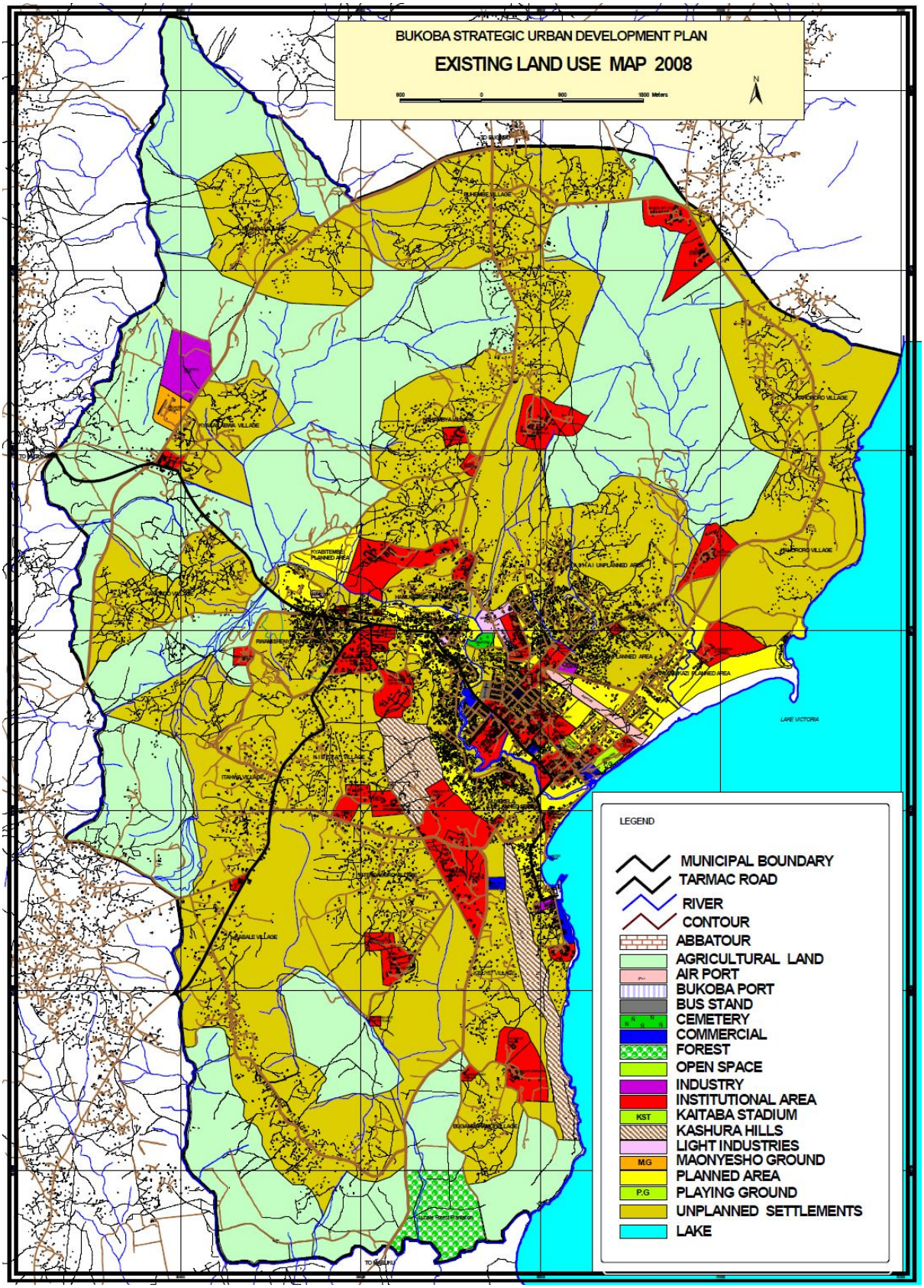
Appendix VI: Proof of Project Compatibility with the Land use Plan of the Area

