WATER SUPPLY SYSTEMS FOR BUHONGWA, BUSWELU, KISESA AND USAGARA IN MWANZA CITY AND NEIGHBOURING AREAS

Updated ESIA Report for Butimba WTP
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Project	Water Supply Systems for Buhongwa, Buswelu, Kisesa and Usagara In Mwanza City and Neighbouring Areas
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ACRONYMS

AFD	Agence Française de Développement
DED	Detailed Engineering Design
DoE	Department of Environment
DP	Domestic Point
EA	Environmental Assessment
EIA	Environmental Impact Assessment
EIB	European Investment Bank
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
E&S	Environment and Social
ESA	Environmental and Social Assessment
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management/Monitoring Plan
ESS	Environmental and Social Safeguard Standards
EU	European Union
EUR	Euro
GBV	Gender Based Violence
GRC	Grievance Redress committee
GRM	Grievance Redress Mechanism
GoT	Government of Tanzania
HIV/AIDS	Human Immunodeficiency Virus / Acquired Immune Deficiency Syndrome
IIP	Immediate Investment Plan (for LVWATSAN)

LVWATSAN	Lake Victoria Water and Sanitation (Project)
MCC	Mwanza City Council
MEO	Mtaa Executive Officer
MSF	Multi-Stakeholder Forum
MWAUWASA	Mwanza Urban Water Supply and Sanitation Authority
NEMC	National Environment Management Council
NGO	Non-governmental Organization
PAP	Project Affected Person
PFR	Project Formulation Report (for LVWATSAN)
PMC	Project Management Consultant (for LVWATSAN)
PMU	Project Management Unit (for LVWATSAN)
PPE	Personal Protective Equipment
RAP	Resettlement Action Plan
RPF	Resettlement Policy/Planning Framework (for LVWATSAN)
SEA	Sexual Exploitation and Abuse
SH	Sexual harassment
SEP	Stakeholder Engagement Plan (for LVWATSAN)
SER	Supplementary Engineering Report (for LVWATSAN)
STP	Sexually Transmitted Diseases
STIP	Short-term Investment Plan (for LVWATSAN)
TANROADS	Tanzania National Roads Agency
TBS	Tanzania Bureau of Standards
USD	United States Dollar
VEO	Village Executive Officer
WHO	World Health Organization
WEO	Village Executive Officer
WSDP	Water Sector Development Project

EXECUTIVE SUMMARY

INTRODUCTION

The proposed STIP works are part of the ongoing LVWATSAN – Mwanza Project. The Project aims at protecting the Lake Victoria environment and well being of the population in the Lake Basin. The Project has several components, one of these being the preparation and implementation of plans for the rehabilitation and expansion of existing water supply and wastewater infrastructure in Mwanza City, and the implementation of these plans.

Implementation of the LVWATSAN – Mwanza Project started in October 2014 with the engagement of a Detailed Engineering Design (DED) consultant, COWI, followed by UN-HABITAT being responsible for community liaison and starting in February 2015, and a Project Management Consultant (PMC), Mott MacDonald, commencing in April 2015. Meanwhile, Halcrow had been contracted by EIB to develop a project-specific Resettlement Policy (Planning) Framework (RPF) in late-2014, whereas UN-HABITAT was entrusted with the task to develop a project-specific Stakeholder Engagement Plan (SEP) – the resulting RPF and SEP, meant to guide Project implementation, were endorsed by the MoWI on 8 January 2016.

In order to document significant changes in the current biophysical and socioeconomic baseline conditions, MWAUWASA contracted SEURECA/NETWAS JV to update the Environmental and Social Impact Assessment (ESIA) report. This update takes into account the environmental and social risks and impacts associated with the added project components, such as solar panels. Revise the ESIA to incorporate the details of the Solar Generation Plant, and to conform to the most recent changes to the WB ESF and its ESS and assist the Client in seeking advice from NEMC regarding the extension of time of the NEMC Certificate to cover the additional construction works for Phases 2 and 3 of the WTP as well as the solar generation plant.

The main raw water intake from Lake Victoria and water treatment plant (WTP) are located at Capri Point and Butimba in Mwanza City. There are two free standing reservoirs at the Capri Point WTP, but only one is in use. Water is transmitted to the network via four (4) transmission pipes. In addition, MWAUWASA has installed two smaller pipelines to serve the Capri Point hilltop areas located above the WTP. The Capri Point WTP was first built in 2008, while Bitimba WTP was built in 2023 and it is in the DLP of One year. Capri Point plant produces between 63,000-96,000 m3/day against a design

capacity of 108,000 m3/day while Butimba WTP is planned to be developed in four Phases from an initial design capacity of 44,000 m3 /day, increasing to an ultimate capacity of 178,000 m3 /day. The low production coupled with erratic power supply restricts water availability in the City especially for the higher outlying areas, and therefore rationing is in force.

For Solar components three options have been evaluated and when optimized for technical, financial, environmental and LCOE, a hybrid configuration with BESS was established as the best fit solution. In particular the system was determined to be a 9MWp/31.4MWh Solar system comprising 9MW peak solar PV system, 31.4MWh BESS to provide 12 hrs of energy supply from the solar system. It has also been established that the space requirement of approximately 45,000m^2 is needed against available space area of around 75,000m^2. It was thus established that the space available is adequate to meet the requirements for deployment of the 9MW solar Plant.

Aim and Objectives of this ESIA Study

The objective of updating the Environmental and Social Impact Assessment (ESIA) of Water Supply and Wastewater Short-Term Investment Plan for Mwanza City aims to document significant changes in the current biophysical and socioeconomic baseline conditions, Environmental and social risks and impacts associated with the added project components, such as solar panels, Incorporate the details of the Solar Generation Plant, and to conform to the most recent changes to the WB ESF and its ESS. The ESF objective is going beyond the traditional “do not harm” approach to maximising development gains and its compliance is measured through the compliance with the following 10 Environment and Social Standard (ESS): ESS1 to ESS10. For the proposed Project, it is expected that eight of the 10 ESSs will be applied: ESS1, ESS2, ESS3, ESS4, ESS5, ESS6, ESS8, and ESS10.

The general objectives listed in Part IV of the Environment Impact Assessment Regulations of 2005 are as follows, but not limited to:

- Ensure that environmental considerations are explicitly addressed and incorporated into the development decision making process
- Anticipate and avoid, minimise or offset the adverse significant biophysical, social and relevant effects of developmental proposal
- Protect the productivity and capacity of natural systems and ecological processes which maintain their functions
- Promote development that is sustainable and optimises resources use and management opportunities

- Establish impacts that are likely to affect the environment before a decision is made to authorise the project
- Enable information exchange, notification and consultations between stakeholders.

Components of the STIP Works

The proposed STIP works for Mwanza City are divided in the following water supply and wastewater components:

I. Raw Water Intake and Water Treatment Works
II. Transmission Main
    - Construction of a transmission main from Butimba intake to sub-Igoma reservoir and Booster Pump Station (BPS)
    - Construction of a Sub-Igoma reservoir and BPS in Sahwa area located in Lwanhima Ward
    - Installation of a transmission main from Sub-Igoma BPS to Igoma existing reservoir.
III. Sewerage System:
    - Construction of a Igoma Wastewater Treatment Plant (WWTP) in Nyamhongolo area, Igoma. The acquired site is 39.5 ha for the WWTP located along the Mwanza-Musoma highway. The wastewater treatment plant at Igoma will have a capacity of approximately 12,500 m3/day; the sewerage network measures about 30 km and will have an estimated 14,000 connections
    - Construction of a sewerage network to cover households in five wards i.e. Igoma, Kishiri, Nyamhongolo, Buswelu and Nyakato to allow maximum drainage of different parts. Wastewater from industries in those wards will also be collected.
IV. Solar Plant at Butimba WTP

Project Alternatives

Through the analysis of alternatives, a comparison can be made of the operational effectiveness, costs and environmental and social risks of proposed development options. For the proposed water supply works three alternatives have been considered, i.e. Do-Nothing, Delaying Implementation or Expansion of Existing Works as is outlined below.

No-Project Alternative

The No-Project Alternative means that the proposed project will not go ahead. Constructions and operations will not take place. This alternative will not fulfil the purpose of the project, the objective of the National Environment, Water and Public Health Policies or MWAUWASA responsibilities to meet

the identified needs to provide sanitation services. This means that Mwanza would depend on water produced by the current water supply system, severely affecting socio-economic activities in the City. On the other hand, sanitation services for the wards of Buswelu, Nyamhongolo, Igoma, Nyakato and Kishiri would continue to be based on on-site sanitation which is not adequate given the soil and water table conditions. Therefore, this is not a feasible alternative to be considered

Delay Implementation

There is a great need for improvement of water supply to supplement existing services. Funds have been made available through the GoT and EIB. Failure to complete the works within the relatively limited project duration may result in no improvement being realised for considerable time to come. Any delays will just mean continuation of the current inadequate water supply and sewerage services in Mwanza City.

Expand Existing Water Treatment Plant At Capri Point

This option is already being implemented under another component of the LVWATSAN – Mwanza Project but will not lead to notable water supply coverage increase. There is limited space to expand the works at Capri Point. There are already two transmission mains laid from the plant, laying another transmission main alongside would necessitate costly and lengthy compensation procedures as this is a high-value residential/commercial area of Mwanza City

Choosing Another Site For Waste Stabilization Ponds

Several alternatives have been considered, such as the discharge of backwash waters from the water treatment plant away from the water intake area, and alternative routings of trunk mains and distribution network piping to avoid resettlement and/or compensation of Project Affected People (PAPs).

Building a Conventional Sewerage Treatment Plant Instead of Waste Stabilization Ponds

Though a conventional sewerage treatment plant would require less area and produce less odour nuisance, both the construction and operational costs would pose too high a burden to MWAUWASA which would ultimately lead to higher water and sewerage bills for the City residents.

Key Policies, Regulations and Standards

The Government has adopted national policies to address environmental management in various sectors. National environmental policies and regulations are based on the need to take an integrated

approach to environmental management and the need to work towards the goals of sustainable development. The objectives of these policies are among others to regulate development so that this is not undertaken at the expense of the environment. Preparation and implementation of the ESIA reflects the key national policies and regulations which are described in the report. In addition Word Bank Environmental and Social Framework has been reviewed. The World Bank Environmental and Social Framework sets out the World Bank's commitment to sustainable development, through a Bank Policy and a set of Environmental and Social Standards that are designed to support Borrowers' projects, with the aim of ending extreme poverty and promoting shared prosperity. This Framework comprises:

- A Vision for Sustainable Development, which sets out the Bank's aspirations regarding environmental and social sustainability,
- The World Bank Environmental and Social Policy for Investment Project Financing, which sets out the mandatory requirements that apply to the Bank; and
- The Environmental and Social Standards which set out the mandatory requirements that apply to the Borrower and projects.

The World Bank Environmental and Social Policy for Investment Project Financing sets out the requirements that the Bank must follow regarding projects it supports through Investment Project Financing.

The Environmental and Social Standards(ESS)

This set out the requirements for Borrowers relating to the identification and assessment of environmental and social risks and impacts associated with projects supported by the Bank through Investment Project Financing. The Bank believes that the application of these standards, by focusing on the identification and management of environmental and social risks, will support Borrowers in their goal to reduce poverty and increase prosperity in a sustainable manner for the benefit of the environment and their citizens. The standards will: (a) support Borrowers in achieving good international practice relating to environmental and social sustainability; (b) assist Borrowers in fulfilling their national and international environmental and social obligations; (c) enhance nondiscrimination, transparency, participation, accountability and governance; and (d) enhance the sustainable development outcomes of projects through ongoing stakeholder engagement.The following are applicable Environmental and Social Standards regarding this project.The world Bank ESS1, ESS2, ESS3, ESS4, ESS6, ESS8, ESS9 ESS10 have been discussed in details in chapter three of legal policy and social framework

Baseline Conditions/Existing Condition

This section presents an overview of the existing environmental and socio-economic conditions of the proposed project areas. For updating the ESIA Document, the baseline information was collected from primary as well as secondary data sources. Primary information was collected through field surveys, focussed group discussions and consultations while secondary information was obtained from published journals, books, authorised websites and government reports. Site-specific environmental and social conditions at the targeted STIP intervention sites have been assessed by the Design Consultant (COWI: EIA Screening Report, January 2017). This Chapter summarises the key resources such as water, vegetation cover, aquatic resources, habitats, archaeology, landscape, settlements, economic activities, protected areas, utilities and infrastructure located in each specific project location. Specific locations were screened in line with the proposed facilities that entail the intake area, treatment plant/pump house, transmission mains to the reservoirs, tank locations, domestic point locations and distribution network. The site-specific conditions have been assessed based on Tanzanian Legislative requirements, EU's EIA Directives and EIB's Environmental and Social Safeguards and World Bank Environmental and Social Framework.

Stakeholder Consultation and Public Participation

During the Updation of the ESIA Study Team carried out a stakeholder analysis followed by identification of the means of public involvement through either public meetings, advertisements and notices, surveys, interviews and questionnaires. Methods were weighed against each other to select the best option for participation. Public meetings were chosen to be the best option for the majority of stakeholders at the project sites.

Public consultation during the study involved various stakeholders i.e. persons and institutions that have an interest in the planning and execution of the project, including those positively and negatively affected. The stakeholders consulted were officials from Mwanza City Council, Ilemela Municipal Council, Ward Councillors, WEOs, MEOs and the project communities. The stakeholder consultations helped in the determination and identification of impacts and their significance as well as mitigation measures.

Intensive consultations on the proposed construction of water supply and wastewater infrastructure were held at regional, municipal/district, and ward levels between November 2017 and March 2018 by another consultant. Issues pertaining to the proposed construction of water supply and wastewater infrastructure and its environmental and social consequences were presented and discussed with representatives of the key stakeholders, interested institutions and residents particularly those around

working or residing within the areas earmarked for project activities. Views and/or concerns during the meetings were noted, documented and responded upon by the Study Team.

Methodologies for Identification of Impacts

The assessment of environmental impacts and their significance is largely dependent on the extent and duration of the expected change, size of the resource affected and their sensitivity to the change. Impact identification is a process designed to ensure that all potential significant impacts are identified and taken into account in project design and implementation. Several 'tools' are available to assist in impact identification. The most frequently used are checklists of impacts, although matrices, network diagrams and map overlays are also commonly used. In this ESIA study, the following are the methods used.

Matrix

The Consultants team identified the environmental impacts through the application of the matrix method (screening matrix), which is predicated on identifying and qualifying Project actions in relation to natural and social environmental conditions. This resulted in a list of anthropomorphic actions that had an impact on the environment, including the health and safety of the project's communities, the latter of which was accomplished by means of a cause-effect relationship matrix.

Focused Approach-Impacts Mapping

The method was applied to locate and identify every receiving environment for potential impacts from the STIP Project.

Experts Knowledge

Expert or knowledge-based systems were used to assist diagnosis, problem solving and decision-making.

Identification and Assessment of Impacts

ESIA involves the identification of any positive or negative environmental and social impacts that may arise from a development, whereas it also aims at identifying alternatives that would result in less adverse impacts. Rehabilitation and expansion of an existing water supply system and associated infrastructure, like any other development project in a (peri)urban or rural setting, may have environmental and social impacts that may occur from the construction activities ranging from site clearance to transportation of building materials, construction and operation of works. Potential

environmental and social positive and negative impacts may emerge during the subsequent phases of the project. Impacts and their magnitude and receptor sensitivity were assessed and the overall significance was determined.

The main positive impacts of the STIP works include:

- Rehabilitated and extended water supply system offering a more reliable source of safe drinking water to a larger portion of the population.
- Reduced incidence of diseases due to more and better-quality potable water resulting in a healthier population.
- Safe disposal of sewage and other waste water from domestic, commercial and industrial sources for the areas that will be served by the sewerage system.
- Employment and trading opportunities for the neighbouring communities during the construction and operation phase of the project including food vendors.
- Increase in government and municipal revenue collection through income tax payments by the Contractor and sub-contractors as well as statutory contributions made by the contractor for his employees.

Main negative Impacts include:

- Disturbance, particularly land scarring at borrow sites or sources of construction materials
- Increase in traffic intensity during construction activities
- Possible contamination of water from leakages of fuel and lubricants from construction equipment
- Poor air quality from dust and emissions around the construction site and material hauling routes
- Spread of diseases (HIV/AIDs, STIs or STDs)
- Safety hazards during construction
- Generation of construction solid and liquid wastes
- Discharge of effluent from sewage treatment plant may cause pollution of the soil and surface and water courses if there is inadequate treatment or inadequate precautions
- Unpleasant odours could emanate from the sewerage treatment plant and affect communities close to the plant if the operations are not effective and there is inadequate buffer zone.
- There may be a bird influx in the sewerage treatment area as experienced at the existing sewerage ponds at Butuja in Ilemela causing nuisance.

Environmental and Social Management Plan

The report provides the ESMP for the three-main works i.e. the intake/water treatment plant, transmission main, and sewerage system. The objectives of the ESMP are to:

- Provide a systematic overview of the required measures to manage the mitigation of impacts that will or may result from the proposed rehabilitation and extension of water supply and wastewater works in Mwanza City;
- Indicate main responsibility for implementation of these mitigation measures, as well as the timing of the measures, targets to be achieved, reporting requirements, and indicative costs.
- The ESMP outlines the key activities as well as the main actors and their responsibilities. MWAUWASA will ensure that the contractor and sub-contractors who will be awarded the tenders for implementing the works adhere to the laid down procedures for construction and commissioning of the proposed development in accordance with the ESMP.

ESMP Monitoring Plan

The ESMP Monitoring Plan is detailed for the STIP works. Monitoring of the ESMP will be a primary responsibility of the Supervision Consultant, reporting to the MWAUWASA Project Management Unit (PMU) which will be supported by Project Management Consultant (PMC). The PMU will report to NEMC, MoWI and EIB. MWAUWASA will also share relevant information with the Mwanza Regional Secretariat and other stakeholders wherever necessary. 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 life cycle of the proposed development.

Environmental audits are also usually carried out some years after completion of the project. The project proponent, MWAUWASA in collaboration with other project stakeholders (project financers, project beneficiaries, etc.) may initiate such audit processes to cover all projects activities in accordance with NEMC.

Decommissioning

The report provides guidance for the unlikely event that the construction works need to be terminated prematurely, or dismantled at the end of the lifetime. The works are expected to have a minimum operational lifespan of 25 years; however, rehabilitation or upgrading may be needed within this period. For decommissioning after the end of project operation MWAUWASA will prepare and submit to NEMC the decommissioning plans for approval. In this regard, the proponent / developer shall

approach NEMC in due time with a proposal on decommissioning stating details and methodology of proper decommissioning. Guidelines from other relevant regulatory authorities including TEMESA, Tanzania Building Agency, and Occupational Health and Safety Agency will also be adhered to.

For Solar, the expected lifetime of the project ranges between 30 that will be renewable as long as the proper predictive maintenance measures are taken and all the necessary revamps and upgrades are done.

Summary, Conclusion and Recommendation

A systematic assessment of expected impacts of the interventions shows that the planned development is expected to lead to a number of positive impacts notably improved water supply and sewerage for the population of Mwanza City, and some employment and business opportunities. Some negative impacts of the interventions are associated with the construction, operation and (whenever applicable) decommissioning phases of the facilities, but are all believed to be of low to moderate significance. All impacts can be managed and mitigated to acceptable levels by the various parties for which responsibility has been indicated in the report.

1. INTRODUCTION

1.1. Background of the Project

The Lake Victoria Water and Sanitation (LVWATSAN) Initiative was launched in 2004 by the ministers responsible for water from Kenya, Tanzania and Uganda with the aim of achieving the Millennium Development Goals (MDG) for water and sanitation in secondary centres within the Lake Victoria Basin. The Water Sector Development Programme (WSDP; 2005-2023) established under the Ministry of Water and Irrigation (MoWI), under which LVWATSAN resorts, is the main financing mechanism for the water sector in Tanzania. Its past five-year programme has foreseen almost USD 1 billion of funding for the WSDP. An Environmental and Social Management Framework (ESMF) and a Resettlement Management Framework (RMF) for the programme were prepared and completed in 2006.

Following a request from the ministers in 2009, the European Investment Bank (EIB) launched a project formulation study in 2010 with the aim to develop plans to scale up the UN-HABITAT-promoted LVWATSAN Initiative to the major settlements of Kisumu in Kenya, and Mwanza, Musoma and Bukoba in Tanzania together with three smaller satellite towns around Mwanza, i.e. Misungwi, Magu and Lamadi.

This study, concluded by Atkins in August 2012, resulted in a Project Formulation Report (PFR) covering the six fore-mentioned Tanzanian shore towns. Supplementary studies were conducted by R-Solve, the findings of which are reflected in the Supplementary Engineering Report (SER, August 2012). Both the PFR and SER include sections on preliminary perceived environmental and social impacts of the interventions, which were regarded as mostly positive.

EIB's Environmental and Social Datasheet, of February 2013, concluded for the LVWATSAN project that "the majority of the investments will need to be subjected to Environmental and Social Impact Assessments (ESIAs) at town level, with development of Resettlement Action Plans at intervention level tailored in accordance with the spatial footprint as ultimately determined".

The program also adheres with Tanzania's Development Vision 2025 with the aim to reduce poverty and to attain a high quality of life for all people by 2025. Water Resources Management and Water Supply feature prominently in the Development Vision. Regarding the overall targets, the objectives to be achieved include: equity of access, water management capacity and proper maintenance of water systems. Consequently, use of environmentally friendly technologies suiting affordable water tariffs coupled with billing and revenue collection mechanisms are considered as important for a sustainable water supply system.

Implementation of the LVWATSAN – Mwanza Project started in October 2014 with the engagement of a Detailed Engineering Design (DED) consultant, COWI, followed by UN-HABITAT being responsible for community liaison and starting in February 2015, and a Project Management Consultant (PMC), Mott

MacDonald, commencing in April 2015. Meanwhile, was contracted by EIB to develop a project-specific Resettlement Policy (Planning) Framework (RPF) in late-2014, whereas UN-HABITAT was entrusted with the task to develop a project-specific Stakeholder Engagement Plan (SEP) – the resulting RPF and SEP, meant to guide Project implementation, were endorsed by the MoWI on 8 January 2016.

Key deliverables of the COWI/DED consultant (October 2014 – early-2017) included the following:

1. **Immediate Investment Plan (IIP) –** i.e. a study report and tender documents for planned interventions in Mwanza City for (i) sanitation in selected schools and public places; (ii) water supply extension and rehabilitation of pipelines; (iii) simplified sewerage and sewer rehabilitation and extensions.
2. **Satellites Investment Plan –** study reports and tender documents for rehabilitation and expansion of water supply infrastructure and construction of a faecal sludge treatment plant, i.e. in the Mwanza satellite towns of Misungwi, Magu and Lamadi.
3. **Master Plan for Mwanza City –** a water supply, wastewater and sanitation strategy for Mwanza and satellites covering the period 2015-2040 and including the Short-term Investment Plan (STIP) for proposed (i) funded and (ii) unfunded works.

The Environmental and Social Impact Assessment (ESIA) for the proposed Water Supply and Wastewater Short-Term Investment Plan for Mwanza City – Tanzania was conducted according to the Environmental Management (EIA and Audit) (Amendment) Regulations, and submitted to the National Environment Management Council (NEMC) for certification. Based on the ESIA submitted to the NEMC, MWAUWASA was issued an Environmental Impact Assessment (EIA) Certificate in accordance with Section 92(1) of the Environmental Management Act, Cap 191.

In order to document significant changes in the current biophysical and socioeconomic baseline conditions, MWAUWASA has contracted SEURECA/NETWAS JV to update the Environmental and Social Impact Assessment (ESIA) report. This update takes into account the environmental and social risks and impacts associated with the added project components, such as solar panels. Revise the ESIA to incorporate the details of the Solar Generation Plant, and to conform to the most recent changes to the WB ESF and its ESS and assist the Client in seeking advice from NEMC regarding the extension of time of the NEMC Certificate to cover the additional construction works for Phases 2 and 3 of the WTP as well as the solar generation plant.

The updated ESIA Report, supporting documentation, and management plans have been prepared in accordance with the Environmental Management Act, cap 191 and Environmental Management (EIA and Audit) (Amendment) Regulations, 2018, and took into account the other relevant government policies, laws and regulations, WB ESF and its ESS relevant to the project and the environment to include the phase II and III extension and to include the Solar generation Plant.

1.2. Rationale of the STIP Works

Poor water supply and sanitation has long been regarded as a constraint to inclusive economic growth. Inadequate access to clean and safe water supply and adequate sanitation especially in rural areas is a major contributing factor to poverty. The amount of time and effort spent on daily chores of water collection, and in caring for those suffering from water and sanitation-related diseases, decreases opportunities for engaging in productive activities. With improved water supply and adequate sanitation provision, the reduction of time spent on fetching water and the positive health impact through reduced morbidity will allow the population in the project areas to increase productive and income generating activities. This will ultimately lead to more inclusive growth outcomes.