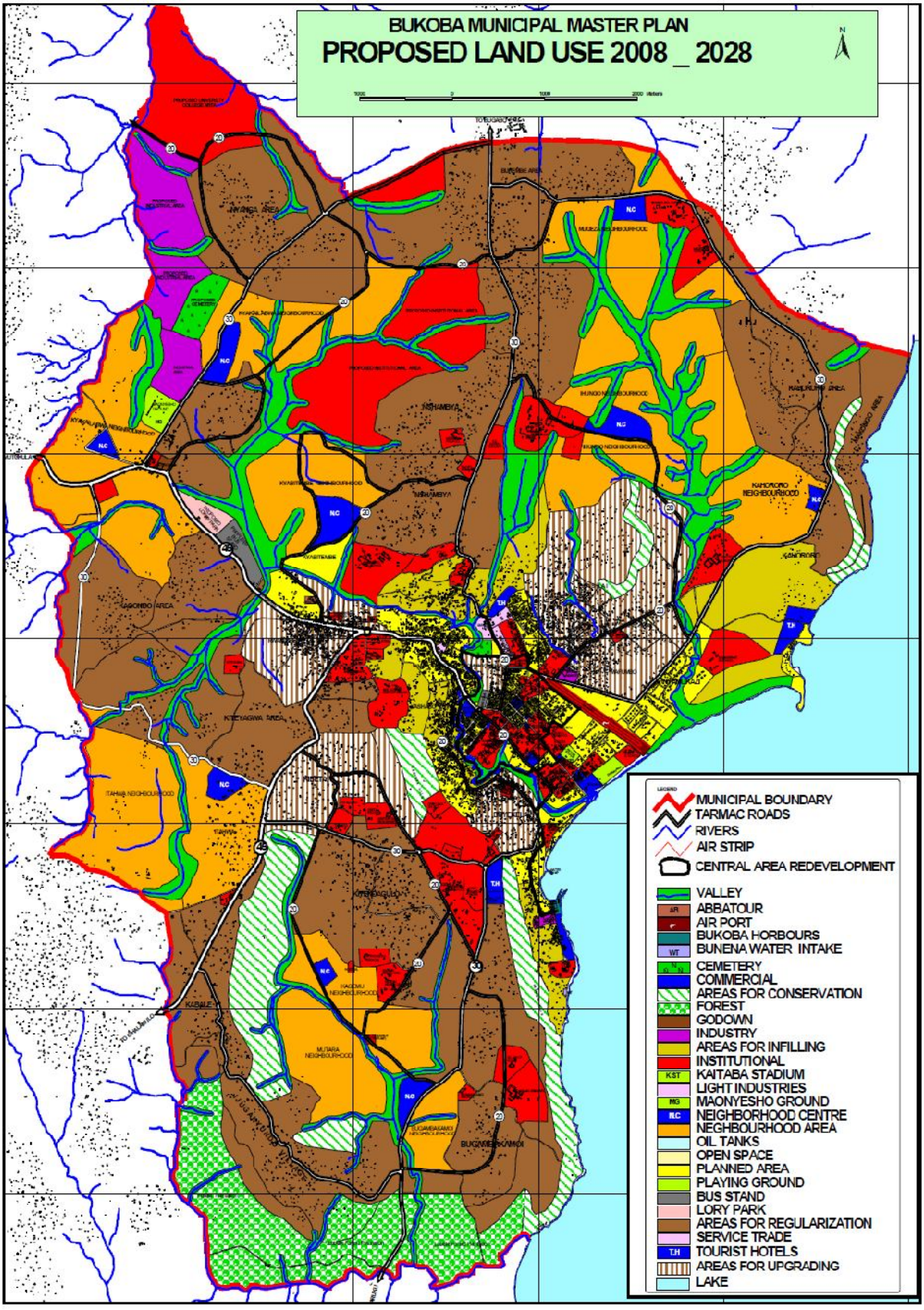
The land use plan presented below was extracted from the Bukoba Strategic Urban Development plan that was prepared under the Urban Planning Act, 2007 which empowered every municipal council to be a planning authority in respect of its area of jurisdiction.