The existing water supply in substantial areas of Mwanza City does not accommodate the current water demand, and many people do not have access to improved sanitation. There is also a need to better manage the country's water resources to improve water allocation and equitability. Similarly, there is a need for investment to improve growth in water dependent economic sectors (people in the area are also engaged in animal keeping which demands water for daily sustenance).

While investments in the sector have increased over the past years, a further increase is needed to meet the country's goals as articulated in Tanzania's Development Vision 2025, which stipulates among others increased access to water, increased access to sanitation; and improved institutional capacity for water resources management.

An assessment was carried out by COWI to determine what is required to improve water supply and wastewater systems in Mwanza City. In terms of water supply facilities, Mwanza City, Ilemela and Nyamagana Municipal council are being served by the MWAUWASA. The utility is unable to consistently attain satisfactory levels-of-service throughout the entire service area. The main causes are insufficient infrastructure (lack of finances), rudimentary system layout, unreliable power supply and sparse maintenance of existing facilities.

1.3. Project Benefits

The WTP is planned to be developed in four Phases from an initial design capacity of 44,000 m3 /day, increasing to an ultimate capacity of 178,000 m3 /day. Phase 1 (44 MLD) has already been constructed and was commissioned in October 2023 but is currently under the 1 year operation period according to the scope of the Contract, the STIP works will increase coverage of sustainable and clean water to the population of Mwanza City. An additional 200,000 people are expected to benefit from the improved water supply. The sewerage system is expected to benefit people/households and industries in the fourteen wards(14) of Mwanza. These will result in health and economic benefits. In addition, the project will create jobs especially during the construction phase.

1.4. Project Funding and Cost

The overall LVWATSAN – Mwanza Project is financed under the European Union (EU) Africa Infrastructure Trust Fund within the overall context of the EU and Africa Strategic Partnership. The European Investment Bank (EIB) and the Agence Française de Development (AFD) have signed two loan agreements with the United Republic of Tanzania for an amount of EUR 45 million each for financing of 86% of the investment costs associated with the extension and upgrading of water supply and sanitation in Mwanza City and three satellite towns (Misungwi, Magu and Lamadi) as well as sewerage systems in the towns of Bukoba and Musoma. The Seureca Veolia/SEAL/NETWAS JV Consultant has been engaged to conduct feasibility study, preliminary designs, tender documentation and construction supervision of Buhongwa, Buswelu, Kisesa and Usagara Water Supply Project. The Consultant has been engaged as the Engineer for the Buhongwa, Buswelu, Kisesa and Usagara Water Supply Project. MWAUWASA and the MoW are considering seeking additional funding from AFD and the EIB to ensure the continuation of implementation of works in Mwanza City and Neighbouring Areas.

1.5. Rationale of the ESIA Study

The most useful tool for understanding and managing the impacts of a particular infrastructural development is through an Environmental and Social Impact Assessment (ESIA). Through scientific analysis and stakeholder involvement, the EIA process helps an organisation or individual / developer identify critical social and environmental issues associated with a project, and ensure that positive impacts are optimised while negative impacts are minimised and mitigated. An effective ESIA process can improve local community understanding of the whole project, increasing the sustainability of the project. It is cost-effective to carry out an ESIA prior to site development, to identify and resolve issues

at an early stage by appraising options for development, because of the large amount of capital funding involved in developing or altering a site. ESIAs can also be useful for the operations phase to identify areas for improvement and thus avoid site closures because of non-compliance. The purpose of conducting this ESIA study was to facilitate evaluation of potential impacts and mitigation associated with the proposed water supply works in harmony with relevant stakeholders.

Part VI and Third Schedule of the Environmental Management Act (Act No. 20 of 2004) (URT, 2004) provides information on EIA and projects that require EIA. Similarly, according to the First Schedule of the EIA and Audit Regulations, 2005 (URT, 2005), the proposed project falls within the category of projects that require mandatory EIA. Item 1 (ii) in the First Schedule of the Regulations compels mandatory EIA projects that are relevant to the proposed development. The Environmental Management Act (EMA), Act No. 20 of 2004 provides comprehensive laws for environmental management in the country bringing together stakeholders across different sectors. The Act through its EIA and Audit Regulations, 2005 outlines steps to be followed and elaborates clearly procedures to be followed in undertaking EIA study for any development project. Thus, this EIA study corresponds with the EMA, 2004 and its EIA and Audit Regulations of 2005.

1.6. Objective of the Environmental and Social Impact Assessment Study

The objective of updating the Environmental and Social Impact Assessment (ESIA) of Water Supply and Wastewater Short-Term Investment Plan for Mwanza City aims to document significant changes in the current biophysical and socioeconomic baseline conditions, Environmental and social risks and impacts associated with the added project components, such as solar panels, Incorporate the details of the Solar Generation Plant, and to conform to the most recent changes to the WB ESF and its ESS. The ESF objective is going beyond the traditional “do not harm” approach to maximising development gains and its compliance is measured through the compliance with the following 10 Environment and Social Standard (ESS): ESS1 to ESS10. For the proposed Project, it is expected that eight of the 10 ESSs will be applied: ESS1, ESS2, ESS3, ESS4, ESS5, ESS6, ESS8, and ESS10.

The general objectives listed in Part IV of the Environment Impact Assessment Regulations of 2005 are as follows, but not limited to:

- Ensure that environmental considerations are explicitly addressed and incorporated into the development decision making process
- Anticipate and avoid, minimise or offset the adverse significant biophysical, social and relevant effects of developmental proposal
- Protect the productivity and capacity of natural systems and ecological processes which maintain their functions

- Promote development that is sustainable and optimises resources use and management opportunities
- Establish impacts that are likely to affect the environment before a decision is made to authorise the project
- Enable information exchange, notification and consultations between stakeholders.

1.7. Approach and Methodology

This ESIA report was updated using the same methodology as the previous assessment.In accordance with the Environmental Management (EIA and Audit) (Amendment) Regulations, 2018, the ESIA was updated using a methodology that was appropriate. This updated ESIA was conducted using checklists, the consultants' prior experience, and conversations with the Butimba site supervisor and MWAUWASA.

Both a desktop analysis and fieldwork were conducted for this updated ESIA. In order to obtain information and data on various project aspects, it involved reviewing literature and documents as well as conducting field studies at the project site.

1.7.1. Analysis of Baseline Conditions

The report has been developed based on available information. A review of the current baseline status of the project area and subsequent updating of the anticipated impacts, mitigation measures as well as the environmental management plan is the focus of this assignment as such as to prepare an ESIA Study Report. In addition to physical environmental assessment, consultation meetings were undertaken by the consultant with a view to appreciating the design concepts, project components and implementation schedule as well as associated experiences.

1.7.2. Consultation Meetings

The consultation process with the stakeholders was conducted including meetings with community members and ward leaders, Mwanza City officers as well as the Lake Victoria Basin Water Board (LVBWB) office, etc. A project brief giving the project description and anticipated environmental impacts was prepared, also outlining the mitigation of negative impacts. The consultation process resulted in stakeholders' appreciation and acceptance of the project; stakeholder's recommendations have to the extent possible been incorporated in the design.

1.7.3. Document Review

Updated ESIA Report was reviewed so as to incorporate some changes related to the mentioned changes in the Terms of References. The ESIA existing report document was reviewed for an

understanding of the nature of the works, Policies and Regulations, Likely Positive and Negative Impacts, Proposed Mitigation measures and the project setting, environmental status, data on social and economic characteristics of Mwanza City and land use practices, proposed design concepts, development strategies and related development master plans. Other documents that were reviewed are Nyamagana and Ilemela Socio Economic Profile.

1.7.4. Field Assessment

The team of the consultant conducted the site visit to observe the nature of the project area, the nature of the implemented works, and other relevant information. Apart from the field assessment other data was obtained from the existing ESIA Report where they managed to visit the Water Treatment Plant, Transmission Mains, Sewerage Pipes and Waste Stabilization Ponds.

The fieldwork sessions established the impact zone and impact parameters in terms of physical environment, existing infrastructure, social and economic conditions, housing and settlement patterns, and potential PAPs. The team also visited existing water supply and sewerage works including the water treatment plant at Capri Point, Constructed Water treatment Plant at Butimba, wastewater stabilisation ponds at Ilemela namely Butuja, and water reservoirs at Nyashana, Igoma, Kisesa, Bwiru.

1.7.5. Identification of Impacts and Mitigation Measures

Based on the findings of the field investigations and review of the existing ESIA report, The consultant team identified the potential impacts of all the project/sub-project specific activities related to construction, operation and decommissioning phase and cumulative impact assessment (CIA). Interaction matrix has been used to identify the interaction between project activities and the environmental and social sensitivities. This records the rationale for the impacts and their potential significance, the mitigation measures linked to relevant legislations, the construction contract requirements and the provisions of the ESMP.

Impacts are identified from environmental and socio-economic baseline as affecting the receptors' air, water, land, biodiversity, resources and community. These were further categorized into preconstruction, construction, operational and decommissioning impacts. After the identification of impacts, suitable and viable mitigation measures are proposed for each potential negative impact during the construction, operation and decommissioning phases of the project.

1.7.6. Environmental and Social Management Plan

An ESMP has been compiled to ensure mitigation compliance during the project implementation and operation phases, by identifying explicitly the negative impacts, how these are to be mitigated, who will be responsible for ensuring mitigation, and how compliance will be monitored.

1.7.7. REPORTING

The process of document review involved the Consultant in analysing respective data and information obtained in the design phases and discussions on the design principles that are still evolving. The information obtained was translated into supplementary findings and potential impacts. It also provided a basis for developing mitigation measures and the ESMP for incorporation into the project implementation.

1.8. REPORT STRUCTURE

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

- Introduction
- Project Background and Description
- Policy, Legal and Administrative Framework
- Baseline and Existing Conditions
- Stakeholders Engagement and Public Consultation
- Assessment of Impacts
- Identification of Project alternatives
- Impacts management, Environmental Mitigation measures
- Environmental and Social Management Plan
- Environmental and Social Monitoring Plan
- Cost Benefit Analysis
- Decommissioning
- Summary and Conclusions

2. DESCRIPTION OF THE PROJECT

2.1. Project Location

The project area is located in Mwanza City (Nyamagana) and Ilemela Municipal areas on the southern shores of Lake Victoria in Northwest Tanzania. Mwanza City is made up of Nyamagana and Ilemela District. Mwanza City Council is located on the southern shores of Lake Victoria and is situated between the latitudes 2 015' and 2 031' South of Equator, Longitude 32 0 45' and 33 0 East. Mwanza City is characterised by an urban settlement with a commercial and industrial set up.

Ilemela Municipal Council lies on the southern shores of Lake Victoria within Mwanza Region between Latitude 2015" and 2031" South of the Equator and Longitude 320 45" and - 3302" East of Greenwich approximately 1,140 metres above sea level. The municipality is bordered by Lake Victoria on its Northern and Western parts with a distance of about 12 kilometres, whereas on its Eastern part it is bordered by Magu District and on its Southern part is bordered by Mwanza City Council. It is located 16 Kilometres West of Mwanza International Airport. This council has a total surface area of 1080.55 sq. kms out of which 828.45 sq.kms (77%) is covered by water body (Lake Victoria) and 252.10 (23%) sq. kms are land area.

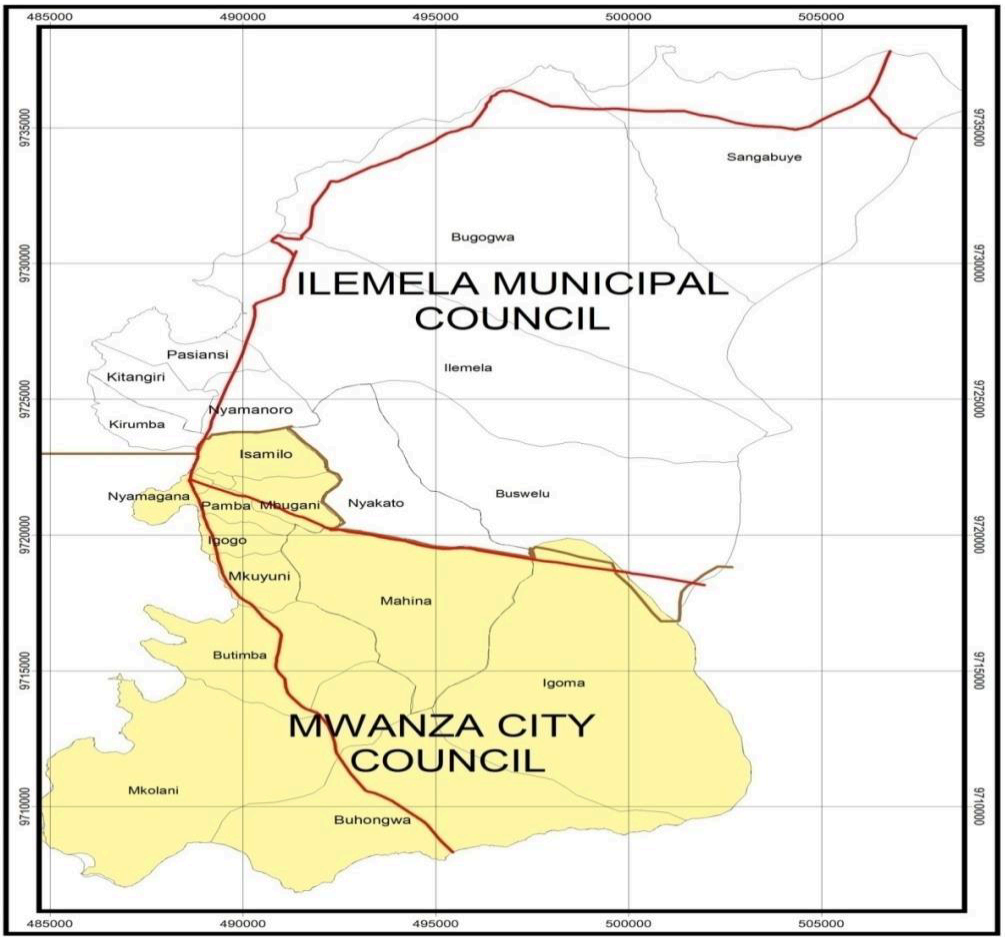

Figure 1: Map showing the location of Mwanza City Council and Ilemela Municipal Council

2.2. Proposed STIP Development Components

2.2.1. Construction of Butimba Raw Water Intake and Pumping Station

This raw water intake facility and pumping station is located close to the lake in a valley bottom marshland/wetland-like area surrounded by rocky hills as shown in the figure below. The entire area is under government ownership (Butimba Prison). The dominant vegetation species include Calliandra species, fern plants and Common Cattail. Small-scale agriculture is the major economic undertaking at the site, including the cultivation of paddy (rice), maize, bananas, mangoes and other crops. The site lacks an access road, although a footpath is available.

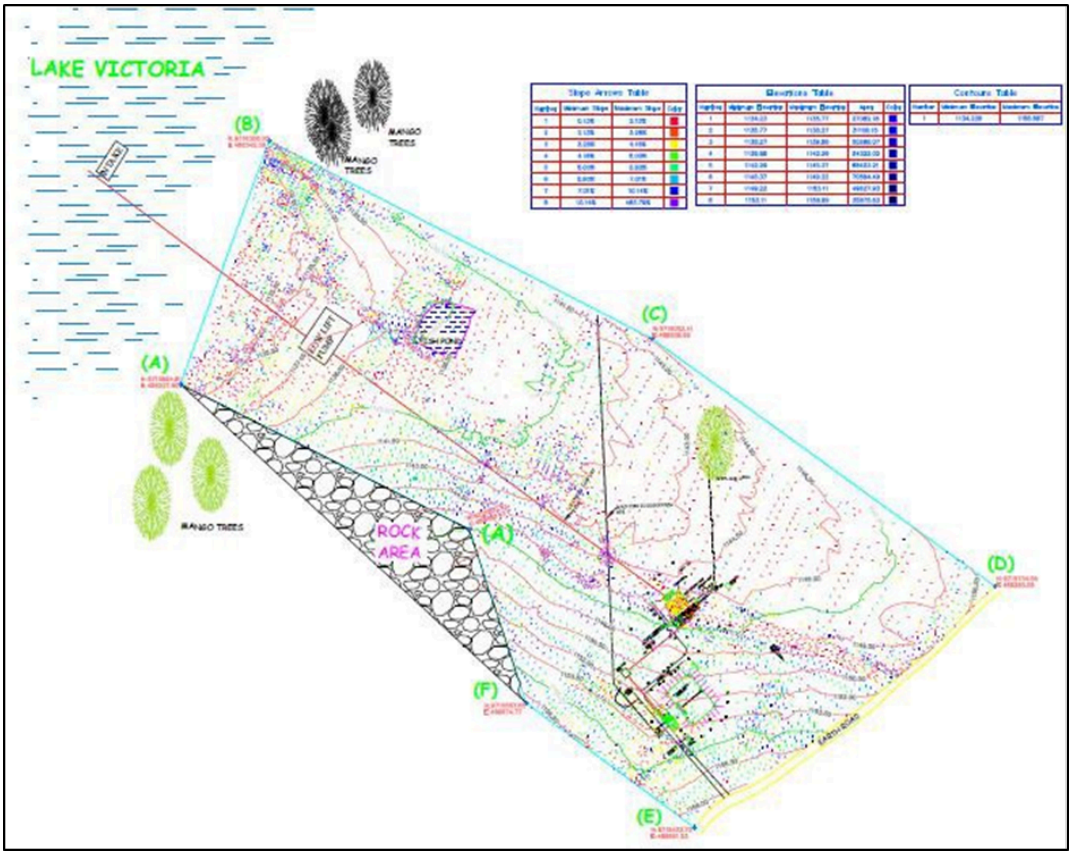

Figure 2 Location of Butimba Raw Water Intake and Water Treatment Plant

2.2.2. Construction of Butimba Water Treatment Plant (WTP)

The WTP is planned to be developed in four Phases from an initial design capacity of 44,000 m3 /day, increasing to an ultimate capacity of 178,000 m3 /day. Phase 1 (44 MLD) has already been constructed and was commissioned in October 2023 but is currently under the 1 year operation period according to the scope of the Contractor. The Butimba Water Treatment Plant (WTP) is situated to the south of Mwanza City and is located within a site that has no immediate development in the vicinity, which covers an area of estimated 37.5 Hectares adjacent to Lake Victoria. The WTP site lies within the Nyamagana District, whose geographic location is identified by its latitude range of 2 015' to 2 031' south of the equator, and longitude between 32 0 45' and 33 0 east. The treatment works have been designed for an enhanced output of 44,000 m3 /day, whilst the raw water intake and pumping station have been designed to meet a Phase 2 output of 88,000 m3/day. The location and layout of the WTP has been designed to take advantage of the natural slope of the site from the south-west towards the north-east, where it drains to the dambo wetland area, which flows through to Lake Victoria. The lower area of the site is a natural wetland drainage area during the rains, but is not subject to significant flows, or floods. The Constructed Butimba Water Treatment tank is shown in the figure 3 below

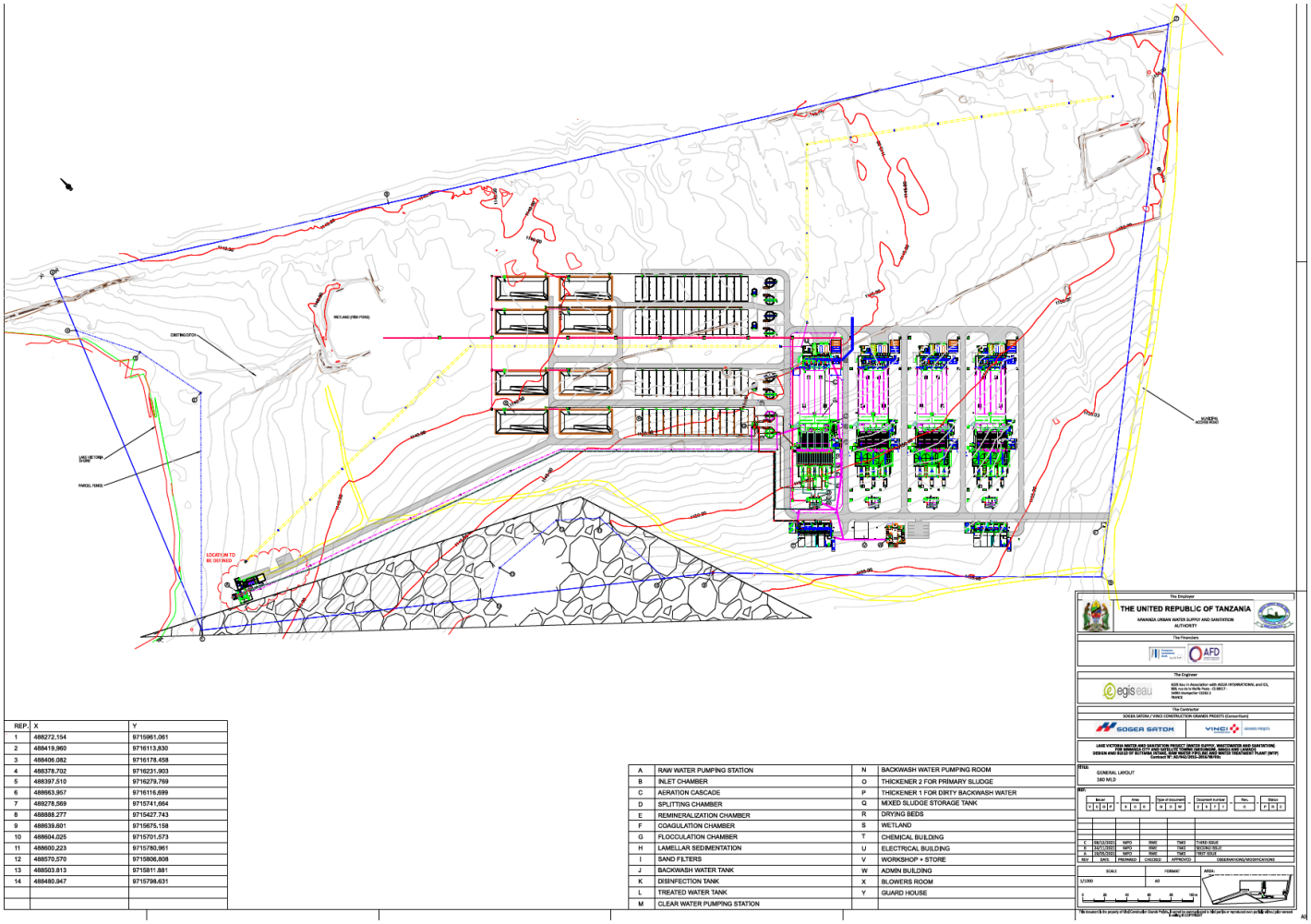

Figure 3: Butimba Water Treatment Plant Layout

2.2.3. Construction of Transmission Main from Butimba Intake to Sub-Igoma Reservoir and Booster Pump Station

A transmission main will be installed to supply water to Sub-Igoma BPS. The approximately 9.8 km long proposed alignment passes mostly along existing road reserves utilising the available RoW and some farmland. The re-aligned route is shown in the figure below.

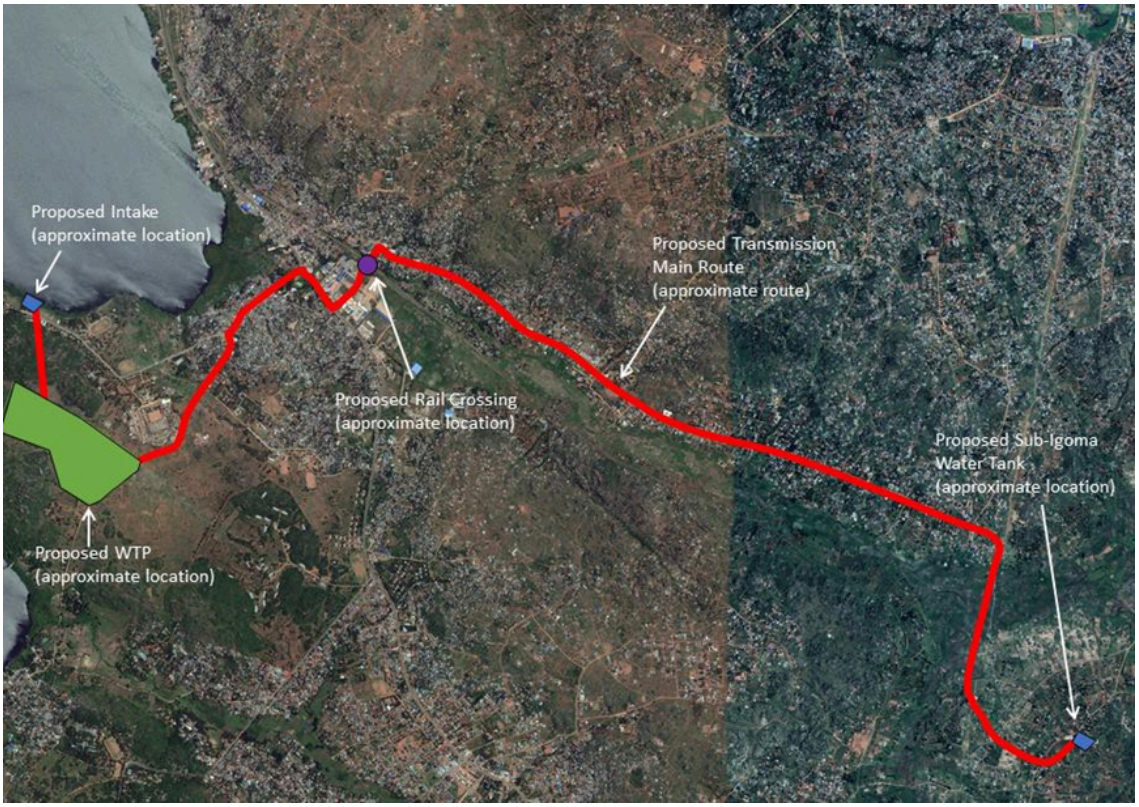

Figure 4 Route of transmission main from Butimba WTP to Sub-Igoma Reservoir

2.2.4. Construction of Sub-Igoma Reservoir and BPS in Sahwa / Lwanhima Ward

An area totalling approximately 1.65 ha has been acquired from private owners in Sahwa area for the construction of the Sub-Igoma reservoir and BPS. It had originally been designated as an industrial area. This included the smaller area of 1.16 ha. which had been earmarked earlier. An access road is in place but requires rehabilitation.

2.2.5. Installation of Transmission Main Sub-Igoma BPS to Igoma Existing Reservoir

Approximately 5.5 km of transmission mains has been installed to connect the new Sub-Igoma BPS to the existing Igoma main reservoir. The line traverses mostly urbanized areas and passes along the existing road reserve. In some sections, the pipeline crosses rocky hills, farmlands, properties and crosses several local roads, streams and footpaths, and a graveyard.

2.2.6. Disconnection and Reconnection of Igoma Existing Reservoir

The reservoir has a capacity of approximately 4,800m^3 and will receive water from the new Sub-Igoma BPS. Currently, the reservoir is fed by the Mabatini BPS connection. This existing transmission will be disconnected to relieve the already overloaded Mabatini BPS. No works are envisaged for this reservoir apart from the disconnection of the current existing transmission main from Mabatini BPS (to be used asoutlet from the reservoir) and connection of the new transmission main from Sub-Igoma BPS (new inlet to the reservoir).

2.2.7. Distribution Main

A distribution main will be installed to augment water supply to areas traversed by the transmission main such as Butimba, Mkolani, Lwanimha, Igoma and Kishiri wards. The design of the distribution mains will be done by MWAUWASA after the transmission main has been laid according to the pressure management requirements. The existing road reserves and neighbourhood corridors will be used as much as possible to minimize damage to property.

2.2.8. Solar System at Butimba WTP

Three options have been evaluated and when optimized for technical, financial, environmental and LCOE, a hybrid configuration with BESS was established as the best fit solution. In particular the system was determined to be a 9MWp/31.4MWh Solar system comprising 9MW peak solar PV system, 31.4MWh BESS to provide 12 hrs of energy supply from the solar system. It has also been established that the space requirement of approximately 45,000m^2 is needed against available space area of around 75,000m^2. It was thus established that the space available is adequate to meet the requirements for deployment of the 9MW solar Plant.

The preliminary design has been based on the use of N-Type monocrystalline photovoltaic panels. The model adopted at this stage is the **585Wp** half-cell N-type topcon bifacial module, with an efficiency of 21.5%, which is quite high for currently available solar panels, although higher efficiency panels may become available in the future. N-Type panels have been selected because they have a lower rate of induced light degradation, with this specific model degrading at a rate of 0.4% per year over a lifespan of **30years**. Up to 30% of the electricity is produced by the rear side of the panel, which efficiently absorbs the light on the front and reflects and scatters the light on the back. This generates sufficient power, with a maximum theoretical output of **870W.**

All solar modules are subjected to Standard environment test conditions (controlled environment) and there is a need to adjust the theoretical performance to meet site specific working environments. While a careful choice was made on the technical factors likely to affect output from the solar PV plant, the following criteria was adopted in line with international best practice and prevailing industry practice. Generally, a performance ratio of 20% was adopted as the minimum guided the summation of the

various contributing factors as enumerated next. It is worth noting PR in a well-designed PV system is in the ratio of 0.5 to 0.80 excluding energy loss within the pump itself.

Assuming the use of the PV panels outlined above with dimensions 2.278m by 1.134m, in combination with an optimum angle of inclination and angle of azimuth, the simulated minimum distance between PV panels to avoid shadowing and obtain maximum power output is determined to be 1.152m.This is based upon the solar azimuth and installation tilt angle.

Tanzania's sunshine hours per year range between 2,800 and 3,500 with global horizontal radiation of 4–7kWh per m^2 per day. Given that, the Tanzanian Government supports solar development within the country by removing VAT and import taxes on the main solar components (panels, batteries, inverters, and regulators). Solar resources in Tanzania are especially present in the central region, and they are being exploited for both off-grid and grid-connected solutions.

In general, the amount of solar radiation to the ground is influenced by solar altitude, atmospheric transparency, latitude, and sunshine duration. Butimba site has sufficient solar irradiation with onsite measurement recorded between the 5th and 6th June 2024 observed to range between 709W/m^2 and 1,000w/m^2. Therefore based upon a professional meteorological data source the global horizontal solar irradiation for Butimba is modeled as shown in the table below. The average irradiation of 184kWh/m^2/month where the peak month has potential to generate 207.6kWh/m^2 and lowest month potential record of 168.7kWh/m^2 means the site fall within the high solar potential zone and therefore viable for solar plant deployment.

2.2.9. SANITATION

In terms of sanitation, the Igoma Wastewater Treatment Plant (WWTP) will be built in the Nyamhongolo area, Igoma. The acquired site is 39.5 ha located along the Mwanza-Musoma highway. The acquisition process is on-going. The site is available and is considered as the most suitable lowest point allowing for drainage of wastewater by gravity through sewers.

A sewerage network will be constructed to cover households in five wards i.e. Igoma, Kishiri, Nyamhongolo, Buswelu and Nyakato to allow maximum drainage of different parts of the city. Wastewater from industries in those wards will also be collected. The proposed WWTP site is surrounded by settlements to the north and east, and it is currently used as farming land. There are a few temporary structures inside the plot and temporary 'biomass' for keeping livestock before selling to the markets in other regions of the country. The WWTP at Igoma will have a capacity of 12,500 m_3/day, network of approximately 30 km and an estimated 14,000 connections.

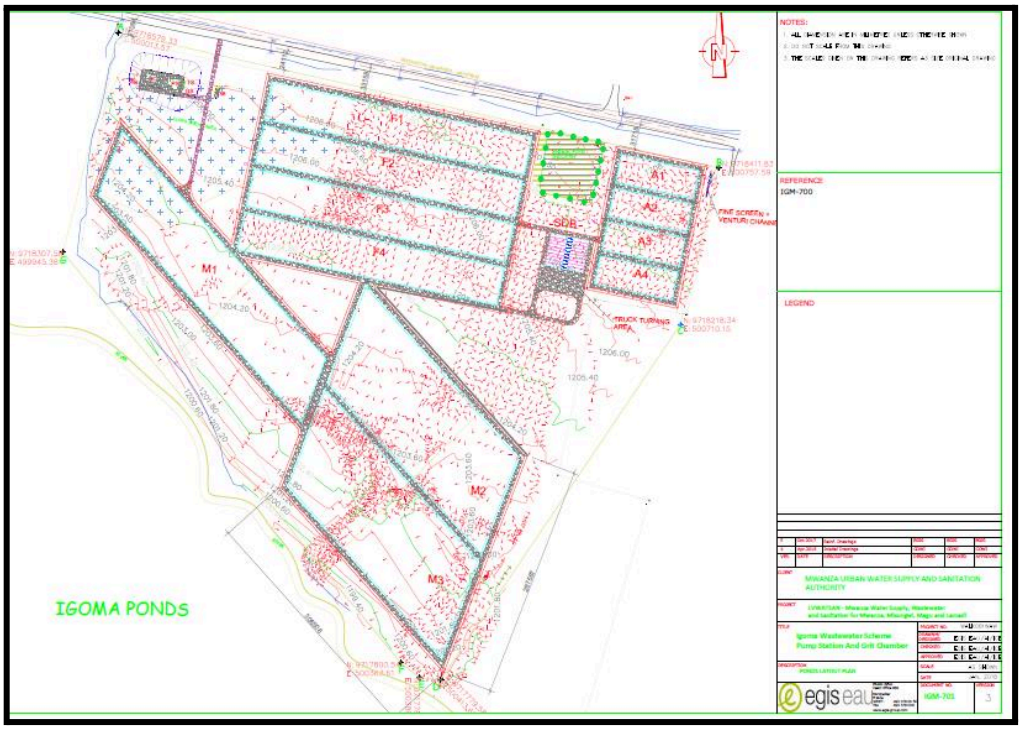

Figure 5: Proposed lay-out for Wastewater Treatment Plant at Igoma

Figure 6: Proposed main sewer collection pipe network

2.3. Project Activities

Major project activities are categorised by pre-construction, construction, operation and decommissioning phases as follows:

2.3.1. Pre construction Phase

Activities to be undertaken during pre-construction phase include

- Clearing of the site areas required, levelling, excavation, etc
- Demarcation of any access/service roads;
- Mobilisation of construction materials, equipment and machinery
- Identification and movement of the construction materials

2.3.2. Construction Phase

Activities anticipated during construction phase include but are not limited to:

- Clearing of the site areas required, levelling, excavation, etc;
- Demarcation of any access/service roads
- Construction of water storage facilities
- Construction of water supply network
- Construction and Installation of Solar System at Butimba WTP.

2.3.3. Operation Phase

The operation phase refers to the use of the facilities to be constructed such as pipes, pump stations, treatment plants, etc. During the operation phase the main activities will include but not limited to the following:

- Routine maintenance for efficiency and quality of the facilities, which over time will experience wear and tear.
- General environmental and safety management on site.
- Routine use of treatment chemicals. Routine collection, transfer and safe disposal of solid and liquid waste.
- General inspection of the Solar system

2.3.4. Decommissioning Phase

As long as there are no other options for supplying water from a different source, water supply facilities will always be needed to supply the community with water. The fact that more people will need water to sustain their rising population means that decommissioning the project is not deemed to be a pressing concern. Instead, every effort will be made to extend the lifespan of the water delivery infrastructure. Rather than thinking about decommissioning the water supply system, stringent preparations will be created for preserving the suggested structures and growth to have an extended lifespan. With exception of the solar with the proposed life span of 30 years that needs to be disposed of after use.

2.4. Materials to be Used, Waste Generation and Disposal Methods

2.4.1. Mobilisation phase materials

Site Preparation - Preparation of the site for proposed water supply network will automatically result in disturbance and/or removal of existing vegetation around the site of works. These construction practices remove protective plants cover over the existing ground. The sites proposed for water intake, pump house. Transmission main, Distribution and water treatment plant will equally be cleared of vegetation. These activities will result in generation of vegetal wastes like brushes and marshes debris mixed water lilies and other solid wastes all sorts of which will be collected and disposed in designated waste disposal sites. Decomposable materials may be buried at site if spaces are available, plastics and other recyclable materials will be collected and sent out for recycling within the project boundaries and beyond.

2.4.2. Required Construction Materials

With the exception of the pipes and fittings, the proposed water supply project will be primarily built using locally accessible resources. For reinforced concrete, the primary building materials will be aggregates, cement, sand, reinforcing steel, and water. Additional materials like wood, scaffolding, formwork, etc., will also be needed. The materials to be borrowed for building will be gathered from the designated borrow sites, including those utilised for local project development. For Solar Installation material needed will be mostly steel equipment and parts for the solar panel, cement, water, sand, aggregates, iron sheets, iron bars, timber, fuel for the transport of materials and non-road mobile construction machinery.

2.4.3. Wastes

Food scraps, cardboard boxes, and paper wastes are examples of biodegradable materials that will be gathered and dumped in hygienic landfills with other solid wastes. Other materials will be gathered and delivered to recycling facilities, including plastics, metal straps, pipes, steel cable fragments, reinforcement bars, and useless wood crates. Excavation wastes will be utilised as fill material when borrow pits are restored.

2.4.4. Waste during Operation of the Water Treatment Plant

The Water Treatment Plant component will be a ‘design and build’ contract, so the key design and construction aspects \are not yet known. However, it is expected that the sludge production will be as follows:

- Settled sludge: backwash water from sand filters.
- Sludge quantity will depend on variations in raw water quality.
- Sludge is mainly composed of mineral matter (hydroxides)

2.4.5. Waste during Operation of the Solar Panels

For Solar Panels during operation phase, very limited amounts of waste are expected to be generated during the operation phase, since only power is generated, so the only source of waste would be discharges from general maintenance.

2.4.6. Sludge Drying Beds

- This is the proposed dewatering option since they require only little maintenance at a minimum cost and the investment cost is low (civil works only). However, they are extensive and require a large surface area.
- Sludge drying beds are supplied with raw sludge (before thickening).

2.5. Project Boundaries

2.5.1. Spatial Boundaries of the Project

Local, regional, and global ramifications could arise from the proposed water delivery project. The planned project's implementation will significantly improve the standard of living for all residents of the targeted areas by granting universal access to basic healthcare and a potable water supply. These are two essential Ministry of Water functions that are utilised to provide communities with adequate sanitation and potable water. Regionally speaking, Mwanza standing may rise as a result of the projected water supply, providing them the advantage in luring in new investors and boosting the local economy. Today, Mwanza is home to a diverse range of enterprises. Buyers from Rwanda, Burundi, Uganda, and the Democratic Republic of the Congo (DRC) as well as neighbouring districts of Kagera, Geita, Simiyu, Shinyanga and Kigoma travel to this town to buy items of all kinds. The type of commerce being conducted in Mwanza City has ramifications for both the region and the world.

2.5.2. Temporal Boundaries of the Project

There could be short-term and negative impacts from implementing the suggested project while it is being built. People's livelihoods will be restored, particularly for those whose enterprises may be damaged by the proposed water reticulation works, by the implementation of the suggested mitigation measures to alleviate the negative impacts. Economic losses could be offset by the effects of business disruption and the potential need to relocate some infrastructure in order to make room for project

implementation. Social cohesion among the populace must be preserved above all else, although compensation for land and disruptions in socioeconomic operations may also be provided.

2.5.3. Institutional Boundaries of the Project

The proposed initiative will engage with many institutions, as indicated by departmental, ministerial, and legislative responsibilities, to improve collaboration among sectors. The Vice President's Office and NEMC are in charge of overseeing all environmental issues related to the project's implementation, even though the Environmental Management Act No. 20 of 2004 provides a well-organised administrative framework for environmental management. Nonetheless, the Ministry of Water is in charge of creating the laws and regulations that control the operation of water supply and related sanitation projects or systems. Through the provision of technical support throughout the construction, operation, and maintenance phases of the project, MWAUWASA will be tasked with project oversight, construction monitoring, and routine maintenance. In technical terms, these are the Ministry of Water's right-hand. The district administration oversees and defers to the Districts' responsibilities; the targeted District administration is responsible for community mobilisation, awareness campaigns, and ensuring that any negative effects on the impacted population are fairly and effectively mitigated.

3. POLICY, LEGAL FRAMEWORK AND ADMINISTRATION

3.1. INTRODUCTION

In regard to the proposed water supply and sanitation project, pertinent national policies, laws, administrative procedures, international treaties, and conventions, World Bank Social Safeguards and Policy were gathered and examined. In order to make sure that the proposed water supply works fulfill and adhere to the current standards, various laws dealing with pollution of ground and surface water, soil, air, land and land use, forests, wildlife, and other topics were studied. Below is a detailed description of these laws and policies.

Tanzania's Poverty Reduction Strategy Programme (PRSP) recognises the heavy dependence of the poor on the environment (soil, water and forests), particularly household's reliance on environmental resources for income generation. Water is considered a key factor in socio-economic development and the fight against poverty. Deliberate efforts are therefore needed in the management of the resources to sustain the desired pattern of growth and consumption, and to ensure that all the socio-economic activities maximise their capacities, as articulated in the Vision 2025. This entails integrated planning, development and river basin management.

As per Tanzania's National Water Policy, a clean, safe and healthy environment is the constitutional right of every person living in Tanzania. The regulation on environmental management is mainly vested in two public institutions, the Division of Environment (DoE) in the Vice President's Office and the National Environment Management Council (NEMC). The DoE coordinates various environment management activities undertaken by other agencies and promotes the integration of environmental considerations into development policies, plans, programs, strategies, projects and undertakes strategic environmental assessment with the view to ensuring proper management and rational utilisation of environmental resources on a sustainable basis for the improvement of human life. The NEMC undertakes among others enforcement, compliance, review and monitoring of environment impact assessment. Environmental awareness in the country has significantly increased in recent years.

3.2. NATIONAL POLICIES

The government has been developing and reviewing national policies to address environmental management in various sectors. National environmental policies and regulations are based on the

need to take an integrated approach to environmental management and the need to work towards the goals of sustainable development. The objectives of these policies are among others to regulate development so that this is not undertaken at the expense of the environment.

3.2.1. National Environmental Policy of 1997

It provides policy guidelines, plans and guidance for the determination of priority actions and provides information for monitoring and regular reviewing of policies, plans and programmes.

The main objective of the policy is to ensure sustainability, security and equitable use of resources. The specific objectives are: -

- To prevent and control degradation of land, water, vegetation, and air; conserve and enhance the natural and man-made heritages
- To improve the condition and productivity of degraded areas including rural and urban settlements
- To raise public awareness and understanding of the essential linkages between environment and development.
- To promote individual and community participation in environmental action
- To promote international cooperation on the environment agenda including implementation of Treaties.
- To protect water sources and to prevent environmental pollution by planning and implementation of water resources and other development programmes in an integrated manner.

Relevancy With This Project: The proposed project aims to improve the water supply and sanitation facilities in the project area which will further contribute to environmental protection.

3.2.2. National Water Policy of 2002

The National Water Policy (NAWAPO) directs adoption of a holistic basin approach that integrates multisectoral and multi-objective planning and management that minimises 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. To ensure that domestic and industrial wastewater is not haphazardly discharged to contaminate water sources, the project in each town entails:

- Wastewater sludge disposals / treatment facilities will be constructed to accommodate the wastewater produced in the area.
- Cesspit emptying services will be established and/or contracted to the private operators.

Relevancy With This Project: The proposed project will increase the productivity and health of the population through provision of safe and adequate sanitation services.

3.2.3. National Land Policy of 1995, revised in 1997

This policy advocates the equitable distribution and access to land by all citizens. It aims to ensure that existing rights in land, especially customary rights of the smallholders (i.e. peasants and herdsmen who form a majority of the country's population) are recognized and clarified to promote rapid social and economic development of the country among other objectives and secured by the law. The National Land Policy recognizes the need of protecting environmentally sensitive areas. The policy emphasises on protecting the environment and natural ecosystems from pollution, degradation and physical destruction. In addition, the policy recognizes the importance of social services such as water, road, energy and solid waste management for environmental protection. Finally, the policy identifies the need for conservation and preservation of prehistoric/historic sites and buildings. The proposed development shall ensure all requirements of this policy.

Relevancy With This Project: The project will ensure the optimal use of land resources without endangering the ecological balance of the environment.

3.2.4. Community Development Policy of 1996

One of the objectives of this policy is to educate communities on the importance of environmental conservation in pursuing social and economic development. Some of the areas of emphasis of the policy include public health and sanitation in rural and urban areas, water and environmental sanitation, appropriate technology for domestic energy use, particularly improved cook stoves, and improving rural and urban environment through programs such as planting trees and forests in households, villages and wards. In fulfilment of these policy goals, the proposed development will support realisation of a clean and healthy environment in each town.

Relevancy With This Project: Before implementation of the project, the project insured the provision of education to the community regarding the project and its environmental Impacts to the community.

3.2.5. Women and Gender Development Policy of 2000

This policy's overall objective is to promote gender equality and equal participation of men and women in economic, cultural and political matters. It also focuses on fairer opportunities for women

and men and access to education, child care, employment and decision-making. During project implementation the proponent is to give fair opportunities for both women and men.

Relevancy With This Project: The proposed project will encompass all aspects of gender-based issues specific to water and sanitation services. Improved sanitation facilities in the area will be made accessible to all, irrespective of gender.

3.2.6. National Policy on HIV/AIDS of 2001

This policy identifies HIV/AIDS as a global disaster, hence requiring concerted and unprecedented initiatives at national and global levels. It recognizes HIV/AIDS as an impediment to development in all sectors, in terms of social and economic development with serious and direct implication on social services and welfare. Being a social, cultural and economic problem, prevention and disaster control will depend on effective community-based prevention, care and support interventions. The local government council will be the focal point for involving and coordinating public and private sectors, NGOs and faith groups in planning and implementing HIV/AIDs work, particularly community-based interventions. Best experiences in community-based approaches in some districts in the country will be shared with local councils. The Project proponent is to link its effort with other stakeholders in HIV/AIDS sensitization during different project phases.

Relevancy With This Project: The project will establish adequate mechanisms for HIV/AIDS awareness in the project area through consultations amongst affected communities.

3.2.7. National Employment Policy of 1997

In view of the Government efforts in development of this policy, the contractor in collaboration with the District Council intends to supplement these efforts by providing employment to local residents during project implementation. Transfer of skills and 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. It is envisaged that some people will be engaged by the project proponent during operation of the works.

Relevancy With This Project: The project will provide employment to the local people irrespective of vulnerable groups, and gender.

3.2.8. Cultural Policy of 1997

This policy 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”. The District Council and the contractor are to follow the requirements of this policy and in case such historical or cultural sites are discovered, appropriate measures are to be taken to involve local and national authorities in their conservation. However, so

far no cultural or historical sites of relevance are known to be present in any of the proposed project intervention sites.

3.2.9. National Health Policy, 2003

The policy aims to reduce the burden of diseases; maternal and infant mortalities; and increase life expectancy through provision of adequate and equitable maternal and child health services. It promotes environmental health and sanitation, adequate nutrition, control of communicable diseases and treatment of common conditions.

Relevancy With This Project: The proposed WTP will improve the health status of the project area by avoiding major waterborne diseases through provision of safe and potable water.

3.2.10. Road Safety Policy, 2009

The policy provides for a safe environment for the road traffic system in accordance with internationally accepted standards. The policy involves the stakeholders and places an emphasis on cooperation and sharing of knowledge, experience, expertise and resources.

Relevancy With This Project: Traffic safety, health safety and worker safety during the construction phase and operation phase of the proposed project has been proposed in the environmental and social management plan (ESMP) to accomplish the policy.

3.3. Legal Framework

Laws have been enacted to provide a legal basis for implementation of the national policies as shown below:

3.3.1. Environmental Management Act No. 20 of 2004

This act provides both a legal and institutional framework for the sustainable management of the environment, prevention and control of pollution, waste management, environmental quality standards, public participation, environmental compliance and enforcement. It also requires the undertaking of the EIA for investment projects. It further recognizes the need for research, public participation in environmental decision making, environmental awareness raising, and dissemination of environmental information. The act gives Local Government Authorities the mandate to ensure environmental compliance in their areas of jurisdiction.

Relevancy With This Project: The policy specifies that the NEMC shall upon examination of a project brief, require the proponent of a project or undertaking to carry out an EIA study and prepare

an Environmental Impact Statement" (EIS). Accordingly, the ESIA report was submitted with NEMC for review through its Technical Advisory Committee (TAC). After acquiring the EIA certificate, the development of the proposed project was implemented

3.3.2. Land Act No. 4 of 1999

This act contains provisions of critical environmental importance. One of the important fundamental principles of the act is to ensure that land is used productively and that any such use complies with the principles of sustainable development. Among others, the act prohibits any development activities within 60m of the high tide water mark of the shoreline as well in environmentally sensitive areas such as wetlands and swamps. Proposed developments shall be located at least 60 m from the lakeshore, unless on technical or other grounds permission is granted do otherwise.

Relevancy With This Project: The proposed project was implemented on land that has been legally acquired by the project proponent by complying with conditions of occupancy of the subject land.

3.3.3. 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 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. Objectives of the Village Land Act, Cap 114 are 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;
- Interest in land has value and that value is taken into consideration in any transaction affecting that interest

To pay full, fair and prompt compensation to any person whose right of occupancy or recognized longstanding 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, Cap118 of 2002.

Relevancy With This Project: The project will ensure that it will be implemented in compliance with the principles of sustainable development.

3.3.4. Land Acquisition Act, Cap 118 R.E. of 2002

This act 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 unexhausted 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 regarding sanitary improvement of any kind or about laying out any new city, municipality, township or minor settlement or extension or improvement of any existing city. Other purposes are relating to development of any airfield, port or harbour; mining for minerals or oils; for use by the community or corporation within the 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 public use as well as for the resettlement sites is within the provision of this act. Furthermore, 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.