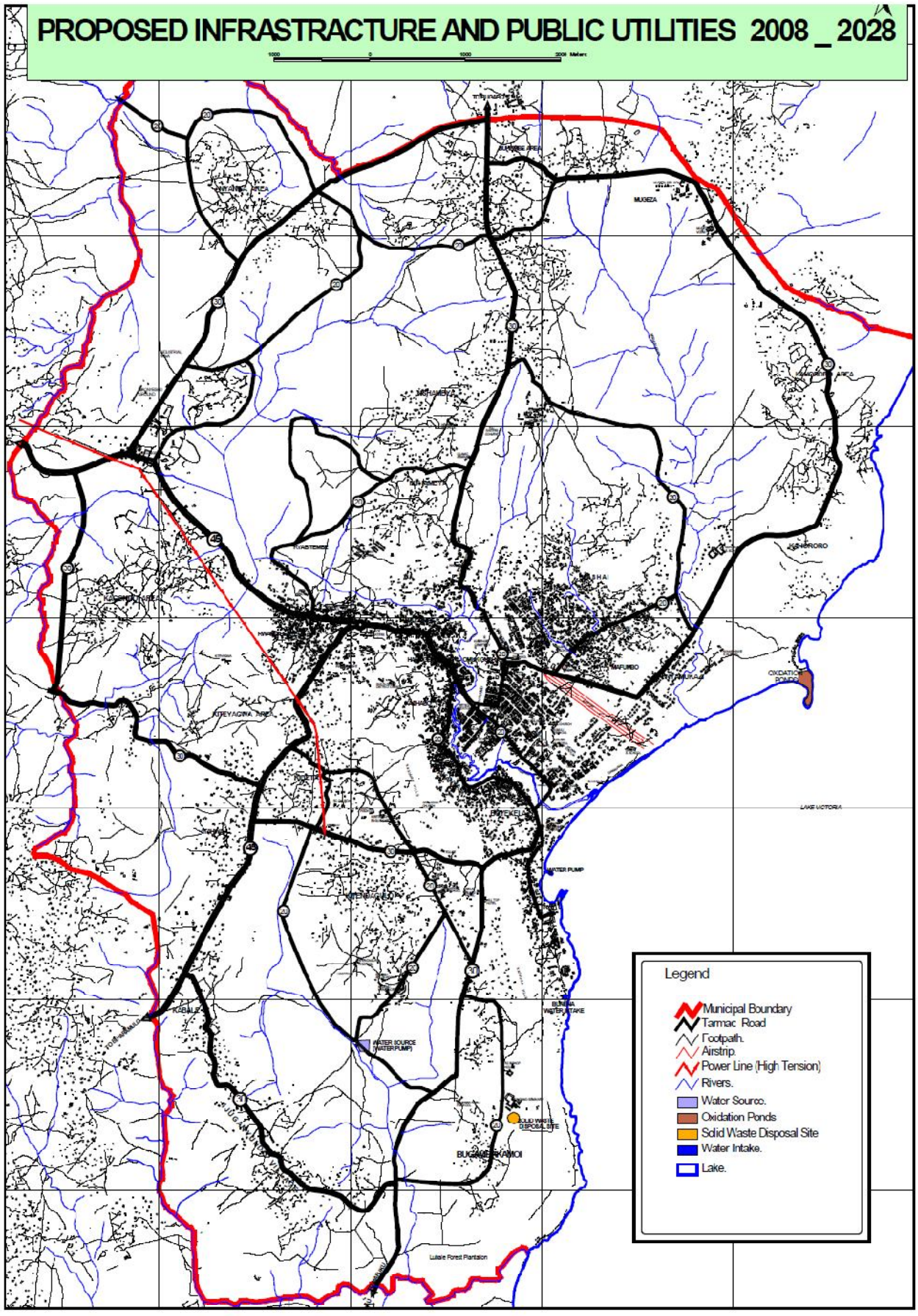
In the preparation of the Strategic Urban Development Plan, Bukoba Municipal Council, herein regarded as the planning authority is supposed to pass a resolution to that effect and to cause such resolution to be published in the gazette. The Bukoba Municipal Council made such a resolution and the resolution was gazetted. Within six months of such publication, the planning authority prepared a draft strategic plan and submitted it to a meeting of key stakeholders, including landholders, public and private institutions, community based organizations and non–governmental organizations in the area. The draft report of the Bukoba Strategic Urban Development Plan was presented to a meeting on 29 January 09 where a positive resolution was passed.

The planning authority deliberated upon the draft Urban Strategic Development Plan and endorsed it by a resolution. The planning authority submitted the endorsed plan to the Regional Secretariat following passing of the resolution. The Regional Secretariat deliberated upon the plan and submitted it to the Director for Town Planning together with recommendations and comments.

The Director made the draft plan available to the public by publication in a local newspaper. The planning authority within three months of such publication conducted a public hearing in the planning area, the proceedings of which were recorded and submitted to the Director. The Director made alterations or modifications to the plan after taking into account the public hearing and views of the Regional Secretariat. Upon satisfaction, the Director approved the plan and the Minister gazetted the Bukoba Strategic Urban Development Plan.