3.3.5. 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 others, it recommends measures to ensure that 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 ourage development of technology to prevent, or minimise 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.enc

Relevancy With This Project: The project will ensure the minimum effect on the private resources including land

3.3.6. Water Supply and Sanitation Act No. 12 of 2009

This act aims at ensuring the quality of water by protecting water works and storage facilities against pollution. The act also provides power to Local Government Authorities to mobilise community water supply organisations to take over water supply schemes and get technical and financial support. The act further gives mandate to Local Government Authorities to make by-laws in relation to water supply and sanitation for the efficient and sustainable provision of these services in their areas of jurisdiction by water authorities or community organisations.

Relevancy With This Project: The proposed project will improve sanitation services in the area

3.3.7. Occupational Health and Safety Act No. 5 of 2003

This act gives provisions for the protection of human health from occupational hazards. It provides for the protection of persons other than those at work against hazard to health and safety arising out of or in connection with activities of persons at work. The act further requires companies or institutions to provide safety gears to those working at risk areas. Relevant sections of the ordinance to the project activities include Part IV Section 43 (1) Safe means of access and safe working place; Prevention of fire; and Part V on health and welfare provisions, which includes provision of supply of clean and safe to workers, sanitary convenience, washing facilities and first aid facility, Section 50, deals with fire prevention issues. The act allows adequate enforcement.

Relevancy With This Project: In the ESMP of the present study recommended to ensure a safe working environment to all its workers, provide clean and safe water, as well sanitary and first aid facility to fulfill this act during the construction and operation phase of the project.

3.3.8. Workers Compensation Act No. 20 of 2008

This act covers the establishment of a Workers Compensation Fund, its board of trustees, and lays out provisions for right to compensation for occupational injury and disease. The act covers claims, determination of compensation, disputes settlement and other regulatory provisions for the Fund.

Relevancy With This Project: The project will ensure provision of rehabilitation and adequate compensation to employees who suffer occupational casualties.

3.3.9. The Penal Law (the Penal Code as amended by the Sexual Offences Special Provisions Act 1998.).

The Act provides information about sexual offences, its provisions and amendments.

Relevancy With This Project: as stated in the existing ESIA study, The contractor implementing the project shall comply with these acts for all his employees during the entire period of the proposed project.

3.3.10. Employment and Labour Relations Act No. 6 of 2004

This act gives provisions for core labour rights; establishes basic employment standards; provides a framework for collective bargaining; and provides for the prevention and settlement of disputes. The developer is to see that the contractor adheres to employment standards as provided for by the law

Relevancy With This Project: The project will provide the employment following the legal framework for effective and fair employment relations

3.3.11. Water Resources Management Act No.11 of 2009

This act provides for sustainable management and development of water resources; outlines principles for water resources management; provides for the prevention and control of water pollution; provides for participation of stakeholders and the general public in implementation of the National Water Policy, repeal of the Water Utilisation (Control and Regulation) Act and provides for related matters.

Relevancy With This Project: During the development of the proposed project, the water use permit to be obtained by the contractor before abstracting or using water from surface or groundwater for the project activities.

3.3.12. Water Laws Act, 1999

The Act facilitates the private sector participation in water supply and sewerage in Tanzania. It provides guidelines on the tariffs chargeable for the provision of water supply and sewerage services, and also examines and approves them.

It exercises licensing and regulatory functions in water supply and sewerage services including the establishment of standards relating to equipment attached to water and sewerage systems.

Relevancy With This Project: The policy will be referred by the proponent to finalise the tariff chargeable for the provision of sewerage services in the project area

3.3.13. The Solid Waste Management Act, 2009

The Act provides for management of solid wastes in conformity with the best environmental practices. It prescribes the methods for handling various types of wastes, including their disposal for which reuse, recycling or composting alternatives are available and implements standards and requirements for waste handling, separation and processing. It also establishes the licensing and permitting system for the regulation of waste management facilities, equipment and waste haulage, and prescribes fees for the issue of licences, permits, inspections and other services related to waste management.

Relevancy With This Project: During the construction and operation phases of the project, there will be generation of waste from project activities. It will be necessary to manage and safely dispose of the waste generated in accordance with these regulations, thereby, making the regulations applicable for the project.

3.3.14. The HIV and AIDS (Prevention and Control) Act, 2008.

The Act provides for prevention, treatment, care, support and control of HIV and AIDS. It promotes public health in relation to HIV and AIDS, provides for appropriate treatment, care and support using available resources to people living with or at the risk of HIV and AIDS. The ministry is responsible for establishing a comprehensive system of monitoring and evaluation mechanisms to determine the magnitude and progression of HIV infections and other matters relating to HIV and AIDS.

Relevancy With This Project: The project will establish adequate mechanisms for HIV/AIDS awareness in the project area through consultations amongst affected communities.

3.4. Relevant Regulations

3.4.1. Environmental Impact Assessment and Auditing Regulations of 2005 GN 349/2005

The Regulations encompass all matters pertaining to the environment and set standards, procedures, duties and limits with obligations for all stakeholders to benefit human needs and govern sustainable resources. They provide composition and responsibilities of environmental authorities that are the minister responsible for the environment, the Division of Environment (DOE) and NEMC. They cut across all sectors that in one way or another are affected or impact the environment and recommend the use of sectoral legislation for specific issues. The EIA as a tool for better planning is undertaken to enable compliance with environmental requirements in order to ensure risks associated with any upcoming project are exposed and corrected accordingly.

The Regulations further provide information for periodic reviews and alterations of environmental management plans as necessary, ensuring that environmental management is optimised at all stages of projects through best practices. Policies and laws that relate to EIA aim at promoting sound environmental management. The Regulations also require registration of EIA experts. In addition to the Act, the Regulations provide the cornerstone for any EIA for projects in Tanzania. The Regulations apply to all projects, undertakings and activities referred to in Part VI and the Third Schedule to the Act and the First Schedule to the Regulations. The First Schedule to the Regulations contains a list of projects for which EIA is mandatory and projects for which EIA may or may not be required. Any project in the water sector cannot be undertaken without an EIA. In short, the Regulations encompass the whole process of EIA and the prescribed forms under the law.

Relevancy With This Project: The project will ensure that environmental considerations are properly addressed during the project implementation, so as to have minimum or no effect on the environment.

3.4.2. The Environmental (Registration of Environmental Experts) Regulations, 2005.

The primary objective of these Regulations is to establish a system for registration of environmental experts; provide for a system of nurturing competence, knowledge, professional conduct, consistency, integrity and ethics in the carrying out of environmental impact studies and environmental audits; ensure that the conduct of environmental impact assessment or environmental audit is carried out in an independent, professional, objective and impartial manner and to provide for a code of conduct, discipline and control of environmental experts. The Regulations establish the Environmental Experts Advisory Committee to, among others, advise NEMC on matters regarding registration, practice and conduct of environmental impact assessors.

Relevancy With This Project: The environmental impact study is carried out by environmental

3.4.3. The Environmental Management (Air Quality Standards) Regulations, 2007.experts.

These Regulations set baseline parameters on air quality and emissions based on acceptable limits and enforces minimum air quality standards prescribed by the National Environmental Standards Committee.

Relevancy With This Project: The use of vehicles and machineries can affect the air quality of the area for a short term. The project will ensure emissions based on acceptable limits.

3.4.4. The Environmental Management (Water Quality Standards) Regulations, 2007.

The objective of these Regulations is to enforce minimum water quality standards prescribed by the National Environmental Standards Committee. To enable the National Environmental Standards Committee to determine water usage for the purposes of establishing environmental quality standards and values for each usage and ensure all discharges of pollutants take into account the ability of the receiving waters to accommodate contaminants. The National Environmental Standards Committee of Tanzania Bureau of Standards is responsible for establishing the minimum standards for the treatment of effluents before their final discharge into public sewer systems.

Relevancy With This Project: The project will ensure minimum water quality standards prescribed by the National Environmental Standards Committee.

3.4.5. NEMC and TBS National Environmental Standards

NEMC's website includes a Compendium and covers: discharge and effluent standards for municipal and industrial wastewater, potable water standards, air quality standards and various emissions tolerance, limits of radiations and tolerance limits for acoustics - noise pollution. Also, a draft for solid waste management is provided. The website includes among others information on the following:

- National Environmental Standards Compendium - Tanzania Bureau of Standards
- Environmental Management Act CAP 191 - Environmental Management (Water Quality Standards) Regulations 2007
- Revised Draft Environmental Management (Solid Waste Management) Regulations 2009
- Environmental Management (Soil Quality Standards) Regulations 2007
- Revised Draft Environmental Management (Hazardous Waste Control and Management) Regulations 2008
- Environmental Management (Air Quality Standards) Regulations 2007
- TZS 846: 2005 – Tolerance Limits of Emissions Discharged to the Air by Cement Factories Emission Standard
- EMDC 2 1758: 2005 Air Quality: Vehicular exhaust emission limits (Product standards
- TZS 845: 2006 Air Quality Specification
- TZS 846: 2004 Air Quality: Tolerance limits of emission discharged to the air by cement factories
- TZS 847: 2004 Air Quality: Guidelines of emissions discharged to the air by cement factories
- EMDC 2 1817: 2006 Air Quality: Stationary source emission - Guidelines for online gas analyse.
- TZS 932:2006 General Tolerance Limits for Environmental Noise.

3.5. Plans and Vision

3.5.1. The National Plan of Action to End Violence Against Women and Children in Tanzania 2017/18 – 2021/22

The Five-year National Plan of Action to End Violence Against Women and Children (NPAVAWC 2017/18 – 2021/22), has been developed by consolidating eight different action plans addressing violence against women and children to create a single comprehensive, National Plan of Action to eradicate violence against women and children in the country.

Relevancy With This Project: The implementation of the project can cause violence against women and children.

3.5.2. Tanzania's Development Vision 2025

Tanzania's Development Vision 2025 aims at achieving a high-quality livelihood for its people, attaining good governance through the value of law and to develop a strong and competitive economy. Specific targets include:

- High quality livelihood characterised by sustainable and shared growth (equity), and freedom from abject poverty in a democratic environment. Specifically, the Vision aims at: food self-sufficiency and security; universal primary education and extension of tertiary education; gender equality; universal access to primary healthcare; 75% reduction in infant and maternal mortality rates; universal access to safe water; increased life expectancy; absence of abject poverty; and a well-educated and Learned-society.
- Good governance and the rule of law, moral and cultural uprightness, adherence to the rule of law, and elimination of corruption.
- A strong and competitive economy capable of producing sustainable growth and shared benefits of a diversified and semi-industrialized economy, macro-economic stability, growth rate of 8% per annum, adequate level of physical infrastructure, an active and active player in regional and global markets.

Relevancy With This Project: The proposed project works support achieving the Development Vision 2025 objectives

3.6. World Bank Environmental and Social Framework

The World Bank Environmental and Social Framework sets out the World Bank's commitment to sustainable development, through a Bank Policy and a set of Environmental and Social Standards that are designed to support Borrowers' projects, with the aim of ending extreme poverty and promoting shared prosperity. This Framework comprises:

- A Vision for Sustainable Development, which sets out the Bank's aspirations regarding environmental and social sustainability,
- The World Bank Environmental and Social Policy for Investment Project Financing, which sets out the mandatory requirements that apply to the Bank; and
- The Environmental and Social Standards which set out the mandatory requirements that apply to the Borrower and projects.

The World Bank Environmental and Social Policy for Investment Project Financing sets out the requirements that the Bank must follow regarding projects it supports through Investment Project Financing.

3.6.1. World Bank for Sustainable Development

The World Bank Group Strategy sets out the corporate goals of ending extreme poverty and promoting shared prosperity in all its partner countries. Securing the long term future of the planet, its people and

its resources, ensuring social inclusion, and limiting the economic burdens on future generations will underpin these efforts. The two goals emphasise the importance of economic growth, inclusion and sustainability including strong concerns for equity.

3.6.2. The Environmental and Social Standards(ESS)

This set out the requirements for Borrowers relating to the identification and assessment of environmental and social risks and impacts associated with projects supported by the Bank through Investment Project Financing. The Bank believes that the application of these standards, by focusing on the identification and management of environmental and social risks, will support Borrowers in their goal to reduce poverty and increase prosperity in a sustainable manner for the benefit of the environment and their citizens. The standards will: (a) support Borrowers in achieving good international practice relating to environmental and social sustainability; (b) assist Borrowers in fulfilling their national and international environmental and social obligations; (c) enhance nondiscrimination, transparency, participation, accountability and governance; and (d) enhance the sustainable development outcomes of projects through ongoing stakeholder engagement.The following are applicable Environmental and Social Standards regarding this project.

3.6.2.1. Environmental and Social Standard 1: Assessment and Management of Environmental and Social Risks and Impacts

ESS1 sets out the Borrower's responsibilities for assessing, managing and monitoring environmental and social risks and impacts associated with each stage of a project supported by the Bank through Investment Project Financing, in order to achieve environmental and social outcomes consistent with the Environmental and Social Standards (ESSs). The ESSs are designed to help Borrowers to manage the risks and impacts of a project, and improve their environmental and social performance, through a risk and outcomes based approach. The desired outcomes for the project are described in the objectives of each ESS, followed by specific requirements to help Borrowers achieve these objectives through means that are appropriate to the nature and scale of the project and proportionate to the level of environmental and social risks and impacts.

Applicability in this Project: The Consultant team was able identify, evaluate and manage the environment and social risks and impacts of the project in a manner consistent with the ESSs whereby in the assessment the priority was given to the avoidance of the risks and impacts followed by minimizing or reduce risks and impacts to acceptable levels and where significant residual impacts remain, compensation for was technically and financially feasible.

3.6.2.2. Environmental and Social Standard 2: Labor and Working Conditions

ESS2 recognizes the importance of employment creation and income generation in the pursuit of poverty reduction and inclusive economic growth. Borrowers can promote sound worker-management relationships and enhance the development benefits of a project by treating workers in the project fairly and providing safe and healthy working conditions. Its objective is to promote safety and health at work, to promote the fair treatment, nondiscrimination and equal opportunity of project workers, to protect project workers, including vulnerable workers such as women, persons with disabilities, children (of working age, in accordance with this ESS) and migrant workers, contracted workers, community workers and primary supply workers, as appropriate, To prevent the use of all forms of forced labor and child labor, to support the principles of freedom of association and collective bargaining of project workers in a manner consistent with national law, o provide project workers with accessible means to raise workplace concerns.

Applicability in this Project: As stated in the ESMP the contractor will adhere to all the requirements of this world bank standard while employing people during the construction and operation of the proposed project. Also, contractors ensure an equal opportunity in employment and strive to eliminate discrimination in any employment policy or practice.

3.6.2.3. Environmental and Social Standard 3: Resource Efficiency and Pollution Prevention and Management

ESS3 recognizes that economic activity and urbanisation often generate pollution to air, water, and land, and consume finite resources that may threaten people, ecosystem services and the environment at the local, regional, and global levels. The current and projected atmospheric concentration of greenhouse gases (GHG) threatens the welfare of current and future generations. At the same time, more efficient and effective resource use, pollution prevention and GHG emission avoidance, and mitigation technologies and practices have become more accessible and achievable.This ESS sets out the requirements to address resource efficiency and pollution prevention and management throughout the project life cycle.

Applicability in this Project: The waste management plan has been proposed in the ESMP of this report on how to manage the waste generated during the construction and operation phase, in order to fulfill the objective of this act.

3.6.2.4. Environmental and Social Standard 4: Community Health and Safety

ESS4 recognizes that project activities, equipment, and infrastructure can increase community exposure to risks and impacts. In addition, communities that are already subjected to impacts from climate change may also experience an acceleration or intensification of impacts due to project

activities.ESS4 addresses the health, safety, and security risks and impacts on project-affected communities and the corresponding responsibility of Borrowers to avoid or minimize such risks and impacts, with particular attention to people who, because of their particular circumstances, may be vulnerable.

Applicability in this Project: In the ESMP of the present study recommended to ensure a safe working environment to all its workers, provide clean and safe water, as well as sanitary and first aid facility to fulfill this act during the construction and operation phase of the project. Also from the ESMP of this report, the mitigation measures regarding the community health and safety are Construction works should be restricted within daytime between 6 am to 9 pm (as per WHO guidelines), If noise level exceeds the limits, the noise generating equipment should be kept inside proper acoustic enclosure, Nearby residents and businesses should be notified 24 hours in advance prior to any additional noisy activity.

3.6.2.5. Environmental and Social Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources

ESS6 recognizes that protecting and conserving biodiversity and sustainably managing living natural resources are fundamental to sustainable development. Biodiversity is defined as the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species, and of ecosystems. Biodiversity often underpins ecosystem services valued by humans. Impacts on biodiversity can therefore often adversely affect the delivery of ecosystem services. ESS6 recognizes the importance of maintaining core ecological functions of habitats, including forests, and the biodiversity they support. Habitat is defined as a terrestrial, freshwater, or marine geographical unit or airway that supports assemblages of living organisms and their interactions with the nonliving environment. All habitats support complexities of living organisms and vary in terms of species diversity, abundance and importance.

Applicability in this Project: The project to provide awareness about the importance of biodiversity conservation to the workers which can protect the biodiversity from any impact during the construction phase to ensure conservation of the fauna, flora and its biodiversity.

3.6.2.6. Environmental and Social Standard 8: Cultural Heritage

ESS8 recognizes that cultural heritage provides continuity in tangible and intangible forms between the past, present and future. People identify with cultural heritage as a reflection and expression of their constantly evolving values, beliefs, knowledge and traditions. Cultural heritage, in its many manifestations, is important as a source of valuable scientific and historical information, as an

economic and social asset for development, and as an integral part of people's cultural identity and practice. ESS8 sets out measures designed to protect cultural heritage throughout the project life cycle. This ESS sets out general provisions on risks and impacts to cultural heritage from project activities. ESS7 sets out additional requirements for cultural heritage in the context of Indigenous Peoples. ESS6 recognizes the social and cultural values of biodiversity. Provisions on Stakeholder Engagement and Information Disclosure are set out in ESS10.

3.6.2.7. Environmental and Social Standard 9: Financial Intermediaries

ESS9 recognizes that strong domestic capital and financial markets and access to finance are important for economic development, growth and poverty reduction. The Bank is committed to supporting sustainable financial sector development and enhancing the role. FIs are required to monitor and manage the environmental and social risks and impacts of their portfolio and FI subprojects, and monitor portfolio risk, as appropriate to the nature of intermediated financing. The way in which the FI will manage its portfolio will take various forms, depending on a number of considerations, including the capacity of the FI and the nature and scope of the funding to be provided by the FI

Applicability in this Project: The project will ensure that the any development in the project area is maintained in the form of an Environmental and Social Management System (ESMS), effective environmental and social systems, procedures and capacity through assessing, managing, and monitoring risks and impacts of the projects, as well as managing overall portfolio risk in a responsible manner with the available domestic capital and financial markets.

3.6.2.8. Environmental and Social Standard 10: Stakeholder Engagement and Information Disclosure.

This ESS recognizes the importance of open and transparent engagement between the Borrower and project stakeholders as an essential element of good international practice. Effective stakeholder engagement can improve the environmental and social sustainability of projects, enhance project acceptance, and make a significant contribution to successful project design and implementation.Stakeholder engagement is an inclusive process conducted throughout the project life cycle. When properly designed and implemented, it supports the development of strong, constructive and responsive relationships that are important for successful management of a project's environmental and social risks. Stakeholder engagement is most effective when initiated at an early stage of the project development process, and is an integral part of early project decisions and the assessment, management and monitoring of the project's environmental and social risks and impacts.

Applicability in this Project: The project ensured all stakeholders were consulted before the implementation of the project. The stakeholders were consulted starting from the planning stage,

Construction phase and further will be consulted during the implementation with the proper established communication plans. The project established a systematic approach to stakeholder engagement that will help Borrowers identify stakeholders and build and maintain a constructive relationship with them, in particular project-affected parties.

3.7. International Conventions

Tanzania and other the East African Community countries have signed and ratified four major international conventions namely, Convention on Biological Diversity (CBD), United Nations Convention to Combat Desertification and Drought (UNCCD), United Nations Framework Convention on Climate Change (UNFCCC), and the RAMSAR Wetlands Convention which are all in force. The RAMSAR Convention recognizes the fundamental ecological functions of wetlands as regulators of water regimes and habitats supporting flora and fauna. Where relevant, measures need to be put in place to control pollution.

3.8. Institutional Framework for Management of the Environment

3.8.1. Central Government Agencies

At the national level, the institutional and legal framework for sustainable management and development of water resources and sludge treatment falls under the Ministry of Water and Irrigation. 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:
    - Minister of Water
    - Director of Water Resources
    - National Water Board
    - Basin Water Boards
    - Catchment and Sub-catchment Water Committees

When it comes to fulfillment 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 President's 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.

The Minister responsible for Environment (VP Office) is the overall responsible for all matters relating to the 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.

3.8.2. Regional and District Administrative Structure

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.

3.8.3. European Investment Bank

Environmental protection and improvement, and benefits to people's welfare form key operational priorities for the European Investment Bank, the European Union's long-term lending institution. The

EIB's environmental and social safeguard policies are based on the EU approach to environmental sustainability. The principles, practices and standards derived from these policies are highlighted in the Declaration on the European Principles for the Environment (EPE), agreed to by the EIB and four other European multilateral financing institutions in May 2006. The general approach of the Bank is described in public documents (Table 1). The EIB aims to maximize the environmental benefits and to minimize the environmental costs of the projects that it finances through appropriate screening, mitigation and compensation measures

Table 1: EIB documents presenting the general approach to environmental and social safeguards

Document	Date
Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment	2014
Environmental and Social Handbook	2003
The EIB Statement of Environmental and Social Principles and Standards	2009
European Principles for the Environment	2006
Environmental Statement	2004
The EIB and its Contribution to Sustainable Development	2002
The EIB Project Cycle	2001

4. BASELINE/EXISTING CONDITIONS

4.1. INTRODUCTION

This section presents an overview of the existing environmental and socio-economic conditions of the proposed project areas. The baseline information was collected from primary as well as secondary data sources. Primary information was collected through field surveys, focussed group discussions and consultations while secondary information was obtained from published journals, books, authorised websites and government reports. Site-specific environmental and social conditions at the targeted STIP intervention sites have been assessed by the Design Consultant (COWI: EIA Screening Report, January 2017). This Chapter summarises the key resources such as water, vegetation cover, aquatic resources, habitats, archaeology, landscape, settlements, economic activities, protected areas, utilities and infrastructure located in each specific project location. Specific locations were screened in line with the proposed facilities that entail the intake area, treatment plant/pump house, transmission mains to the reservoirs, tank locations, domestic point locations and distribution network. The site-specific conditions have been assessed based on Tanzanian Legislative requirements, EU's EIA Directives and EIB's Environmental and Social Safeguards and World Bank Enviornmental and Social Framework.

The more generic characteristics of the physical, biological and socio-economic conditions in Mwanza City are outlined below

4.2. ADMINISTRATIVE SET UP

The project areas consist of two Councils (Mwanza City (Nyamagana) and Ilemela Municipalities) which are controlled and managed by the Councillors under the leadership of Lord Mayor. However, the Municipal Executive Directors who are assisted by heads of departments and sections execute the day-to-day administration of the district councils. At the Mtaa levels there are Mtaa Executive Officers, at Ward level there are Ward Executive Officers who are under the Municipal Executive Directors.

These Municipal Executive Directors offices consists of 12 departments: Engineer of Works, Fire and Rescue; Land Urban Planning and Environment and Natural Resources, Economic and Planning, Statistics and Monitoring; Finance and Trade; Community Development; Health and Social Welfare; Human Resources and Administration; Agriculture and Cooperative, Livestock and Fisheries; Primary Education and Culture; Secondary Education.

4.3. Climatic Conditions

4.3.1. Rainfall

The areas experience bimodal rainfall seasons, i.e Long and short rains.The long rain season lasts between February and May with an annual average precipitation of 800mm; while the short rain season occurs between the months of October and December. The rains tend to fall in localized storms rather than generalized downpour and are therefore unevenly distributed in quite a small area.

4.3.2. Température

The average temperature ranges between 25°C to 28°C with average maximum temperatures occurring from September to December. The cool dry season occurs in June to August which experiences low temperatures which range between 20°C- 11°C.

4.3.3. Humidity

Average relative humidity ranges between 50-70% and average monthly sun-hours ranges between 200-300 hours. Both including average temperature is considered as indicators of conducive weather.

4.3.4. Wind

Based on a database of Freshwater Eco-regions of the World, the wind speed is generally low but increases to about 15 m/s in the dry season. The dominant wind direction for the region is from WNW according to windfinder.com. WNW cardinal directions sit in between degrees of 281.25 to 303.75.

4.3.5. Earthquake

Historically, seismicity in the East African Rift is mainly concentrated along the branches of the rift system (i.e., at the edges of the Victoria microplate, and along the main rift running through Ethiopia in the north, and Malawi and Mozambique in the south). Over the preceding century, only one other earthquake has been recorded within 100 km of the September 10, 2016 earthquake – a M 4.3 event in Lake Victoria in December 2013.

Tanzania's largest historic earthquake over this time period was a M 7.2 event in July 1919, near Lake Tanganyika in the west of the country. A M 6.8 earthquake near the center of Lake Tanganyika in December 2005 resulted in half a dozen or more fatalities. At the time of writing (10 hours after the earthquake), the September 10, 2016 earthquake has been reported to have caused over a dozen fatalities, and 200 or more injuries. Mwanza region is in Zone 1 with risk level of weak or not frequent and ground acceleration factor of 0.025.

4.3.6. Topography

The topography of Mwanza City is characterized by gently undulating granites and granodiorite physiography with isolated hill masses and rock inselbergs. It is also characterized by well-drained sandy loam soil generated from coarse grained cretaceous.

4.3.7. Soil

The soil types vary from yellow, red, gritty, sandy and loam soils which are delivered from coarse-grained cetaceans' rock. The soils are usually associated with the rocky Island of between 1100 – 1600 metres in height.

4.3.8. Drainage

Major water bodies surrounding Mwanza City and Ilemela Municipal are related to Lake Victoria and all the rivers that run through the city flow into the lake. There are four rivers in Mwanza City flowing into the lake, namely Mirongo, Nyaguganwa, Ndote and Nyashishi. The main river that runs through the city centre is Mirongo River. Nyashishi River at the southern part of the planning area is forming Luchelele wetland before flowing into Lake Victoria.

4.3.9. Hydrology and Hydrogeology

Groundwater in Mwanza Region is generally found at a varying level beneath the surface, depending on local topography and time of the year (dry/wet season).

Lake Victoria is the main nearby surface water body for Mwanza City in which all surface drains discharge. The lake is considered as one of the most important shared natural resources by the East African Community (EAC) partner states and is a major source of water and fisheries in the region. The ecosystem around the lake consists of savannah, forests and wetlands.

4.3.10. Water Quality Measurements

A series of water quality measurements were taken/analysed by COWI for the proposed Butimba Intake site period from 2010 - 2014 as presented in Appendix 7. The raw water quality is compared with TBS and WHO Standards in the table below:

Table 2: **Water quality measurement in Lake Victoria at Mwanza (Capri Point intake area)**

Parameter	August	TBS	WHO
Turbidity (NTU)	3.6		0.5
Ph	8.4	6.5 – 8.5	0

Parameter	August	TBS	WHO
TDS (mg/l)	100	300	600-1000
Iron (mg/l)	0.02	5	Not of health concern at levels causing acceptability problems in drinking-water (WHO)
Manganese (mg/l)	2.45	5	0.4
Fluoride (mg/l)	1.01	8	1.5
Nitrates (mg/l)	0.04	20	50

The comparison shows that most parameters are within TBS standards except for E. Coli. The design of the water treatment plant will take the TBS and WHO standards into consideration to ensure that the quality of the water produced is wholly within acceptable limits.

4.3.11. Noise Emission

Noise in the area mainly results from the traffic and commercial and residential households, and due to the generally rural low-intensity nature of these it is concluded that these are generally well within TBS and WHO standards for noise emission.

4.4. Biological Environment

Mwanza City lies in an area that was originally covered with savannah terrain. Today little remains in terms of undisturbed natural habitat and therefore the area is believed to have little biodiversity value. Nevertheless, small groups or individuals were noted of heron, egret, stork and ibis species, mainly feeding along roads, unoccupied land plots, lake edges and waste dumps.

4.5. Social Economic Activities in the Project Areas

4.5.1. Population

According to the 2022 national census, the population of Mwanza City was approximately 3,699,872 people. The annual natural growth rate of 2.9% and the population density is 390.8people/km2, being the second largest city in the country, after Dar es Salaam.

4.5.2. Social Economic

The average GDP per capita in Tanzania Mainland amounted to around 2.7 million TZS (1,163 U.S. dollars) based on a 2020 survey. Dar es Salaam registered the highest Gross Domestic Product per capita in Tanzania, approximately 4.7 million Tanzanian shillings (TZS). The Mwanza region became

the second region after Dar es Salaam to have a GDP of 2,608,202 at the current prices. However, currently there is no GDP distribution down to the Municipal and District level which includes Nyamagana and Ilemela Municipalities.

The past record of Economic Survey Report 2011, shows that Mwanza region's (Nyamagana and Ilemela together with other districts cumulatively share of the national GDP for the year 2016 was only 9.3 percent equivalent to TShs. 8,452,013 million while per capita income of regional residents was estimated to be TShs. 2,004,353, (equivalent to US$ 911.1 at a rate of TZS 2,200 per USD). Most of the employed people work in the service sector, while those who are self-employed are involved in petty trade, tilling land, micro-fishing activities etc. The current figure of employment in the City (Employed and Self-employed) stands at about 50%. The average per capita income is about US$21 per month. The regional GDP was TShs. 4,016,270 million in 2010 and Tshs. 6,654,600 million in 2013.

The 2012 Population and Housing Census Report shows that Mwanza City Council, like its neighbouring council of Ilemela Municipal, has vast economic opportunities due to the diversification of industries performed in the city. Commercial food crops and forestry was reported to be the main source of income in the council engaging 13.9 percent of residents. It was followed by the selling of raw food or uncooked food (13.6 percent), trade and commerce (12.9 percent of the population), manufacturing (11.7 percent), construction (7.2 percent), services for food hotels and lodges (5.5 percent), domestic services (5.0 percent), haulage and storages (4.7 percent), Administration and security services (3.3 percent), education services (3.1 percent) and fishing, hunting, livestock and other related (2.5 percent).

The 2012 population census shows that service workers, shop and stall sales workers were the main occupation in Mwanza city, employing 21.9 percent of residents aged 10 years and above. It was followed by crafts and related workers (16.1 percent), elementary occupation (12.6 percent), farmers (12.5 percent), street vendors and related workers (9.2 percent), technicians and associate professionals (5.7 percent). Plant machine operators and assemblers including drivers employed 4.7 percent of Mwanza residents, professionals (4 percent) and small business managers (3.6 percent) while other common occupations such as fishermen, livestock keepers, legislators, administrators and managers, and clerks have employed less than 2 percent each.

4.5.3. Industrial and Commercial Activities

Industries all over the Mwanza region are known to play a major role in socio-economic development. This is also the case in Mwanza city and Ilemela Municipal councils, where industries, mostly small scale, contribute significantly to jobs creation, income generation and stimulation of growth in urban

areas of the city council. At the end of 2015 there were 231 small scale industries employing 1,180 staff. More than thirty percent (i.e 32.9 percent) of the 76 industries were involved with carpentry.

Small scale industries involved with welding counted to have 76 industries (32.9 percent), service industries 32 (13.9 percent). Majority of staff (430 or 36.4 percent of the total staff) were working in the service industry - garage while very few of them (8 staff, 0.7 percent) were working in the freshwater industry. Trade is flourishing economic activity with employment of several people. The project areas residents engage in various retail and wholesale trade within the formal and informal sector. The sector is becoming popular to most of the residents; almost everybody has some sort of small retail shop. There are also bars, restaurants, lodgings, milling machines, Bakeries abattoirs and open markets.

4.5.4. Agriculture

Mwanza City Council is an urban area with a history of vast and intensive urban farming. However, a variety of people, including businesspeople, government employees, and the poorest slum residents, are urban farmers. Tanzanian urban areas are typically not built to support large-scale farming or livestock rearing. It is typical to zone out property inside metropolitan areas to make room for residential neighborhoods, commercial buildings, industrial sites, building sites for roads and railroads, recreational activities, etc. In addition, the continuation of peasant culture has played a role in the establishment and survival of urban agriculture in Tanzania. This is a result of Tanzania's contemporary urban population, which includes the Mwanza City Council, still having traces of their rural heritage. The peasant culture's continued to exist.

4.5.5. Housing and Settlement

Mwanza City is characterized by having modern housing estates in various areas like Capri Point, Bugando and Buswelu and unplanned squatter areas especially on the hills within the City environs. Unplanned settlements are characterized by high congestion of buildings, poor accessibility, lack of physical infrastructure like electricity and roads, and poor sanitation. Municipal Councils have embarked on participatory land use planning and upgrading to enable survey and infrastructure upgrading.

4.5.6. Social Services

4.5.6.1. health facilities in nyamagana municipal

Nyamagana Municipal consists of 2 public hospitals, 2 public health centres, and 14 public dispensaries. There is only 1 dispensary located in the project area in Igogo ward. The rest are located outside the project areas.

4.5.6.2. Health Facilities in Ilemela Municipal

Ilemela Municipal consists of 19 Hospitals, 4 Health Centres, 11 Dispensaries and 37 Clinics. In the project areas Kabuhoro consist of 2 clinics, Kitangiri 1 health centre, 1 Dispensary and 2 clinics. Kilimahewa consists of 1 Dispensary and 1 Clinic.

4.5.6.3. Top Ten Disease at Nyamagana Municipal Council Outpatients 2023

Rank	Diseases	Diagnosed clients	Percentage (out of all diagnoses)
1	Malaria	72,367	54.2
2	Intestine worms	18,264	13.7
3	ARI	13,944	10.4
4	Skin Infections	6,024	10.4
5	Other diagnosis	5,975	4.5
6	Pneumonia	5,703	4.3
7	Diarrhoea	4,584	3.4
8	Eye condition	3,592	4.3
9	Emergency Surgical	2,016	1.5
10	Anamea	1.161	0.9

Source: Mwanza City Director's Office, City Medical Office Mwanza City Council 2023

4.5.6.4. Top Ten Most Commonly Reported Causes Of Morbidity In Nyamagana Municipal Council Inpatients 2023

Rank	Diseases	Number of cases	Percentage (out of all diagnoses)
1	Other Diagnosis	5,305	34.7
2	Uncomplicated Malaria	3,421	22.5
3	Severe Malaria	2,757	18.0
4	Pneumonia	1,261	8.2
5	Anaemia	1,160	7.6
6	Diarrhoea	881	5.8
7	TB	320	2.1
8	Burn	133	0.9
9	Poisons	32	0.2
10	ARI	21	0.1

4.5.6.5. Top Ten Diseases at Ilemela Municipal Council

Rank	OPD	Diagnosed clients	Percentage (out of all diagnoses)
1	Upper Respiratory Infections	77,028	21.97
2	Urinary Tract Infections	62,053	17.7
3	Intestinal Worms	20,220	5.77
4	Other Non-Infectious GIT Diseases	18,064	5.15
5	Malaria (BS +Ve, mRDT +Ve)	17,117	4.88
6	Diarrhoea With No Dehydration	13,078	3.73
7	Peptic Ulcers	11,522	3.29
8	Hypertension	10,867	3.1
9	Pneumonia, Severe & Non-Severe	9,659	2.76
10	Anaemia, Severe & Mild/Moderate	9,395	2.68

4.5.6.6. Mortality Rate

The Infants' mortality rate deaths for 2023 were 22/1000 and under 5 mortality rates were 28/1000 under five deaths.

4.5.6.7. Water Related Diseases

In the year 2023 there were 8600 reported water borne cases among 334880 OPD attendees which is equal to 2.6% out of OPD attendance. Malnutrition rate was 2.9% for the year 2023.

4.5.7. Education Facilities

MWANZA City is endowed with many educational facilities such as primary schools, secondary schools and vocational training centers, and higher learning institutions. It boasts two locally-based universities – St Augustine University and Catholic University of Health and Allied Sciences, plus campuses of other national universities including Open University of Tanzania, University of Dares Salaam, Mzumbe University, and Institute of Finance Management.

4.5.8. Existing Water Supply Conditions

The main raw water intake from Lake Victoria and water treatment plant (WTP) are located at Capri Point and Butimba in Mwanza City. There are two free standing reservoirs at the Capri Point WTP, but only one is in use. Water is transmitted to the network via four (4) transmission pipes. In addition, MWAUWASA has installed two smaller pipelines to serve the Capri Point hilltop areas located above the WTP. The Capri Point WTP was first built in 2008, while Bitimba WTP was built in 2023 and it is in the DLP of One year. Capri Point plant produces between 63,000-96,000 m3/day against a design capacity of 108,000 m3/day while Butimba WTP is planned to be developed in four Phases from an initial design capacity of 44,000 m3 /day, increasing to an ultimate capacity of 178,000 m3 /day. The low production coupled with erratic power supply restricts water availability in the City especially for the higher outlying areas, and therefore rationing is in force. There are currently four(5) main booster stations, located in Mabatini, Bwiru and Nyegezi, Sahwa Chini and a smaller one (2nd tier) at Kisesa.

The 2040 Mwanza City Master Plan (COWI, August 2016) targets the areas north and south of the town, and it will therefore be necessary to plan for future water supply in these areas. The need for additional water resources capture is estimated to triple to about 340,000 m3/day by 2040, from the current capture production design capacity. This increased water demand is based on an estimated population growth from 736,939 (2012 census) to about 1,968,000 in 2040. The current growth in Mwanza City's importance as an economic and country/lake regional hub supports this prediction.

4.5.9. Waste and Sanitation Status

Waste management services are divided into two major categories i.e solid waste management and liquid waste management services. Mwanza city council has the responsibility of managing solid waste and on-site liquid waste. The Mwanza urban water and sanitation Authority deals with sewerage services.

Mwanza City Council has a moderate standard of service in respect to collection and disposal of solid waste and liquid waste. Crude damping method of waste disposal is more controlled in the Town thus reducing environmental and health hazards like unpleasant Odour, breeding sites of vermin and contamination of surface and groundwater.

4.5.10. Social Infrastructure in the Project Areas

4.5.10.1. Roads and Railways

Road transport is the most used mode of transport in Mwanza city and Nyamagana.

4.5.10.2. Air and Water Transport

Marine Transport and the existing airport is located in Ilemela District.

4.5.10.3. Energy and Power Supply

Both Municipality - Electricity is the power source for industries, commercial premises, service institutions and for domestic premises. The region is connected to the National Grid by TANESCO. All district headquarters are served by this grid.

4.5.10.4. Tourism

Mwanza is one of the unique destinations in Tanzania that has yet to be discovered by many. Main tourist attractions in Mwanza are the Bujora Sukuma Museum and Sanane Island. There are a few high-class hotels such as JB Delamonte, Gold-Crest, Tilapia, Malaika and New Mwanza Hotel. There are also myriad other mediums/small size hotels. Day trips can be made to the famous Serengeti National Park and other nature reserves.

4.5.10.5. Cross Border Trade

Mwanza Region is a business gateway for neighbouring countries of Uganda, Kenya, Rwanda, Burundi and Democratic Republic of Congo. Taking advantage of its location, the Region not only serves neighbouring countries but also serves neighbouring regions. These countries and regions are benefiting by purchasing goods and services in Mwanza.

4.5.10.6. Communications

Telecommunications

All the Wards in the Project area are using the Tanzania Telecommunication Company Limited (TTCL) as the inland-based telephone and mobile provider for the Region. In addition, there are email services and several cellular telephone services provided by a few private and semi-private telecommunication companies. These include Vodacom, Airtel, Tigo, and Zantel. There are adequate telephone services in all urban centers in the Region and in some parts of the rural areas.

News and Mass Media

All these news and media services are available in the project areas where there are eleven Radio Stations. These are; - TBC1 FM, Radio Free Africa – RFA, Radio Maria, Living Water radio Kwa Neema radio and Radio One. Others include TBC Taifa, KISS FM, and Clouds FM, Capital radio, Afya radio, Mwanza City FM radio, Sengerema radio and East Africa radio. Television stations can be accessed via satellites by using antennas and boosters. Some of the local stations which can be accessed include TBC1, ITV, Star TV, Channel 10, Channel 5 and EATV, depending on the type of the

antenna used. Other international worldwide stations such as CNN, BBC, CFI, Al Jazeera, and others may be accessed.

4.5.10.7. Conclusion

Mwanza City is a city with a high socio-economic potential, but requires well-targeted investments to improve the social and economic conditions. Programmes such as the LVWATSAN – Mwanza Project are highly welcomed. The following are positive factors that contribute to a conducive environment for further development:

- Climate suitable for both tourism and agriculture
- Strategic location with transport links to neighboring countries like Rwanda, Burundi, Kenya and Uganda.
- Peace and political stability that offers a safe environment with low crime rates.
- High growth potential
- Inexpensive and trainable workforce
- Source of skills in the local education institutions
- Transport links with other regions and proximity to neighboring countries.

5. STAKEHOLDERS CONSULTATION AND PUBLIC PARTICIPATION

5.1. INTRODUCTION

Public consultation during the Scoping Study involved various stakeholders i.e. persons and institutions with interest in the planning and execution of the project, including those positively and negatively affected. Stakeholders consulted were officials from Mwanza City Council, Ilemela Municipal Council, Ward Councillors, WEOs, MEOs and project communities. Stakeholder consultations helped in the determination and identification of impacts and their significance as well as mitigation measures as represented in the Table 5-1 below.

The Study Team carried out a stakeholder analysis followed by identification of the means of public involvement through either public meetings, advertisements and notices, surveys, interviews and questionnaires. Each of the methods was weighed to select the best options for participation. Public meetings were chosen to be the best option for the majority of stakeholders at the project sites.

The ESIA Study Team conducted public meetings which involved key stakeholders and community beneficiaries. Public involvement through stakeholders' consultation achieved:

- Being a vehicle for public input and facilitated negotiated outcomes;
- Creating trust and partnerships
- Identifying potentially negative impacts, and discussing how to minimize these
- Identifying positive impacts, and discussing how to enhance these.

Accordingly, issues arising from this public participation process were used to determine mitigation measures for the project and these are incorporated in the present report

5.2. STAKEHOLDERS IDENTIFICATION AND ANALYSIS

The ESIA Study Team identified organizations, groups and individuals considered as "stakeholders". This identification was based on each one's roles and their relevance in the proposed construction of water supply and wastewater infrastructure at Buswelu and Nyamhongolo wards in Ilemela municipality, and Butimba, Buhongwa, and Igoma wards in Nyamagana municipality. Some of the stakeholders such as government authorities and representatives at 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 the below tables.

Key stakeholders identified for the proposed works are indicated in Table 5-1.

5.3. Stakeholder Consultation Process

Intensive consultations on the proposed construction of water supply and wastewater infrastructure were held at regional, municipal/district, and ward levels in March 2017 within Mwanza City. Issues pertaining to the proposed construction of water supply and wastewater infrastructure and its environmental and social consequences were presented and discussed with representatives of the key stakeholders, interested institutions and residents particularly those around working or residing within the areas earmarked for project activities. Views and/or concerns during the meetings were noted, documented and responded upon by the ESIA Study Team.

Between November 2017 and March 2018, the ESIA Study Team carried out additional consultations at ward/mitaa level and also carried out public consultation meetings at Mitaa level for the entire area. Further consultations were conducted for updating this Report. The consultation was based on the added project components while the other consultation was for the Butimba constructed Intake.

The 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 the EIA and Audit Regulations. To facilitate an open and transparent process, interested and project affected persons (PAP) 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. Comments and concerns received have been incorporated and are addressed in the present ESIA report.

5.4. Overview and Legal Requirement

Stakeholder consultation and disclosure of information is an ongoing overarching requirement that applies to the ESIA process. Consultation is of critical importance in gaining insights into the key environmental and social issues, concerns of communities and other stakeholders, and in aiding the development of potential strategies for addressing these impacts.

Effective consultation with stakeholders is (i) key to understanding the concerns and requirements of affected communities and ensuring their participation in the formulation and refinement of the project design; and (ii) a prerequisite for sustainable development and operation of the planned works. Effective disclosure through the release of timely accurate and comprehensive information to stakeholders is essential to ensure that the likely impacts (both positive and negative) are understood by stakeholders and allow the stakeholders to provide feedback to the project. It also enables the consultant in:

- Determining the scope of the ESIA / ESMP
- Deriving specialist knowledge about the site
- Evaluating relative significance of the likely impacts
- Improve project design and, thereby, minimize conflicts and delays in implementation
- Proposing mitigation measures;
- Ensuring that the ESIA / ESMP report is objective, truthful and compete;
- Facilitate the development of appropriate and acceptable entitlement options;
- Increase long term project sustainability and ownership;
- Reduce problems of institutional coordination;
- Make the resettlement process transparent (if any);
- Increase the effectiveness and sustainability of the facility, and improve coping mechanisms;
- Monitoring any conditions of the development agreement.

The Environmental Management Act of 2004 requires that all ESIA Studies undertake public consultation as part of the study. The aim of public consultation and disclosure is to ensure that all stakeholders interested in a proposed project (including project beneficiaries and the public in the vicinity of the proposed project) are identified and their opinions considered during project planning, design, construction, and operation and decommission phases.

5.5. Stakeholder Engagement Approach

The Stakeholder Engagement Plan entails developing suitable strategies to successfully engage stakeholders throughout the project's lifespan based on an assessment of the stakeholders' needs, interests, and potential influence on the project's success. To address different stakeholder groups, this ESIA used a variety of approaches, including meetings, interviews, and consultations. This method's primary benefit is that it provides a clear, practical approach for communicating with project stakeholders in order to forward the project's objectives.

5.6. Stakeholders Engagement during Planning and Preparation

The planning and preparation of the project involved mapping out and including many stakeholders. A number of important concerns were considered in the Environmental and Social Impact Assessment. Stakeholders may continue to express their views and provide feedback on this ESIA.

5.7. Stakeholder Engagement during Implementation

During project implementation, engagement activities will be conducted in line with project activities. During the implementation stage, the engagement process will start with the contractors' introduction. Village and community leaders will be made more aware of the ongoing construction after involvement at the district and regional levels. A range of methods, including focus groups, community gatherings,

one-on-one discussions, formal and structured meetings, and site visits, will be used to accomplish this.

5.8. Consultations Conducted

Section 89 of the Environmental Management Act (EMA, 2004) provides directives on public participation and its importance in the EIA (of ESIA). Regulation 17 of the EIA Regulations (URT, 2005) provides further details and procedures for public participation in the EIA process. Stakeholders are all those people and institutions that have interest in the successful design, implementation and sustainability of the project. This includes those positively and negatively affected by the project. Stakeholder participation involves processes whereby all those with a stake in the outcome of the project actively participate in decisions on planning and management. They share information and knowledge and may contribute to the project, so as to enhance the success of the project and hence ultimately their own interests.

In this definition stakeholder consultation would encompass different government agencies, beneficiaries and other formal or informal groups associated with a project. The range of potential stakeholders to EIA will greatly depend on the definition of boundaries for that project but it is important to be 'inclusive' rather than 'exclusive'.

5.8.1. Involvement of Stakeholders

The scoping study applied different participatory methods to involve stakeholders. Community leaders and members at key project sites were identified and interviewed, projects were explained and responses of participants were discussed and noted. Also, representatives of a number of key organizations were contacted and discussions held. The outcome of these consultations is reflected in Appendix VI. The Table below shows the list of stakeholders identified in the project area and their roles and responsibilities.

Table 3: **List of key stakeholders for LVWATSAN STIP works**

Level	Institutions	Roles and responsibilities
National Level	President's Office - Regional Administration and Local Government	• Supervision of Local Government Authorities • Issuing policies • Overseeing enforcement of local authorities' laws and regulations • Project monitoring

Level	Institutions	Roles and responsibilities
	Vice President's Office Division of Environment	• Coordination of the EMP, Act and guidelines • Environmental Monitoring and Auditing • Advice to the government on all environmental matters
	NEMC	• Environmental monitoring • Review and approval of ESIA/ESMP • Issuing of ESIA Certificates
	Ministry of Finance and Planning	• Official signatory to Project Agreement • Official Custodian of all government funds • Release of counterpart funds
	Ministry of Water	• Parent Ministry for the Project Proponent • Issuing policies on water resources management and planning • Enforcement of laws/regulations in water resources management and supply • Setting operational standards • Activities monitoring in planning • Release of counterpart funds
	Ministry of Lands and Human Settlement Development	• Custodian of the national land policy including the project area • issuing of title deeds for allocated land plots • Enforce law and regulations in the area of influence of the project • Approval of valuation processes and amounts of compensation
	Occupational Safety and	• Issuing certificates of compliance and

Level	Institutions	Roles and responsibilities
	Health Authority (OSHA)	Designated • Authority for occupational safety issues • Monitoring health and safety issues working sites
	EWURA	Regulating provision of water supply services in urban areas including tariff-setting
Regional Level	Regional Administrative Secretary	• Oversee/advice implementation of national policies at regional level • Oversee enforcement of laws and regulations • Advice on the implementation of development projects and activities at regional level • Overall law and order
	TANROADS/ TARURA	• Safeguarding road reserve and right of way • Issuing road crossing permits during construction
	Tanzania Railways Corporation	• Safeguarding railway reserve and right of way • Issuing railway crossing permits during construction
	Tanzania Electricity Supply Company	• Electricity distribution/maintenance and safeguarding right of way for transmission mains
	Lake Victoria Basin Water Board	• Safeguarding of water resources in the Project areas • Issuing water rights permits • Monitoring water quality

Level	Institutions	Roles and responsibilities
	Prisons Department	Custodian of land at proposed water treatment area
District Level	Mwanza City Council Ilemela District Council	• Provision of staff for land survey and valuation • Land use approval • Oversee/advice implementation of national policies at District level • Oversee enforcement of laws and regulations • Land use planning at municipality level • Environmental management • Responsibility over Ward Development Committees and Village Councils
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 • Community sensitization • Liaising on local land issues
Community Level	Village Council	• 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 • Liaising on local land issues • Community Sensitization
	Community Members	• Ultimate project beneficiaries • Liaising on compensation issues with

Level	Institutions	Roles and responsibilities
		potential/actual PAPs • Safeguarding project assets
Project Level	MWAUWASA	• Project Proponent • Project implementation • Consultation with stakeholders • Project monitoring and internal auditing • Tendering Responsibility
	UN Habitat	• Technical Support for Stakeholder Engagement
	Mott MacDonald/PMC	• Provision of technical support
	UWP Tanzania	• Provision of technical support through PMC
	Egis eau (Supervision) Consultant Seureca Veolia/Netwas (T) Ltd	• Preparing or reviewing designs/drawings • Supervising contractors
	Contractors	• Construction of project works • Liaising with communities
International Level	EIB	• Project Funding • Overall supervision
	AfD	• Project Funding • Overall Supervision

5.8.2. Stakeholders Consulted

Stakeholders who have been consulted during the preparation of the Scoping Report and ESIA, included the following:

I. National Level:

A. NEMC
B. MOW (Sector Environment Unit)

II. Regionally-based Institutions:

A. TANROADS
B. TARURA
C. LVBWB
D. LVEMP II
E. TANESCO
F. TRC
G. Mwanza Zonal Water Quality Laboratory
H. Mwanza City Council and Ilemela District Council – meetings with officials including City/Municipal Executive Director, District Town Planner, District Community Development Officer, District Water Engineer, District Planning Officer, District Health Officer, Distinct Valuer, District Environmental Management Officer.