BUKOBA STRATEGIC URBAN DEVELOPMENT PLAN
EXISTING LAND USE MAP 2008
LEGEND
MUNICIPAL BOUNDARY
TARMAC ROAD
RIVER
CONTOUR
ABBATOUR
AGRICULTURAL LAND
AIR PORT
BUKOBA PORT
BUS STAND
CEMETERY
COMMERCIAL
FOREST
OPEN SPACE
INDUSTRY
INSTITUTIONAL AREA
KST
KAITABA STADIUM
KASHURA HILLS
LIGHT INDUSTRIES
M.G
MAONYESHO GROUND
PLANNED AREA
P.G
PLAYING GROUND
UNPLANNED SETTLEMENTS
LAKE
LAKE VICTORIA


BUKOBA MUNICIPAL MASTER PLAN
PROPOSED LAND USE 2008 _ 2028
N
MUNICIPAL BOUNDARY
TARMAC ROADS
RIVERS
AIR STRIP
CENTRAL AREA REDEVELOPMENT
VALLEY
ABBATOUR
AIR PORT
BUKOBA HORBOURS
BUNENA WATER INTAKE
CEMETERY
COMMERCIAL
AREAS FOR CONSERVATION
FOREST
GODOWN
INDUSTRY
AREAS FOR INFILLING
INSTITUTIONAL
KAITABA STADIUM
LIGHT INDUSTRIES
MAONYESHO GROUND
NEIGHBORHOOD CENTRE
NEGHBOURHOOD AREA
OIL TANKS
OPEN SPACE
PLANNED AREA
PLAYING GROUND
BUS STAND
LORY PARK
AREAS FOR REGULARIZATION
SERVICE TRADE
TOURIST HOTELS
AREAS FOR UPGRADING
LAKE


PROPOSED INFRASTRACTURE AND PUBLIC UTILITIES 2008 _ 2028
MUGEZA
KASHOROO
MAFUMBO
OXIDATION PONDS
KITEYAGINA
BUKOBA
LAKE VICTORIA
WATER PUMP
BUNENA WATER INTAKE
WATER SOURCE (WATER PUMP)
SOLID WASTE DISPOSAL SITE
BUGABO KAMOI
Lutale Forest Plantation
Legend
Municipal Boundary
Tarmac Road
Footpath.
Airstrip
Power Line (High Tension)
Rivers.
Water Source.
Oxidation Ponds
Solid Waste Disposal Site
Water Intake.
Lake.

Appendix VII: NEMC's (TAC)Comments – Response Table

S/N	ITEM	
1.0	General Comments	Action/Response Taken
	The non-Technical summary in English and Swahili version is missing	Presented and submitted as a separately bound report
	Append the proof of compatibility of the proposed site with land use plan of the area	See Appendix VI comprising of the Extracts from the Strategic Urban Development Plan for Bukoba Municipality
	The project should be located beyond 60m from the site from the shore of Lake Victoria	Adjustments will be made during setting out of the project to ensure that the project is constructed beyond 60m from the shoreline of Lake Victoria
2.0	SPECIFIC COMMENTS: **Review Area 1** **Description of the development, local environment, baseline conditions**	
2.1	In section 2.4.2 on page 15; more description should be included e.g. component of pumping station and their capacities. Also, the pumping pressure should be discussed in this section	Information on pump station included under section 2.4.2 page 15
2.2	Section 4.2 on page 41-42 should be narrowed down to specific project site and recent data of the soil study should be used as the provided one is outdated	The project area is Bukoba town where the sewerage system will be built. The reviewer has forgotten that the project is covering the all central business district not one specific location. Soil characteristic does not become outdated it does not change from year to year, the soil characteristics are determined by the parent rock unless there were big changes that affected the soil characteristics!
2.3	The source of data for table 4 is contradicting as the heading presents the population by wards in 2012 while the source of data in page 43 is census of 2002	It was the National Population and Housing Census of 2002 that gave the population by wards in 2012, through projection. This is simple and there is nothing contradicting here, the formula for future population is $Pf = Pn(1+r\%)^n$ However in this report the recent records of population (2012 Population and Housing Census) have been used except for the records that are not yet released.
2.4	Base line condition chapter on page 41-54 should include the following data I. Wind direction on the project site II. Current disease profile	The wind changes direction due to varying pressures (i)We did not collect the information for wind direction for Bukoba Town as we did not see its use in the sewerage system project that covers the whole town. We will be ready to learn this (ii) Disease incidences is presented under section 4.2.2 covering social services including health
2.5	The design of the project should include wetland constructing after maturation pond and it should be described in terms of its capacity and efficiency. Provide the design layout of the ponds, indicating the residence time, depth of the ponds. Hydraulic loading rate, removal efficiency etc provide the capacity of the sewerage	Constructed wetland is not just provided on every waste stabilization pond, it is provided for specific purposes e.g. additional or advanced treatment. In this case Waste stabilization ponds are not built to see their performance. The effluent characteristics will determine the need of the advanced treatment. Therefore the requirement by TAC of the wetland is not supported by any scientific reasoning.