III. Community Level:

- Ward / Mtaa leader
- Ward / Mtaa leader
- Water Use Associations
- Individual stakeholders / groups
- Members of the public

5.8.3. Conclusion and Summary of Public Consultations

Extensive stakeholder consultations have been undertaken during both the Scoping stage and detailed assessment stage. Key issues have been reflected in the ESMP where applicable. The table below gives a summary of the key issues raised and the ESIA Team Responses.

Table 4 : **Summary of Key Issues from Stakeholder and Community Consultations**

S/N	Issue Raised	ESIA Team Response
01	Benefits of the sewerage system	The sewerage system is part and parcel of the STIP works which will improve sanitation in the target communities and Mwanza City as a whole. The project as a whole will reduce cases of water related diseases. This will also address the current poor disposal of industrial waste water in Nyakato/Igoma areas

S/N	Issue Raised	ESIA Team Response
02	Limited coverage/scope of proposed sewerage system	The proposed works covers Nyakato, Buswelu, Igoma,Nyamhongolo and Kishiri wards, and is in line with the current Mwanza Master Plan. However, a new WWTP will be built in Mkuyuni area under Long-Term Investment Plan (LTIP) as per new Mwanza City 2040 Master Plan
03	Compensation of PAPs	Valuation of properties and compensation of PAPs will be done in accordance with the government's legal framework and procedures and as per the Project's Resettlement Policy Framework. Compensation will be met through Government counterpart funds where applicable.
04	Potential pollution from WWTP	Design will aim at minimizing odour nuisance as well ensuring that effluent standards are met to minimize potential groundwater and surface water pollution. Adequate buffer zones will be maintained between WWTP and residences. Location selected is the optimum site based on technical considerations
05	Inadequate water supply in many communities meant to benefit from the sewerage works	The new water treatment works and transmission main will help increase water supply availability. Ongoing improvements under LVWATSAN Component 1 will also increase water availability
06	Sewerage connection costs and monthly charges	Except for internal pipework and fittings, connection costs for new customers will be met by the Project as per the approved budget. Standard connection charges will apply after that. The monthly charge will be 50% of the water bill as currently set by EWURA
07	Importance/scope of community participation	The Project lays great emphasis on community participation thus the holding of the stakeholder consultations and public meetings. Contractors will be strongly advised to engage local residents

S/N	Issue Raised	ESIA Team Response
		especially youth for unskilled or semi-skilled jobs. Multi-sector Forum and Grievance Redress Committees will be utilized to enhance continuous community engagement
08	Time-table and speed of implementation of the Project	The Project is committed to speedy and timely implementation of the works in accordance with the tendering and approval procedures. It is expected that implementation will start by mid-2018 and be completed by 2020
09	Safety during construction especially digging of trenches	Health and safety precautions will be adhered to in line with the ESMP mitigation measures.
10	Need for better overall environmental management and sanitation	MWAUWASA will work with other stakeholders such as LVEMP, LVBWB to take necessary measures

Appendix VI gives the main issues raised by the stakeholders at each meeting in detail, together with the responses from the ESIA Study Team.

5.8.4. Photographic records of public consultation Meetings

Figure 7 : Industrial and institutional Stakeholders consultative meeting discussing on the proposed construction of Igoma wastewater scheme under STIP

Figure 8: Consultative Meeting with Nyamhongolo ward Officers

Figure 9: Consultative Meeting with Buhongwa Ward Officers

Figure 10: Pictures of Public Consultation Meetings at Mtaa Level

6. IDENTIFICATION AND ASSESSMENT OF IMPACTS AND ALTERNATIVES

6.1. Introduction

ESIA involves the investigation to identify any positive or negative environmental and social impacts that may arise from a development, whereas it also aims at identifying alternatives that would result in less adverse impacts. Rehabilitation and expansion of an existing water supply system and associated infrastructure, like any other development project in an (peri)urban setting may have environmental and social impacts that may occur from the construction activities ranging from site clearance to transportation of building materials, construction and operation of works. Potential environmental and social positive and negative impacts may emerge during the subsequent phases of the project.

6.2. Methodologies for Identification of Impacts

The assessment of environmental impacts and their significance is largely dependent on the extent and duration of the expected change, size of the resource affected and their sensitivity to the change. Impact identification is a process designed to ensure that all potential significant impacts are identified and taken into account in project design and implementation. Several 'tools' are available to assist in impact identification. The most frequently used are checklists of impacts, although matrices, network diagrams and map overlays are also commonly used. In this ESIA study, the following are the methods used.

6.2.1. Matrix

The Consultants team identified the environmental impacts through the application of the matrix method (screening matrix), which is predicated on identifying and qualifying Project actions in relation to natural and social environmental conditions. This resulted in a list of anthropomorphic actions that had an impact on the environment, including the health and safety of the project's communities, the latter of which was accomplished by means of a cause-effect relationship matrix.

6.2.2. Focused Approach-Impacts Mapping

The method was applied to locate and identify every receiving environment for potential impacts from the STIP Project.

6.2.3. Experts Knowledge

Expert or knowledge-based systems were used to assist diagnosis, problem solving and decision-making.

6.3. Identification of Impacts

From the baseline data, important biological, physical, and social receptors were chosen for this part. A significance ranking method was employed to assess the effects of the Project activities on each of these "Valued Ecosystem Components." To find straightforward and tangible characteristics, the environment's complexity and systemic nature were divided into several levels.

Table 5 Components and Factors of the Environment

Environment	Component	Factor
Abiotic	Climate	Microclimate, Temperature, Rainfall
	Atmosphere	Air Quality
		Noise
	Land	Structure
		Quality
		Relieve
	Surface water	Surface drainage (run-off patterns)
		Quality
	Groundwater	Groundwater Aquifer recharge
		Quality
Biotic	Flora & Fauna and ecosystem	Habitat
		Distribution
		Biodiversity
Landscape	Landscape	Quality-vegetation cover, soil erosion
Socioeconomic	Economic	Change of land use
		Jobs

Environment	Component	Factor
		Local and Regional Development
	Service Demand	Water
		Energy
		Communication
		Waste management and disposal

6.3.1. Identification Methodologies for Project Impacts

Due to the project having many sub project, the Interactions between the sub project and the environment were identified for each phase of by using a matrices presented table 6 below

Figure 11: Matrices (Subproject-Environment Interactions)

Proposed Function/ Facility	Flora végétation cover & types species of concern	Water Sources	Ground water Sources and Quality	Archaeological & heritage sites	Aquatic resources	Terrestrial fauna & habitats (species of concern)	Nearby human settlements and establishment	Adjacent economic activities	Land Use	Likely social/economic interruption
Butimba Intake and Raw Water Pump Stations	✔	✓	✓	—	✓	✓	✓	✓	✓	✓
Butimba Water Treatment Plant (WTP)	✔	✔	✔	—	—	✔	✔	✔	✔	✔
Transmission main from Butimba Intake to Sub-Igoma BPS located at Sahwa Centre in Lwanhima Ward	✔	✔	✔	—	—	✔	✔	✔	✔	✔
Sub-Igoma reservoir and BPS	✔	✔	—	—	—	—	✔	✔	✔	✔
Transmission	✔	✔	✔	✔	—	—	—	✔	✔	✔

Proposed Function/ Facility	Flora végétation cover & types species of concern	Water Sources	Ground water Sources and Quality	Archaeological & heritage sites	Aquatic resources	Terrestrial fauna & habitats (species of concern)	Nearby human settlements and establishment	Adjacent economic activities	Land Use	Likely social/economic interruption
main from SubIgoma Reservoir and BPS to Existing Igoma Reservoi										
Solar System ata Butimba	✔				✔	✔			✔	

6.4. Description of the potential Impact from the table above

6.4.1. Pre-construction, Planning and Design Phase

This phase includes topographical surveys and construction site selection, identification of suitable areas for campsites, geotechnical investigation, identification of sources of natural construction materials (gravel, building sand, aggregates and water) and transportation of construction equipment to site.

Positive Impacts

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:

I. Environmental and social impacts studies teams
II. Building economists or Quantity Surveyors to establish quantities of construction materials and assessing project economic viability
III. Surveying teams and technicians for topographical and geotechnical investigations
IV. Local laboratories for construction materials testing

Negative Impact

Negative impacts resulting from the planning / pre-construction phase could include any of the following:

1) **Vegetation loss through clearance** – It is expected that during this phase the need for vegetation clearing will be negligible. If clearing is needed this should be kept minimal as much as possible
2) **Temporary obstruction of access roads** – by topographic survey and geotechnical investigation teams
3) **Soil erosion** – during geotechnical investigation soils will remain bare and in some areas the soils will become loose due to borehole drilling or pit digging to facilitate geotechnical investigations.
4) **Traffic increase –** motor vehicles in the area to facilitate topographic survey and geotechnical investigation.

5) **Noise** – from geotechnical investigation equipment and hydraulic augers.or from transport of equipment to proposed project site
6) **Likely motor accidents** – for example caused by moving vehicles of topographic and geotechnical investigation teams and other road users or damage caused to roads or existing structures.

6.4.2. Construction Phase

Positive Impacts

The construction works will require skilled and unskilled labourers; the latter should preferably be contracted from Mwanza City or nearby villages. Wages will temporarily increase family income and boost the local economy. Some labourers will learn from the construction works and improve their skills. The construction activities will provide opportunities for local food vendors to provide food and refreshments to the workers on site which will boost their incomes.

Negative Impact

The main negative impacts during construction are expected to be the following.

I. **Vegetation clearance** – On some locations vegetation will be present in or along the alignment of the planned works which will be removed or trimmed. Contractors should try to avoid vegetation clearing as much as possible. Also for solar installation, the proposed area is the wetland so it will result in Vegetation clearances.
II. **Disturbance to cultural, historical or archaeological artifacts during site clearance** – Based on the nature of the working sites it is possible that scientific, historical or archaeological interest or anything of value during excavation works may be encountered. Field investigation on-site, including consultations with local authorities and community members suggests that it is unlikely that the working sites have any cultural, historical or archaeological significance.
III. **Change in land use, scenic and visual quality** – Laying of the pipes will be as much as possible done along existing roads. Pipes will be buried underground and dug trenches will be back-filled, and therefore permanent impact on the land use or scenery will be insignificant. Above ground structures such as pump houses and storage tanks will mostly be built on government land that already has similar structures and therefore the impact of the additional buildings on the scenery is expected to be small. For the Solar area, the proposed area is the wetland and therefore they will be a change in the land use as the area will be cleared and restricted only for solar system.

IV. **Land scarring at borrow sites or sources of construction materials** – Borrow materials to be used for construction of the infrastructure (for example sand, aggregates, stones for buildings) will to the extent possible be collected locally from agreed borrow sites.

V. **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 connection 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 will vary according to the degree of severity or sensitivity of those affected. Noise may also temporarily affect domestic and wild animals including birds and other organisms living near the quarry areas and along transportation routes.

VI. **Soil erosion** – Soil excavation for particularly the laying of pipes and associated facilities may trigger soil erosion which may affect adjacent water sources including Lake Victoria. The removal of trees and other vegetation as well as wetland areas in the Solar proposed area will accelerate soil erosion which if not abated it will result in gullies. This could also be observed at quarry sites if quarrying activities will not be conducted properly. Soil erosion will consequently affect soil fertility. Siltation of aquatic systems will therefore reduce aquatic production and it may result in mortality of the affected phytoplankton and benthic algae and other forms of life that depend on primary producers. Excavated soil from construction sites may also be washed away as runoff if the construction activities are carried out during the rainy season. The runoff has the potential to cause siltation of the aquatic system including Lake Victoria.

VII. **Traffic Increase** – During construction there will be heavy duty vehicles that come to the various construction sites to deliver construction materials. This will increase congestion of vehicles on main roads in Mwanza City.

VIII. **Contamination of water** – Ground- and surface water contamination could occur if the Contractor does not follow pollution control measures. Groundwater can be contaminated through leaching of fuel and lubricants during the construction phase of the project.

IX. **Air quality deterioration** – 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, demolition, 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 a relatively long time under dry weather conditions.

X. **Atmospheric pollution** due to fuel combustion during construction may also occur because 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 emissions associated with temporary mean speed reduction on the roads directly affected and in the surrounding road network.

XI. **Spread of diseases (HIV/AIDs, STIs or STDs)** – Construction sites 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 work and services. Such gatherings will allow contacts that may spread the incidence of disease.

XII. **Safety hazards during construction** – A construction site is inherently a potentially dangerous place. Once the construction site is active, this will attract people for example prospecting for employment. While this is their right, roaming or wandering around the construction sites can be dangerous to these people in case of any accident such as falling into open trenches. This can also apply for the Construction workers and visitors to the sites

XIII. **Gender Based Violence in communities neighboring project:** Gender Based Violence risk at the community level can occur during the construction phases as the division of work may favor only one gender due to the nature of the works.Though must be mitigated by the contractor to implement provisions that ensure that gender- based violence at the community level is not triggered by the Project.

XIV. **Solid and liquid wastes** – Since the construction works may involve clearing of the vegetation and excavation of trenches some unexpected issues may emerge, such as bad soil unsuitable for use in backfilling the trenches, one may also encounter collapsible soils such that timber for supporting the walls is required. Worker camps will generate volumes of organic and non-organic wastes daily. Works result in wastes in all forms (liquid or solid).

XV. **Vandalism of construction materials and damage to pipelines** – Leakages will or may increase due to vandalism of construction materials or damage of existing pipelines.

XVI. **Resettlement and disturbance to residents** – Project works may necessitate people to remove temporarily or permanently their property or movable assets to another location, or temporarily or permanently stop farming the land that they own or used through customary rights, and therewith become Project Affected People (PAP) that may need to be compensated through development and implementation of a (Abbreviated) Resettlement Action Plan (A/RAP). A detailed census of Project Affected People (PAP) was prepared as part of the RAP (Resettlement Action Plan) preparation process, which after review and approval by MoWI and EIB were fully implemented prior to commencement of the construction works. The analysis indicated that the estimated number of PAPs is 38. Confirmation of the

PAPs was done based on the final drawings, followed by valuation and compensation in accordance with the Resettlement Policy Framework.

6.4.3. Operation Phase

Positive Impacts

Main positive impacts of the intervention are:

1. Rehabilitated and extended water supply system offering a more reliable source of safe drinking water to a larger portion of the population.
2. Reduced incidence of diseases due to more and better-quality potable water resulting in a healthier population.
3. Safe disposal of sewage and other waste water from domestic, commercial and industrial sources in areas that will be served by the sewerage system.
4. Employment and trading opportunities for the neighbouring communities during the construction and operation phase of the project including food vendors. 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.
5. Increase in government and municipal revenue collection through income tax payments by the Contractor and subcontractors as well as statutory contributions made by the contractor for his employees. Sales from construction materials will have value added tax that goes to the government.

Negative Impact

Few negative impacts are expected from the operation of the rehabilitated and extended water supply system as outlined below:

A. Disturbance from pumps, engines – the raw water intake, the water treatment plant and the high-lift pump may require the frequent utilization of pumps and other engines to operate for longer or shorter periods. This may cause hindrance to the immediate surroundings of these facilities, such as noise and vibrations.
B. Discharge of effluent from sewage treatment plants may cause pollution of the soil and surface and water courses if there is inadequate treatment or inadequate precautions.
C. Unpleasant odours could emanate from the sewerage treatment plant and affect communities close to the plant if the operations are not effective and there is inadequate buffer zone.
D. There will be outflow of sludge from the various water treatment stages.

E. There may be a bird influx in the sewerage treatment area as experienced at the existing sewerage ponds at Butuja in Ilemela causing nuisance.
F. Health risks to laboratory attendants during mixing of water treatment reagents/chemicals.
G. Vandalism of water supply appurtenances along the transmission main and distribution system.
H. There are no global warming emissions associated with operation of the solar energy plant itself. Thus, air emissions generated during operation are limited to emissions from transport vehicles providing required materials and supplies to the project site. Such impacts are considered to be limited during the operation phase.
I. Visual Impact: There are no receptors near the project area because it is a treatment plant. Visual impact assessment takes into account the response of the receptors who experience these effects and the overall consequence of these effects on the visual amenity of the view. Visual effects arise from changes in the composition and character of views available to receptors affected by the proposed development (residents, recreational users, tourists, etc.).
J. Glare and Glint : To maximize electricity generation, solar PV modules are designed to absorb light and reflections are contrary to their central purpose. However, panel glass remains relatively smooth and homogenous and may be physically capable of producing a concentrated reflection similar to a calm lake on a wind-free day. The project site is located far away from the main road, hence the impact can be considered as insignificant.

6.5. Assessment of significance of the Project Impacts

6.5.1. Assessment of positive and negative Impacts

The potential positive and negative impacts of the proposed project have been listed above. These impacts are now analyzed into different categories based on the stakeholders' views and perceptions, the consultants' experience in undertaking Environmental and Social Impact Assessments and experience gained in other projects of a similar nature.

The approach used to assess the significance of the potential impacts and later assess the effectiveness of the mitigation or enhancement measures is to apply significant ratings to each impact based on objective criteria, such as magnitude, extent and duration of that impact, to yield a final evaluation of the significance of impacts before and after mitigation.

The application of significance rating reduces the number of variables which need to be considered by the decision maker, whilst providing pertinent information about the implications of the proposed project. The assessment criteria used in the methodology and their associated ratings are shown in the Table below.

Table: First step assessment criteria for evaluation of impacts

S/N	Assessment Criterion	Ratings
01	Impact	**Direct:** effect comes directly from activities at the project site **Indirect:** effect does not come directly from activities at the project site, but from another direct or indirect effect
02	Duration of Impact	**Short Term (ST)**: 0-5 years; **Medium Term (MT)** 5-10 years; **Long Term (LT):** 15+ years
03	Extent or Spatial influence of Impact	**Site Specific:** Within the boundaries of the project site **Local:** within the local project impact area **Regional/National/International**: Beyond
04	Reversibility	**Irreversible:** cannot recover from the impact over a reasonable amount of time **Reversible:** can recover from the impact over a reasonable amount of time
05	Magnitude of Impact at the spatial scale	**High:** natural and/or social functions and/or processes are severely altered **Medium**: natural and /or social functions and /or processes are notably altered **Low:** natural and /or social functions and/or processes are negligibly or minimally altered

6.5.2. Assessment of Cumulative, Residual and Transboundary Impacts

6.5.2.1. Cumulative Environmental Impacts

Generally Two types of direct and indirect environmental impacts likely to arise from water supply development projects have stated above as above. Now the third category of environmental impacts from the proposed water supply project may be cumulative impacts: Cumulative impacts may be defined as the total impact that will arise from the water supply project under the control of the proponent MWAUWASA, other activities under the control of others (say farmers from local communities) and other background pressures and trends which may be unregulated such as

cultivation and livestock grazing. The activities of the water supply project will therefore be one part of the total cumulative impact on the environment. Therefore, cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. The analysis of the water supply project impacts combined with the effects of other projects can give a more accurate picture and understanding of the effects of the project's development than just considering the water supply impacts in isolation of the presence of other projects.

These cumulative impacts can also be further split down according to their nature, into positive and negative impacts, random and predictable impacts, local and widespread impacts, temporary and permanent impact and also short -and long-term impacts as specified for direct and indirect impacts

The process of cumulative environmental impact can arise from any of the four following types of events:

1) Single large event such as construction of this project
2) Multiple interrelated events,
3) Natural calamities such as severe storms leading into increase in water levels in Lake Victoria or
4) Slow, incremental and widespread change such as erosion as the result of uncontrolled erosion along the project pipelines and other similar actions in the project area.

These possibilities being considered, it is possible that during water supply construction, the hills and valleys will be cut through, firstly by vegetation clearance then exposing a larger part of soil that will later be washed into the nearby water courses causing siltation. This impact on water courses can equally be caused by bushfire or livestock grazing that will either loosen the soil or expose the soil that will later be washed away into the water body. The difference here is the extent and magnitude of causative agents of these cumulative impacts. Cumulative impacts assessment is a complex process which requires extensive knowledge of ecological principles and ecosystem response mechanisms. The success of the analysis relies heavily on the framework that is set up before the assessment is undertaken. The analysis of cumulative impacts can begin once boundaries for the assessment have been defined; quantifiable variables have been chosen; and the relationships between the chosen variables have been established.

Likely cumulative environmental impacts of the water supply project are

- Air quality
- Ecology and nature conservation
- Landscape and visual impairmenT
- Archaeology and heritage on excavated sites

- Land use
- Noise and Vibration

The mitigation actions can be similar to those applied to similar impacts under the direct and indirect impacts category.

6.5.2.2. Residual Environmental Impacts

The residual impacts refer to those environmental effects predicted to remain after the application of mitigation actions outlined in the environmental assessment. The identified residual impacts are

- Change in land use and visual effect – this residual impact will be minimal as the water supply will be passing along the existing routes of access except in some locations where modifications will be made to avoid unavoidable obstacles
- Change in landscape – these will be minimal residual impact as the excavation for water pipes and other appurtenances will be along the existing roads of access to the project sites.
- Ecology will change where locations will be identified to erect storage tanks, treatment plant or locations that will be cut and all vegetation cleared to allow use of earmarked area
- Noise and vibration will be there during construction but once the project is made operational such noise and vibrations will be transient (pressure and air release valves and lower than when the water supply project will be under construction

6.5.2.3. Transboundary Environmental Impacts

Transboundary impact as defined by the United Nations (1991) means any impact, not exclusively of a global nature, within an area under the jurisdiction of a Party caused by a proposed activity the physical origin of which is situated wholly or in part within the area under the jurisdiction of another Party.

While this water supply project is constructed and operated in Tanzania, the water will be drawn from a transboundary water body, Lake Victoria that later feeds into the Nile River which makes it a potential pathway of transboundary impacts. These impacts are related to what may come from the water supply under construction or operation flowing into Lake Victoria. This may be in the form of soil erosion, water pollution and siltation of the rivers that flow into Lake Victoria or dust and emissions generated from project activities.

6.5.3. Analysis of Environmental and Social Impacts

able 6: Analysis of Environmental and Social Impacts

Environmental and Social Impacts	Effect		Duration			Reversibility	
Description of Impacts	Direct	Indirect	Short term	Medium	Long term	Reversible	Irreversible
During Planning Phase							
Vegetation clearance	✔		✔				✔
Displacement of people, properties and infrastructures	✔				✔		✔
Temporary obstruction of access roads	✔		✔				✔
Soil erosion – during geotechnical investigation soils	✔		✔				✔
Likely motor accidents		✔	✔			✔	
Construction Phase							
Vegetation clearance	✔		✔				✔
Disturbance to cultural, historical or archaeological artifacts during site clearance	✔			✔			✔
Change in land use, scenic and visual quality	✔				✔		✔
Poor air quality from dust and emissions	✔		✔				✔

Environmental and Social Impacts	Effect		Duration			Reversibility	
Description of Impacts	Direct	Indirect	Short term	Medium	Long term	Reversible	Irreversible
around the construction site and material hauling routes							
Noise and vibration pollution	✔		✔			✔	
Solid and liquid wastes	✔			✔		✔	
Soil erosion	✔				✔	✔	
Socio-economic Impacts	✔			✔		✔	
Gender Based Violence	✔		✔			✔	
Safety hazards during construction	✔		✔			✔	
Spread of diseases (HIV/AIDs, STIs or STDs)	✔		✔				✔
OPERATION PHASE							
Water supply and wastewater operational problems due to inability of the communities to pay for the service rendered	✔				✔	✔	
Vandalism to project facilities	✔		✔			✔	

Environmental and Social Impacts	Effect		Duration			Reversibility	
Description of Impacts	Direct	Indirect	Short term	Medium	Long term	Reversible	Irreversible
Discharge of effluent from sewage treatment plants		✔	✔			✔	
Health risks to laboratory attendants during mixing of water treatment reagents/chemicals.	✔		✔			✔	
bird influx in the sewerage treatment area	✔				✔	✔	

6.6. Project Alternatives

Through the analysis of alternatives, a comparison can be made of the operational effectiveness, costs and environmental and social risks of proposed development options. For the proposed water supply works three alternatives have been considered, i.e. Do-Nothing, Delaying Implementation or Expansion of Existing Works as is outlined below.

6.6.1. No-Project Alternative

The No-Project Alternative means that the proposed project will not go ahead. Constructions and operations will not take place. This alternative will not fulfill the purpose of the project, the objective of the National Environment, Water and Public Health Policies or MWAUWASA responsibilities to meet the identified needs to provide sanitation services. This means that Mwanza would depend on water produced by the current water supply system, severely affecting socio-economic activities in the City – the COWI master plan provides more details. On the other hand, sanitation services for the wards of Buswelu, Nyamhongolo, Igoma, Nyakato and Kishiri would continue to be based on on-site sanitation which is not adequate given the soil and water table conditions. Therefore, this is not a feasible alternative to be considered.

6.6.2. Delay Implementation

There is a great need for improvement of water supply to supplement existing services. Funds have been made available through the GoT and EIB. Failure to complete the works within the relatively limited project duration may result in no improvement being realized for considerable time to come. Any delays will just mean continuation of the current inadequate water supply and sewerage services in Mwanza City.

6.6.3. Expand existing water treatment plant at Capri Point

This option is already being implemented under another component of the LVWATSAN – Mwanza Project but will not lead to notable water supply coverage increase. There is limited space to expand the works at Capri Point. There are already two transmission mains laid from the plant, laying another transmission main alongside would necessitate costly and lengthy compensation procedures as this is a high-value residential/commercial area of Mwanza City

6.6.4. Choosing another Site for Waste Stabilization Ponds

Several alternatives have been considered, such as the discharge of backwash waters from the water treatment plant away from the water intake area, and alternative routings of trunk mains and distribution network piping to avoid resettlement and/or compensation of Project Affected People (PAPs).

6.6.5. Building a conventional sewerage treatment plant instead of Waste Stabilization Ponds

Though a conventional sewerage treatment plant would require less area and produce less odour nuisance, both the construction and operational costs would pose too high a burden to MWAUWASA which would ultimately lead to higher water and sewerage bills for the City residents.

6.6.6. Alternative Technology in the Solar System

Three development options with different solar configurations have been evaluated based on three key criteria namely Technical, Financial and Environmental.

6.6.6.1. Option 1 (9MW Grid-Tied System)

Under option 1, the Solar PV system will be a Grid-tied configuration. In this case the 9MWp solar system will be coupled directly to the TANESCO electricity supply and feed the power loads without energy storage. By the fact they can operate without being connected to the Battery storage system, it makes these systems simple, cost-effective, and a popular model for dollar deployment.Under this option 1, the solar plant size considered is for **9MWp** solar plant size enough to cover 100% peak Load demand of **6.7MWp**. However this option does not take into consideration energy storage to support plant operation during offpeak or intermittent disruption in grid power supply.

6.6.6.2. Option 2 (14MWp/31.4MWh Hybrid With Energy Storage)

The second type, the hybrid system, is tied to the electrical grid, thus can both send electricity to it and pull electricity from it. However, it also has a small battery system to hold some electricity for emergencies or power outages. Grid-tied systems are automatically switched off when the power goes down to protect line workers, so having the extra batteries can be a huge help in bad weather. This Option 2 provides for partial energy storage capable to last upto 6hrs. The energy storage system has a total rated capacity of **31.4MWh.** Under this option 100% of the Loads will be powered at the peak sun-hours while simultaneously charging the battery energy storage system to provide additional 6hrs from stored energy. Consolidated the system will be functional off solar for 12hrs (approximately 55% of the plant operating time.

6.6.6.3. Option 3 (31MWp/135MWh Hybrid With Energy Storage)

This option is the same architecture as Option 2 save for additional storage capacity to meet 100% load requirement. It is a highly reliable system, using the automatic switching technology for on and off-grid and maximum power tracking technology of PV energy, which can smooth out the power fluctuation between PV and batteries, coordinate and control the power output of PV and energy

storage batteries, and output AC power that meets the standard requirements to supply power to important loads on the microgrid side through energy storage converter technology to ensure long-term stable operation of the system.

Under this option, 100% energy requirement has been assumed to be met from Solar through 6hrs daytime direct pumping and additional 16 hrs from energy storage systems. The energy storage system has a total rated capacity of **135MWh**. This alternative will enhance solar power availability from 6 hrs to approximately 22 hrs by leveraging on energy storage to maintain system needs beyond peak sun-hrs.

6.6.6.4. Best Option

From technical evaluation, it has been established that Option1 has basic and simplified configuration making it to operate, requires the least footprint area and offers greatest efficiency. However this option is inadequate to help solve the problem of Erratic power supply due to frequent voltage fluctuations.

Option 2 has medium rated complexity in operation control, however offers energy storage to cushion and stabilize the system for additional hrs. This means approximately 50% of energy contribution will come from solar. Although there is additional space requirement, the total footprint is within the available space area. This option allows commercial and other large scale users to utilize cheaper electricity whenever available.

Under Option 3, the amount of space required will surpass existing dry land areas necessitating wetland reclamation whose costs will increase project CAPEX requirement. Financially it is already established to be more expensive than grid alternative.

Considering the above summary analysis, it is our considered opinion that Option 2 presents the best solar configuration. It is therefore proposed that Option is adopted for feasibility design.

6.7. Cost-Benefit Analysis

As outlined in Section 1.1, preparation of the LVWATSAN – Mwanza Project started in 2010, and elaborate cost-benefit analyses were part of the preparatory work which led to the conclusion that the proposed works were financially and economically feasible. The main benefit of the proposed water supply works is that a substantial part of the town's population will be provided with a reliable source of treated drinking water. The metering system that will be installed or replaced will generate revenue with which the investment will fully or partly be paid back in the years to come.

For the Cost benefit analysis of the Solar:

The update reconfirms the initial assessment and study with determination that Butimba has sufficient solar resource hence suited for deployment as power source to augment TANESCO grid supply. Butimba's proximity to the Equator, also makes it an ideal location for developing a Solar Energy plant due to minimal seasonal variabilities.

Preliminary design has established ground coverage requirements of the proposed solar plant is approximately 45,000m^2 of space against available 70,000m^2. It was thus established that space available is adequate to meet the requirements for deployment of the 9MW solar Plant.

The total investment required is estimated at the sum total of Euros 25 Million financing. However the solar power plant is phased with Phase 4 requirement scheduled to be installed in 2035. This implies that 21 million is required in the year 2025 whereas an additional 4 million will be required in the year 2035.

Based on this budget estimates, it is therefore prudent to spread the CAPEX requirement into two portions as described below

- Stage 1 of the Solar work to be done is 2025 and this will require Euros **21 million**
- Stage 2 of Solar work to be undertaken in 2035 (upon completion of BWTP phase 4 and will require approximately Euros 4million.
- Operationally the investment requirement is an average of Euros 433,500 using Solar Hybrid coupled onto a storage system that can support and sustain a 12hr operation.

7. ENVIRONMENTAL AND SOCIAL MITIGATION MEASURES

7.1. INTRODUCTION

As outlined in the previous chapter, the construction and operation of the proposed rehabilitation and extension of the water supply and sewerage works for Mwanza City will have adverse environmental and social impacts that should be mitigated or reduced to acceptable levels by implementation of mitigation measures that are presented below.

7.2. PRE-CONSTRUCTION PHASE

Table 7: Impacts and mitigation measures during the Pre-construction Phase

Nr	Impact	Mitigation measures
(i)	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. Limit vegetation clearance to the area required for topographical survey and geotechnical investigation only.
(ii)	Temporary obstruction of access roads	• 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.

Nr	Impact	Mitigation measures
(iii)	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)
(iv)	Traffic increase	• Allow only necessary traffic for work. • Disruption of traffic movement during survey and geotechnical investigations should be minimized by introducing traffic management plans. • Institute speed limit (40km/hr) to all project vehicles within the project area to be surveyed and subjected to geotechnical investigations.
(v)	Noise from geotechnical investigation equipment hydraulic augers and from motor vehicles	• Noise from geotechnical investigation equipment shall be well maintained and fitted with noise silencers such as mufflers. • Noise levels should be monitored and if higher than 85dB (A), PPE in the form of ear muffs or ear plugs shall be provided to all those working near the equipment including the operators. • Noise from motor vehicles is 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
(vii)	Likely motor accidents	• Sensitize drivers of project vehicles to observe speed limits in all areas and institute punishment to traffic rules offenders.

7.3. Construction Phase

Table 8: Impacts and Mitigation measures during the Construction Phase

S/N	Impact	Mitigation Measures
I.	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 shall be replaced with the natural vegetation on completion of the works.
II.	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 artifacts 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.
III.	Deterioration of original land use, scenic and visual quality	• Operations house / buildings to facilitate the project will be designed to blend well with the surrounding buildings. • Landscaping will be carried out to match the existing surroundings
IV.	Disturbance, particularly land scarring at borrow	• The borrow sites are the ones used for sourcing all other construction materials for projects in the area designated for mining of construction materials.

S/N	Impact	Mitigation Measures
	sites or sources of construction materials	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 be channeled back for the rehabilitation or reinstatement of the borrowed areas.
V.	Nuisance from noise and vibration from construction equipment	• Use of properly serviced and well-maintained 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.
VI.	Soil erosion	• Protection of steep slopes 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.
VII.	Nuisance and inconvenience from increase in traffic levels	• Where the construction of pipelines involves the crossing of trunk roads, TANROADS must be consulted. • Only essential traffic will be allowed to the project area during traffic peak hours when traffic is a problem. • Sensitization of the nearby communities about the increased traffic. • Materials hauling to the tipping site and vice versa will be

S/N	Impact	Mitigation Measures
		carried out during off peak periods during the day. • Alternatively, finished materials such ready-made concrete, precast elements or pre-assembled materials can be delivered at site when the need arises.
VIII.	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 hydrocarbon and prevent the hydrocarbons from being washed away in storm water to the nearby water bodies.
IX.	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.
X.	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 the project.
XI.	Injuries to or damage inflicted on neighbours	• Construction sites shall be provided with barricades to protect neighbours and those passing-by.Therefore, the

S/N	Impact	Mitigation Measures
	from falling into trenches and open pits for inspection chambers. Poor public safety during construction – risk to life.	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 at turning places towards the construction site, appropriate warning signage shall be posted. • Sensitization and training of the surrounding communities regarding the risks associated with construction activities. • In case of trenches, and excavated sewer lines, proper barricades should be applied to warn and protect the people of impending
XII.	Gender Based Violence risk at the community level.	The contractor will implement provisions that ensure that gender- based violence at the community level is not triggered by the Project, including: I. Effective and on-going community engagement and consultation, particularly with women and girls in villages and learning institutions in the project area, II. Review and ensure that specific project components that are known to heighten GBV risk at the community level, e.g compensation schemes; employment schemes for women; etc. are managed and implemented in a manner that will safeguard against violence against women. III. Specific plan for mitigating these known risks, e.g. sensitization around gender-equitable approaches to compensation and employment; etc. IV. The contractor will ensure adequate referral mechanisms are in place if a case of GBV at the community level is reported related to project implementation.
XIII.	Generation of	• Site housekeeping to minimize solid and liquid wastes

S/N	Impact	Mitigation Measures
	construction 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 the Contractor's Environmental or Safety Officer the responsibility to ensure that the surroundings are kept clean. • All excavated spoils 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 district waste collection point. • Consult the district council about the suitable trash/waste dumping site and their procedures. • The community should instruct people to stay away from scavenging at the dumping sites. • Solid wastes generated from land clearing shall be collected and disposed of in district sanitary landfill at authorized site. • Decomposable materials shall be collected and combined with district wastes to the authorized dumpsites; plastics and other recyclable materials will be collected and sent out for recycling.
XII.	Vandalism and damage to the pipe system	• Fencing-off and guarding of sensitive facilities • Regular patrols and checks • Offence & penalty system in place and communities made aware of this through appropriate public awareness programs

7.4. Operation Phase

Table 9: Impacts and Mitigation Measures during the Operation Phase

S/N	Impact	Mitigation Measures
I.	Disturbance from pumps, and engines	Pump and engines producing significant noise levels to be equipped with adequate noise silencing equipment, and placed inside isolated buildings.
II.	Pollution of soil and surface and ground waters by discharge of effluent from water treatment plant	• Effluent from WTP should be tested regularly and if exceeding permissible standard quality, additional treatment should be conducted to bring quality of the effluent within these levels. • Sludge should be well kept on drying beds before disposal to official solid waste dumps • Control of oil/fuel leakages
III.	Odour nuisance from wastewater stabilization ponds	• Provide adequate buffer zone from the wastewater stabilization ponds including tree planting • Locate anaerobic ponds furthest from residences
IV.	Influx of birds around wastewater stabilization ponds	Ensure that the design is efficient enough to facilitate removal of all the nutrients which tend to attract the birds
V.	Pollution of soil and surface and ground waters by discharge of effluent from wastewater stabilization ponds or sewerage pipes	• Use high quality rubber mats to prevent leakages from the waste stabilization ponds • Continuous monitoring of sewerage pipes and prompt maintenance if there are leakages • Effluent from WWTP should be tested regularly and if exceeding permissible standard quality, • Consider construction of artificial wetland to provide additional treatment of effluents before final discharge.
VI.	Health risk due to chemical spills/contamination during water treatment	• Appropriate training and equipment • Safe storage and handling of chemicals • Good Operational Procedures

S/N	Impact	Mitigation Measures
	and sampling procedures	
VII.	Vandalism and damage to pipe system	• Fencing-off and guarding of sensitive facilities • Regular patrols and checks • Offence & penalty system in place and communities made aware of this through appropriate public awareness programs.
(viii)	Visual Impact	• Selection of solar panel design that is congruent with landscape characteristics during the final planning stages of the Project (i.e., selection of neutral colour; • Implementation of post-construction site rehabilitation and landscaping to remediate construction mars.

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 means 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 ESMP are to:

- Provide a systematic overview of the required measures to manage the mitigation of impacts that will or may result from the proposed rehabilitation and extension of water supply and wastewater works in Mwanza City
- Indicate main responsibility for implementation of these mitigation measures, as well as the timing of the measures, targets to be achieved, reporting requirements, and indicative costs.

8.2. IMPLEMENTATION ARRANGEMENT OF THE PROJECT WORKS AND THE ESMP

Whilst the Ministry of Finance and Planning (MoFP) is the ‘borrower’ of the loan, the Ministry of Water and Irrigation (MoWI) through MWAUWASA is the ‘Promoter’ having ultimate ownership of this project. The MoWI is charged with the oversight of execution and the provision of enhanced technical assistance as well as carrying the responsibility to supervise execution across the entire project.

Execution at local level rests with MWAUWASA, and effectively acts as the implementing agency, charged with the responsibility of delivering upon the commitments within its geographical jurisdiction.

Daily oversight of this project at the operational level is provided by the Project Management Unit (PMU) of MWAUWASA assisted by project management and supervision consultants. The PMU has assigned Contract Managers for each part of the Project. In addition to the above, the Lenders (EIB and AfD) have contracted a Lenders’ Supervisor whose role is to act as a “third-party” to monitor the Project, including monitoring physical progress and compliance, procurement supervision and quality assurance of technical solutions and physical deliverables.” The Lender Supervisor will work alongside

the PMU to review all implementation tasks. EIB may also appoint independent monitors who would not be full-time but would be contracted for short missions to check compliance of the programme.

MWAUWASA will ensure that the contractor and sub-contractors who will be awarded the tenders for implementing the works adhere to the laid down procedures for construction and commissioning of the proposed development. To be able to minimize potential environmental and social negative impacts, the project will require the support of various institutions in the project area.

8.3. Reporting Arrangements

Monitoring of the ESMP will be a primary responsibility of the Supervision Consultant (SC), reporting to the MWAUWASA-PMU, supported by PMC. The PMU will report to NEMC, MoWI and EIB. MWAUWASA will also share relevant information with the Regional Secretariat and other stakeholders wherever necessary. Within the MoWI, it is the Sector Environmental Coordinator who is responsible for environmental issues, reporting directly to the Permanent Secretary.

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.

The Environmental and Social Management Plans for the three STIP Major Works are shown in successive tables below.

Table 10: **Environmental and Social Management Plan for Raw Water Intake and Water Treatment Plant**

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
i. 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.	Design Engineer	One month from start of activities	Vegetation lost in necessary areas only	1000	Part of Design engineers cost
ii. 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.	Design Engineer	At the start of the project	Ensure no complaints from road users	500	Project Cost
(iii) - Soil erosion	• Earthworks for geotechnical investigation may be carried out during the dry season to prevent soil from being washed away.	Design Engineer	At the start of the project	Soil erosion is controlled	2000	Part of the Project cost

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
	• 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).					
(iv) - Disturbances from increased motor vehicles in the area to facilitate topographic survey and geotechnical Investigation	• Allow only necessary traffic for work. • Disruption of traffic movement during survey and geotechnical investigations should be minimized by introducing traffic management plans. • Institute speed limit (40km/hr) to all project vehicles within the project area to be surveyed and subjected to geotechnical investigations.	Design Engineer	Once every week during pre-construction	No complaints	500	Project Cost
(v)-Noise from geotechnical Investigation equipment	• Where the noise is from the geotechnical investigation equipment 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	Design Engineer	Once every week	Noise within set limits	2000	Project cost

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
	85dB (A), PPE in the form of ear muffs or ear plugs shall be provided to all those working near the equipment including the operators.					
(vii)- Likely motor accidents with pedestrians	• Sensitize drivers of project vehicles to observe speed limits in all areas and institute punishment to traffic rules offenders.	Design Engineer	Every day during investigations No motor Vehicle	No motor Vehicle accidents	500	Project Cost
Construction phase						
(i) - 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 site stations shall be replaced with the natural vegetation on completion of the works.	Contractors	At the beginning of the project On completion of the project		500	
(ii) - 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	Contractor	During extraction of construction materials	As set in the EMP for borrow sites	500	

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
	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.					
(iii) - Deterioration of original land use, scenic and visual quality including partial reduction of the wetland area	• Operations houses and buildings to assist the project will be designed to blend well with the surrounding buildings. • Landscaping will be carried out to	Lead Consultant/and Contractor	During construction of the project	Ensure design and construction blends well with surrounding	1000	

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
	match the existing surroundings. • Design should minimize wetland area utilized for the construction					
(iv) - Loss of farm areas for the Prisons Department	• Agree compensation in kind in consultation with the relevant Government authorities	Project Proponent	Before the project starts	Ensure written agreement between Project Proponent and Ministry of Home Affairs/Prisons Department		
(v) - 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 the area designated for mining of construction materials. 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.	Contractor	During sources of Construction materials	As set in the EMP for borrow pits/sites	2000	

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
	• Part of the charges for purchase of construction materials shall be channelled back for the rehabilitation or reinstatement of the borrowed areas.					
(vi) - Nuisance from noise and vibration from construction equipment	• Use of properly serviced and well maintained 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.	Mining License Holder	Once every Week	Noise within set limits	1000	
(vii) - Soil erosion	• Protection of steep slopes with reinforcement. • Provision of silt trap to prevent	Contractor	Measures applied as construction works proceed otherwise once every month during	All loose soils and bare soils protected from erosion	2000	Part of the contractor BOQ

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
	sedimentation. • Construction activities especially land excavation should be carried out during dry seasons. • Avoid excessive clearance of trees and enhance tree planting and landscaping.		construction			
(viii) - Nuisance and inconvenience from increase in traffic levels	• Only essential traffic will be allowed to the project area during traffic peak hours when traffic is a problem. • Sensitization of the nearby communities about the increased traffic. • Materials hauling to the 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.	Contractor	Once every Week	No complaints	500	

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
(ix) - 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 hydrocarbon and prevent the hydrocarbons from being washed away in storm water to the nearby water bodies.	Contractor	Once every Day	No spillage of lubricants	1000	
(x) - 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.	Contractor	Once every Month	Within limits	5000	

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
	• Speed of vehicles hauling construction materials shall be reduced and the construction materials will be covered with tarpaulins.					
(xi) - 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 the project.	Contractor	Once every week on weekends	All employees Sensitized and examined	3000	Part of HIV/AIDS sensitization program
(xii) - Injuries to neighbours from falling into trenches and open pits for inspection chambers. Poor public safety during Construction – Risk to life. Poor safety at Work place.	• Construction sites shall be provided with barricades to protect neighbours and those passing-by. 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	Supervising Engineer/ Contractor	Every day	Zero injuries	2500	

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
	warning signage shall be posted. ● 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. ● All employees working on the construction site will be sensitized to use PPE to avoid occupational risks. Such equipment includes hard hats, ear plugs or ear muffs, dust coats or overalls, gloves, dust masks, goggles for eye protection, hard toed boots, safety harness etc.					
(xiii) - Generation of construction solid and liquid wastes	● Site housekeeping to minimize solid and liquid wastes generated from construction and other	Supervising Engineer. Contractor	Every day	Good housekeeping	2000	Project Cost

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
	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 the Contractor's Environmental or Safety Officer the responsibility to ensure that the surroundings are kept clean. ● All excavated spoils should be well managed through leveling 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 district waste collection point. ● Consult the district council about the suitable trash/waste dumping site and their procedures. ● The community should instruct people to stay away from scavenging at the dumping sites.					