	system and its life span in relation to population of Bukoba CBD.	The layout of the ponds is provided, refer figure 9 Depth of the ponds refer to the detailed drawings of the ponds it is dully shown.
2.6	In section 2.6.1 on page 20-21;be specific on the sewer line location i.e. Right of way in which sewer line will pass through	Unfortunately the sewer line cannot have a dedicated right of way or specific location as the sewer is laid to a town whose buildings are already in place. Therefore any space that will happen to be available adjacent to the building will be utilised once the sewer is laid the trench is backfilled and the sewer remains underground.
2.7	Standby generator is required for the raising main to ensure continuous flow of sewage. The capacity and specific of standby generator should be included in description chapter	The standby generators are required to run the pumps not the rising main. The items are presented under section 2.4.2 covering the pump Station
2.8	Provide information on laboratory management of its chemicals and waste generated	Laboratory proposed is for in-situ analysis such as p^H and DO which does not involve extensive and through analysis. Specialised analysis will be sent to accredited laboratories. Therefore chemicals are not expected to be purchased for analysis
2.9	Provide detailed information on gas collector and utilization	In the sewerage system we do not have any location involving generation of gas. We are ready to learn if there is anything like this. If the reference is to hydrogen sulphide (H_2S) which is generated in sewers without ventilation then this is another case that does not go to utilization as it is only limited to ventilation.
2.10	Provide the specification/design of the incinerator	There is no incinerator anywhere in the report
2.11	On page 28 The Land Acquisition is Cap 118 R:E 2002 and not Cap 118 of 2002	corrected
2.12	On page 29 section 3.3.3 the Forest Act is not administered under the forest ordinance (1957) the sentence should be removed. Also the law was not revised but was repealed by Act No. 14 of 2002.	Removed and corrected
3.	**Review Area 2** **Identification and Evaluation of Key Impacts**	
3.1	Cumulative and residual impact of the project should be discussed in the impact chapter	No cumulative or residual impacts were noted during the assessment of the proposed project
3.2	Waste associated with existence of construction crew should be incorporated in the impacts associated with construction phase.	Included under section 7.3 item or impact 16 which covers generation of construction solid and liquid wastes whose mitigation measures have been covered under same section
4.0	**Review Area 3** **Alternatives, Mitigations and Commitment**	
4.1	Summary of compensation status should be included in the report.	The valuation of properties has just started and the resettlement Action Report together with the records of those to be compensated will be known later.
4.2	Alternative site, design/technology and operating conditions should be discussed in the report.	See section6.7.5 and 6.7.6
4.3	The qualitative monitoring system of influent from the facility is should be well described in the design as one of	Included under section 7.3 (3)

	mitigation measure to avoid pollution of the lake.	
4.4	Table 24 (Environmental and Social Monitoring Plan) on page 90-98 include the column for monitoring parameter.	This table is for Environmental and social Management Plan (ESMP) not for monitoring. The column for monitoring parameter has been well presented on table 25 (Environmental and Social Monitoring Plan).
4.5	The 103 section 9.3 operation phase: sludge management should be addressed and the targeted level for waste water should be as per waste water regulation.	Included under section 9.3
5.0	**Review Area 4** **Public Participation and Communication of Results**	
5.1	All figures in the report should be improved so that they can be readable e.g. figure 7 on page 14, figure 8 on page 15 and figure 9 and 10 on page 17-18 etc.	Most of the figures are now enlarged for legibility
5.2	Stakeholders' views response table to show how issues raised by stakeholders have been taken care in the EIS should be included in the report.	Stakeholders consultation meetings were a two-way communication system whereby issues asked were responded on the spot and some were mainly on gaining understanding on how the system works. Some or many of the issues were for information only, then how does one show these in the report. Important issues are handled under important subjects like compensation as the mitigation measure for those who will happen to be affected by the project.
5.3	Language used and spell check should be checked throughout the report.	Done as requred
5.4	The word 'draft' should not appear in the cover page of the report.	This was meant for the Draft Report but now removed in this final report
5.5	The indention in the list of tables should be organized well.	Done as required
5.6	On the cover page, the e-mail address of NEMC is incorrect; it should dg@nemc.or.tz	Corrected address presented on the cover page of the EIS
5.7	The report structure should be in a way that executive summary should start and followed with table of content. Also the content of the executive summary should be in line with Reg. 18(3) of the EIA and Audit Regulation, 2005.	Restructured, contents in line with Reg.18(3) of EIA and Audit Regulation,2005