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
	• Solid wastes generated from land clearing shall be collected and disposed of in district sanitary landfill at authorized site. • Decomposable materials shall be collected and combined with district wastes to the authorized dumpsites; plastics and other recyclable materials will be collected and sent out for recycling.					
(xiv) – Vandalism and damage to pipe systems	• Fencing-off and guarding of sensitive facilities • Regular patrols and checks • ·Offence & penalty system in place and communities made aware of this through appropriate public awareness programs.	Supervising Engineer. Contractor	Every day	Good housekeeping	--	
Operation Phase						
(i) - Disturbance from pumps, and engine	• Pump and engines that produce significant noise levels should be equipped with adequate noise silencing equipment, and preferably placed inside noise isolated buildings.	Project Operator (MWAUWASA)	Monthly during operations	No complaints from surroundings	2000	
(ii) - Pollution from	• Effluent from WTP should be	Project Operator	Monthly during operation	Effluent quality not	2000	

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
effluent from water treatment plant	tested regularly and if exceeding permissible standard quality, additional treatment should be conducted to bring quality of the effluent within these levels.	(MWAUWASA)		exceeding GoT standards		
(iii) - Health risk due to chemical spills/contamination during water treatment and sampling procedures	• Appropriate training and equipment • Safe storage of chemicals • Institution of good operational procedures	Project Operator (MWAUWASA)	Monthly during operation	No risks		
(iv) - Vandalism and damage to pipe system	• Fencing-off and guarding of sensitive facilities • Regular patrols and checks • Offence & penalty system in place and communities made aware of this through appropriate public awareness programs.	Project Operator (MWAUWASA)	Monthly during operation	No vandalism or damage		
Total					***31,000***	

Table 11: Environmental and Social Management Plan for Transmission Main and Booster Pumping Station

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
i. 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.	Design Engineer	One month from start of activities	Vegetation lost in necessary areas only	1000	Part of Design engineers cost
ii. 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.	Design Engineer	At the start of the project	Ensure no complaints from road users	500	Project Cost
(iii) - Disturbances from increased motor vehicles in the area to facilitate topographic survey and	• Allow only necessary traffic for work. • Disruption of traffic movement during survey and geotechnical	Design Engineer	Once every week during pre-construction	No complaints	500	Project Cost

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
geotechnical Investigation	investigations should be minimized by introducing traffic management plans. • Institute speed limit (40km/hr) to all project vehicles within the project area to be surveyed and subjected to geotechnical investigations.					
(v)-Noise from geotechnical Investigation equipment hydraulic augers and from motor vehicles	• Where the noise is from the geotechnical investigation equipment 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 the form of ear muffs or ear plugs shall be provided to all those working near the equipment including the operators.	Design Engineer	Once every week	Noise within set limits	2000	Project cost
(vii)- Likely motor accidents with pedestrians	• Sensitize drivers of project vehicles to observe speed limits in all areas and institute punishment to traffic rules offenders.	Design Engineer	Every day during investigations No motor Vehicle	No motor Vehicle accidents	500	Project Cost
Construction phase						

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
(i) - 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 site stations shall be replaced with the natural vegetation on completion of the works.	Contractors	At the beginning of the project On completion of the project		500	
(ii) - 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	500	

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
	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.					
(iii) - Deterioration of original land use, scenic and visual quality	• Operations houses and buildings to assist the project will be designed to blend well with the surrounding buildings. • Landscaping will be carried out to match the existing surroundings. • Design should minimize wetland area utilized for the construction	Lead Consultant/and Contractor	During construction of the project	Ensure design and construction blends well with surrounding	1000	
(iv) - Resettlement and Disturbance to some of the Residents particularly who will be affected by the Project	• 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		
(vi) - Nuisance from noise and vibration from	• Use of properly serviced and well maintained equipment	Mining License Holder	Once every Week	Noise within set limits	1000	

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
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.					
(vii) - Soil erosion	• Protection of steep slopes 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	2000	Part of the contractor BOQ

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
(viii) - Nuisance and inconvenience from increase in traffic levels	• Only essential traffic will be allowed to the project area during traffic peak hours when traffic is a problem. • Sensitization of the nearby communities about the increased traffic. • Materials hauling to the 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.	Contractor	Once every Week	No complaints	500	
(ix) - 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	1000	

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
	hydrocarbon and prevent the hydrocarbons from being washed away in storm water to the nearby water bodies.					
(x) - 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	5000	
(xi) - Spread of diseases (HIV/AIDs, STIs or STDs)	• Sensitization and health awareness campaigns to all involved in the project including	Contractor	Once every week on weekends	All employees Sensitized and examined	3000	Part of HIV/AIDS sensitization program

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
	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 the project.					
(xii) - Injuries to neighbours from falling into trenches and open pits for inspection chambers. Poor public safety during Construction – Risk to life. Poor safety at Work place.	• Construction sites shall be provided with barricades to protect neighbours and those passing-by. 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. • 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	Supervising Engineer/ Contractor	Every day	Zero injuries	2500	

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
	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. ● All employees working on the construction site will be sensitized to use PPE to avoid occupational risks. Such equipment includes hard hats, ear plugs or ear muffs, dust coats or overalls, gloves, dust masks, goggles for eye protection, hard toed boots, safety harness etc.					
(xiii) - Generation of construction solid and liquid wastes	● Site housekeeping to minimize 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.	Supervising Engineer. Contractor	Every day	Good housekeeping	2000	Project Cost

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
	• Assign the Contractor's Environmental or Safety Officer the responsibility to ensure that the surroundings are kept clean. • All excavated spoils should be well managed through leveling 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 district waste collection point. • Consult the district council about the suitable trash/waste dumping site and their procedures. • The community should instruct people to stay away from scavenging at the dumping sites. • Solid wastes generated from land clearing shall be collected and disposed of in district sanitary landfill at authorized site. • Decomposable materials shall be collected and combined with district wastes to the authorized dumpsites; plastics and other					

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
	recyclable materials will be collected and sent out for recycling.					
(xiv) – Vandalism and damage to pipe systems	• Fencing-off and guarding of sensitive facilities • Regular patrols and checks • ·Offence & penalty system in place and communities made aware of this through appropriate public awareness programs.	Supervising Engineer. Contractor	Every day	Good housekeeping	--	
Operation Phase						
(i) - Disturbance from pumps, and engine	• Pump and engines that produce significant noise levels should be equipped with adequate noise silencing equipment, and preferably placed inside noise isolated buildings.	Project Operator (MWAUWASA)	Monthly during operations	No complaints from surroundings	2000	
(ii) - Pollution from effluent from water treatment plant	• Effluent from WTP should be tested regularly and if exceeding permissible standard quality, additional treatment should be conducted to bring quality of the effluent within these levels.	Project Operator (MWAUWASA)	Monthly during operation	Effluent quality not exceeding GoT standards	2000	
(iii) - Health risk due to chemical spills/contamination	• Appropriate training and equipment • Safe storage of chemicals	Project Operator (MWAUWASA)	Monthly during operation	No risks		

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
during water treatment and sampling procedures	• Institution of good operational procedures					
(iv) - Vandalism and damage to pipe system	• Fencing-off and guarding of sensitive facilities • Regular patrols and checks • Offence & penalty system in place and communities made aware of this through appropriate public awareness programs.	Project Operator (MWAUWASA)	Monthly during operation	No vandalism or damage		
Total					***25,500***	

Table 12: Environmental and Social Management Plan for Sewerage System and Solar Plant.

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
i. 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.	Design Engineer	One month from start of activities	Vegetation lost in necessary areas only	1000	Part of Design engineers cost
ii. 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).	Design Engineer	At the start of the project	Soil erosion is controlled	2000	Part of the Project Cost

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
(iii)-Noise from geotechnical Investigation equipment hydraulic augers and from motor vehicles	• Where the noise is from the geotechnical investigation equipment 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 the form of ear muffs or ear plugs shall be provided to all those working near the equipment including the operators.	Design Engineer	Once every week	Noise within set limits	2000	Project cost
(iv)- Likely motor accidents with pedestrians	• Sensitize drivers of project vehicles to observe speed limits in all areas and institute punishment to traffic rules offenders.	Design Engineer	Every day during investigations No motor Vehicle	No motor Vehicle accidents	500	Project Cost
Construction phase						
(i) - 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 site stations shall be replaced with the natural vegetation on completion of	Contractors	At the beginning of the project On completion of the project		500	

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
	the works.					
(ii) - 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	Contractor	During extraction of construction materials	As set in the EMP for borrow sites	500	

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
	Contract.					
(iii) - Deterioration of original land use, scenic and visual quality	• Operations houses and buildings to assist the project will be designed to blend well with the surrounding buildings. • Landscaping will be carried out to match the existing surroundings. • Design should minimize wetland area utilized for the construction	Lead Consultant/and Contractor	During construction of the project	Ensure design and construction blends well with surrounding	1000	
(iv) - Resettlement and Disturbance to some of the Residents particularly who will be affected by the Project	• 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		
(v) - 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 the area designated for mining of construction materials. 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	Contractor	During sources of Construction materials	As set in the EMP for borrow pits/sites	2000	

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
	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 be channelled back for the rehabilitation or reinstatement of the borrowed areas.					
(vi) - Nuisance from noise and vibration from construction equipment	• Use of properly serviced and well maintained 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.	Mining License Holder	Once every Week	Noise within set limits	1000	

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
	• 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.					
(vii) - Soil erosion	• Protection of steep slopes 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	2000	Part of the contractor BOQ
(viii) - Nuisance and inconvenience from increase in traffic levels	• Only essential traffic will be allowed to the project area during traffic peak hours when traffic is a problem. • Sensitization of the nearby communities about the increased traffic. • Materials hauling to the tipping site and vice versa will be carried out	Contractor	Once every Week	No complaints	500	

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
	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.					
(ix) - 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 hydrocarbon and prevent the hydrocarbons from being washed away in storm water to the nearby water bodies.	Contractor	Once every Day	No spillage of lubricants	1000	
(x) - 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.	Contractor	Once every Month	Within limits	5000	

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
	• 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.					
(xi) - 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 the project.	Contractor	Once every week on weekends	All employees Sensitized and examined	3000	Part of HIV/AIDS sensitization program
(xii) - Injuries to neighbours from falling into trenches and open	• Construction sites shall be provided with barricades to protect neighbours and those passing-by. Therefore, the public, particularly	Supervising Engineer/ Contractor	Every day	Zero injuries	2500	

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
pits for inspection chambers. Poor public safety during Construction – Risk to life. Poor safety at Work place.	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. • 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. • All employees working on the construction site will be sensitized to use PPE to avoid occupational risks. Such equipment includes					

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
	hard hats, ear plugs or ear muffs, dust coats or overalls, gloves, dust masks, goggles for eye protection, hard toed boots, safety harness etc.					
(xiii) - Generation of construction solid and liquid wastes	• Site housekeeping to minimize 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 the Contractor's Environmental or Safety Officer the responsibility to ensure that the surroundings are kept clean. • All excavated spoils should be well managed through leveling 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	Supervising Engineer. Contractor	Every day	Good housekeeping	2000	Project Cost

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
	site to district waste collection point. ● Consult the district council about the suitable trash/waste dumping site and their procedures. ● The community should instruct people to stay away from scavenging at the dumping sites. ● Solid wastes generated from land clearing shall be collected and disposed of in district sanitary landfill at authorized site. ● Decomposable materials shall be collected and combined with district wastes to the authorized dumpsites; plastics and other recyclable materials will be collected and sent out for recycling.					
(xiv) – Vandalism and damage to pipe systems	● Fencing-off and guarding of sensitive facilities ● Regular patrols and checks ● ·Offence & penalty system in place and communities made aware of this through appropriate public awareness programs.	Supervising Engineer. Contractor	Every day	Good housekeeping	--	
Operation Phase						

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
(i) - Noise disturbance from pumps, and engines	• Pump and engines that produce significant noise levels should be equipped with adequate noise silencing equipment, and preferably placed inside noise isolated buildings.	Project Operator (MWAUWASA)	Monthly during operation	No complaints from neighbouring communities	2000	
(ii) - Foul odour emanation from the waste water ponds	• ·Maintain a sufficient buffer zone between treatment plant and residential premises with tree/garden cover Design modification entailing enclosing the main inlet pipe within a covered structure	Supervision Consultant/MW AUWASA	Continuously	No complaints from neighbouring communities		
(iii) Influx of birds around waste stabilization ponds	• Ensure that the design is efficient enough to facilitate removal of all the nutrients which tend to attract the birds • Consult bird control experts if influx reaches intolerable levels	Design Engineer/ MWAUWASA	At design stage/ Continuously	Minimal bird intrusion	1000	
(iv) – Pollution of soil and surface and ground waters	• Use high quality rubber mats to prevent leakages from the waste stabilization ponds • Consider construction of artificial wetland to provide ddtional treatment of effluents before final discharge • Continuous monitoring of	Design Engineer/ MWAUWASA	At design stage/ Continuously	As per national effluent discharge standard		

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
	sewerage pipes and prompt maintenance if there are leakages • Effluent from WWTP should be tested regularly and if exceeding permissible standard quality,					
(v) - Health risk to laboratory attendant during wastewater treatment and sampling procedures	• Appropriate training and equipment • Institute good operational procedures	Project Operator (MWAUWASA)	Monthly during operation	No risks		
(vi) - Vandalism and damage to pipe system	• Fencing-off and guarding of sensitive facilities • Regular patrols and checks • Offence & penalty system in place and communities made aware of this through appropriate public awareness programs.	Project Operator (MWAUWASA)	Monthly during operation	No vandalism or damage		
(vii) Glare and Glint	• To maximize electricity generation, solar PV modules are designed to absorb light and reflections are contrary to their central purpose. However, panel glass remains relatively smooth and	Project Operator (MWAUWASA)	Monthly during operation	No risks	2,000	

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
	homogenous and may be physically capable of producing a concentrated reflection similar to a calm lake on a wind-free day.					
(viii) Visual impact	• Selection of solar panel design that is congruent with landscape characteristics during the final planning stages of the Project (i.e., selection of neutral colour; and • Implementation of post-construction site rehabilitation and landscaping to remediate construction mars.	Project Operator (MWAUWASA)	Monthly during operation	No risks	2000	
Total					***33,500***	

9. ENVIRONMENTAL AND SOCIAL MONITORING PLAN

9.1. INTRODUCTION

Monitoring of the construction and operation of the proposed rehabilitation and extension of the water supply and wastewater systems in Mwanza City is a 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 life cycle of the proposed development.

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, MWAUWASA in collaboration with other project stakeholders (project financers, project beneficiaries, etc.) may initiate such audit processes to cover all its projects activities in accordance with NEMC regulations.

The Supervision Consultant shall review/implement the Monitoring Plan and report regularly to the Project Proponent in line with the Contract. The proposed monitoring plan is shown in the table below.

9.2. MONITORING PER PHASE

9.2.1. PRE-CONSTRUCTION

During the pre-construction phase the monitoring will focus on:

- Appointment of a Health, Safety and Environment (HSE) Officer within the Supervision Consultant's Team and how he/she carries out the assigned responsibilities
- Maintenance and checking of construction equipment ready for work at site and during the actual works
- Training and sensitization of the staff on safety aspects and environmental issues.
- HIV/AIDS sensitization campaign planned and implementation.
- 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

9.2.2. Construction Phase

During the construction phase the monitoring will focus on:

- Implementation of mitigation measures.
- HIV/AIDs sensitization campaigns implementation.
- Occupational health and safety measures (conditions at materials storage places, borrow sites, equipment, personal protective equipment (PPE) implemented.

9.2.3. Operation Phase

MWAUWASA will be responsible for monitoring the environmental and social impacts after construction and handing over of the proposed works by the contractor. The Lake Victoria Basin Water Board together with NEMC will be responsible for monitoring the quality of any effluents discharged to water sources.

The City Council/Ilemela Municipal Council will be responsible for monitoring the social impacts

- Monitoring the quantity and quality of the water produced at the treatment plant and transmitted to the Igoma Reservoirs, in comparison with set standards/criteria
- Monitoring quality of effluent from the wastewater treatment plant
- Monitoring air and noise pollution from the various components of the system.
- Environmental degradation control measures such as soil erosion.
- Occupational health and safety measures, and related incidences.
- Management of Solid and liquid wastes generated from the water treatment plant and from the wastewater treatment plant.
- Implementation status and effectiveness of the mitigation measures in the ESMP

9.2.4. Demobilization Phase

During the demobilization phase the monitoring will focus on:

- Resulting debris is managed in planned order.
- Disconnection of electricity supply mains
- Health and safety issues from abandoned/decommissioned building
- Handing over processes as relevant

The detailed Environmental and Social Monitoring Plan is given in the table below for all the proposed works.

Table 13: Environmental and Social Monitoring Plan

S/N	Impact	Project Phase	Frequency	Parameters	Responsibility	Monitoring cost (US$)
I.	Vegetation loss through clearance	Pre-construction	Weekly	Area of land left bare	Design Engineer	-
		Construction	Weekly	Area of land left bare	Supervision Consultant	-
II.	Temporary obstruction of access roads	Pre-construction	Weekly	Number of road-closure incidences	Design Engineer	-
		Construction	Weekly	Number of road-closure incidences	Supervision Consultant	-
III.	Soil erosion	Construction	Weekly	Area of land left bare	Supervising consultant	2000
		Demobilization	Rainy season	Area of land left bare	District Council	1000
IV.	Traffic increase	Pre-construction	Weekly	Number of project vehicles at site	Design Engineer	--
		Construction	Weekly	Number of project vehicles at site	Supervision Consultant	-
V.	Noise from geotechnical investigation equipment hydraulic augers and from motor vehicles	Pre-construction	Weekly	Amount of Dust (PM10) Level of Noise (dB)	Supervising contractor	1000

S/N	Impact	Project Phase	Frequency	Parameters	Responsibility	Monitoring cost (US$)
VI.	Likely increase in motor accidents	Pre-construction/	Daily	Number of accidents involving project vehicles	MWAUWASA	-
		Construction				
VII.	Disturbances to historical and archaeological finds during site clearance	Construction	Daily	Number of cultural and archaeological finds	Supervision Consultant	-
VIII.	Deterioration of original land use, scenic and visual quality	Construction	During construction	Area of land whose use has changed from original	Supervision Consultant	-
IX.	Resettlement and disturbance to residents, including those who use land for cultivation	Before/During Construction	Before and during construction	Proportion of PAPs compensated before start of construction Number of cases fully-resolved during construction as they arise	MWAUWASA	Depending on approved Valuation process
X.	Disturbance, particularly land scarring at borrow sites or sources of	Construction	Weekly	Number of new borrow	Supervision Consultant	500

S/N	Impact	Project Phase	Frequency	Parameters	Responsibility	Monitoring cost (US$)
	construction materials			pits		
XI.	Nuisance from noise and vibration from construction equipment	Construction	Weekly	Amount of Dust (PM10) Level of Noise (dB)	Supervising contractor	500
XII.	Contamination of water from leakages of fuels and lubricants from construction equipment	Construction	Weekly	Number of major spills reported	Supervision Consultant	-
XIII.	Spread of diseases (HIV/AIDs, STIs or STDs)	Pre-construction, Construction and Demobilization	Monthly	Reported Increase of cases in the Project Areas	LGA	-
XIV.	Injuries to or damage inflicted on passers-by	Construction	During construction	Number of reported cases on injury/falling into pits	Supervising consultant District Council	500
		Demobilization	During demolition	Number of reported cases on injury/falling into pits	District Council	1000
XV.	Injuries from work-related activities	Construction	During construction	Number of reported cases on injury/falling into pits or other injuries	Supervising consultant District Council	500
		Operation	Throughout the operation phase	Number of reported cases on other	MWAUWASA	-

S/N	Impact	Project Phase	Frequency	Parameters	Responsibility	Monitoring cost (US$)
				injuries		
		Demobilization	During demolition	PPE to workers	District Council	500
XVI.	Vandalism and damage to the pipe system	Operation	Weekly	Number of reported cases	MWAUWASA	-
XVII.	Disturbance from pumps, and engines	Operation	Monthly	Amount of Dust (PM10) Level of Noise (dB)	MWAUWASA	500
XVIII.	Pollution of soil and surface and ground waters by discharge of effluent from water treatment plant and waste water treatment plant	Operation	Quarterly	Various water quality parameters	MWAUWASA/ NEMC/ LVBWB	1000
XVIX	Odour nuisance from wastewater stabilization ponds	Operation	Weekly	Number of days when odour nuisance was unusually high	MWAUWASA/NEMC	200
XX	Influx of birds around wastewater stabilization ponds	Operation	Daily	Comparative (qualitative) number of birds observed	MWAUWASA	-
XXI.	Leakage from sewerage pipes	Operation	Weekly	Number of leakages reported	MWAUWASA	-

S/N	Impact	Project Phase	Frequency	Parameters	Responsibility	Monitoring cost (US$)
XXII	Health risk due to chemical spills/contamination during water treatment and sampling procedures	Operation	Daily	Number of chemical spills/leakages reported Number of workers affected	MWAUWASA	-
XXIII.	Employment creation	Pre-Construction	During technical investigations	Number of people employed as laborer Number of entrepreneurs benefiting directly from project operations	District Council	-
		Construction	During construction	Number of people employed as laborer Number of entrepreneurs benefiting directly from project operations	District Council.	-
XXIV.	Visual impact	Operation Phase	During operation phase	Visual nuisances	MWAUWASA	2500

S/N	Impact	Project Phase	Frequency	Parameters	Responsibility	Monitoring cost (US$)
					Total	**11700**

10. DECOMMISSIONING

10.1. INTRODUCTION

This chapter provides guidance to the unlikely event that the construction works need to be terminated prematurely, or dismantled at the end of the lifetime. The works are expected to have a minimum operational lifespan of 25 years; While for Solar Plant is expected to have 30 years of lifespan however for water infrastructure, they may rehabilitate the infrastructures within this specified duration.

10.2. DECOMMISSIONING DURING CONSTRUCTION

If construction activities and associated work cease prior to facility completion and commissioning (with no expectation of construction re-start) the constructions would need to be decommissioned in a manner as described below. Mitigation measures will also be implemented where appropriate (e.g. to stabilization of exposed soils).

10.3. DECOMMISSIONING AFTER THE END OF PROJECT OPERATION

Decommissioning activities will occur in the following sequence:

1. Disconnection of raw water intake
2. Disconnection of water supply line (mains) and uprooting of pipes, and backfilling
3. Dismantling of Water Treatment PlantDismantling of High-lift Pump Station
4. Dismantling of water storage reservoirs
5. Uprooting of water distribution network, including house connections and meters, and backfilling
6. Dismantling of the Faecal Sludge Treatment Plant
7. Landscaping and re-vegetation.

MWAUWASA will prepare and submit to NEMC the decommissioning plans for approval. In this regard, the proponent/ developer shall approach NEMC in due time with a proposal on decommissioning stating details and methodology of proper decommissioning.

Guidelines from other relevant regulatory authorities including TEMESA, Tanzania Building Agency, and Occupational Health and Safety Agency will also be adhered to.

While for Solar Plant

The expected lifetime of the project ranges between 30 that will be renewable as long as the proper predictive maintenance measures are taken and all the necessary revamps and upgrades are done. Following are the main issues that may be addressed by the facility's decommissioning plan:The Decommissioning plan was taken from another project of similar nature.

- Development of the decommissioning plan according to international and best practices guidelines.
- Removal procedures for all above ground structures
- Disassemble the PV Modules: The components of the plant will be disassembled and removed. Thereafter they will be reused, recycled (where possible) or disposed of in accordance with regulatory requirements.

Table 14: Summary of Decommissioning Plan

Nr	Activity	Impact	Mitigation measure	Timing	Costs
(i)	Excavation of water supply line for rooting of pipes	Injury to workers and community members	• Prior informing community / municipality on decommission works • Provide warning tape around activity area • Arrange for sufficient trucks to collect and dispose of sewage within a short period of time • Provide PPE to workers according to the use, i.e. nose & ear masks, safety goggles Provide site holding fence • Sell materials for reuse if in good condition	Tbd	Tbd
(ii)	Dismantling buildings, pump houses, tanks and equipment	Noise, dust, smell nuisance to neighbouring community	• Prior informing community / municipality on decommission works • Provide warning tape around activity area • Arrange for sufficient trucks to collect and dispose of sewage within a short period of time • Provide PPE to workers according to the use, i.e. nose & ear masks, safety	Tbd	Tbd

Nr	Activity	Impact	Mitigation measure	Timing	Costs
			goggles Provide site holding fence • Sell materials for reuse if in good condition		
(iii)	Landscaping and re-vegetation	Dust and noise generation, injuries to workers	Provide PPE to workers according to the use, i.e. nose & ear masks, safety goggles	tbd	Tbd

11. SUMMARY AND CONCLUSIONS

In a joint effort, the Government of Tanzania and the European Investment Bank are implementing the Lake Victoria Water and Sanitation Project – Mwanza (2014-2020) with the main overarching aim to achieve the Millennium/Sustainable Development Goals (M/SDG) for water and sanitation in secondary centres within the Lake Victoria Basin, i.e. In Mwanza City, its three satellite towns of Misungwi, Magu and Lamadi, as well as the towns of Bukoba and Musoma.

One of the components of the Project is the rehabilitation and expansion of water supply and wastewater infrastructure in Mwanza City, consisting of several components including building of a raw water intake and water treatment plant at Butimba; construction of a water transmission mains from Butimba to the existing sub-Igoma reservoir; construction and/or rehabilitation of reservoirs and booster pump stations; extension of the water supply distribution network and construction of a wastewater treatment plant at Igoma. Total costs of these interventions are estimated at EUR 30 million.

The targeted developments will all be built in Mwanza City that is characterized by hilly and rocky terrain and relatively high population densities. A considerable part of town consists of unplanned residential areas and low-cost housing. Biodiversity at these localities is rather limited to pockets of low shrub and isolated trees, a marsh fringe along Mwanza Gulf and some birdlife – all common species for these rural environments.

Consultations on the planned interventions were conducted in the period 2016-2018. General agreement was achieved among the stakeholders on the selected interventions. Concerns expressed during these consultations as far as possible have been incorporated in the design.

A systematic assessment of expected impacts of the interventions shows that the planned development is expected to lead to a number of positive impacts notably improved water supply and sewerage for the population of Mwanza City, and some employment and business opportunities. Some negative impacts of the interventions are associated with the construction, operation and (whenever applicable) decommissioning phases of the facilities, all are of low and some of moderate significance, but all impacts can be managed and mitigated to acceptable levels by the various parties for which responsibility has been indicated in the report. The Resettlement Planning Framework will be followed to ensure fair and timely compensation to any persons affected by the Project

APPENDICES

Appendix I: Reference

Appendix II: NEMC Screening Decision

Appendix III: Nemc Review of STIP Scoping Report

Appendix IV: Nemc Approval of STIP Scoping Report

Appendix V: MWAUWASA's Request Letters for Land to Accommodate the Facilities

Appendix VI:Public Consultations

Appendix VII: Water Analysis Report, 2010-14

APPENDIX I: REFERENCES

Atkins, August 2012. Project Formulation Report (PFR) for LVWATSAN – Part 6: Mwanza Satellite Towns

COWI, 18 February 2015. Project Brief on environmental and social impact assessment for rehabilitation and expansion of water supply infrastructure, wastewater collection and treatment for Mwanza Town.

COWI, 25 July 2016. Design Briefs (11 in total) for the planned STIP and LTIP works being part of the Mwanza Master Plan.

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COWI, January 2017. Component 2 Task 10: Environmental Impact Assessment Screening for Design Purposes – Screening Report.

EIB, February 2013. Environmental and Social Datasheet for LVWATSAN

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EIB/UN-HABITAT, December 2015. Stakeholder Engagement Plan for LVWATSAN

Mwanza Regional Commissioner's Office (2018), Mwanza Investment Profile

R-Solve, August 2012. Supplementary Engineering Report for LVWATSAN

Tanzania Ministry of Water, 2006. Environmental and Social Management Framework (ESMF) for Water Sector Development Programme

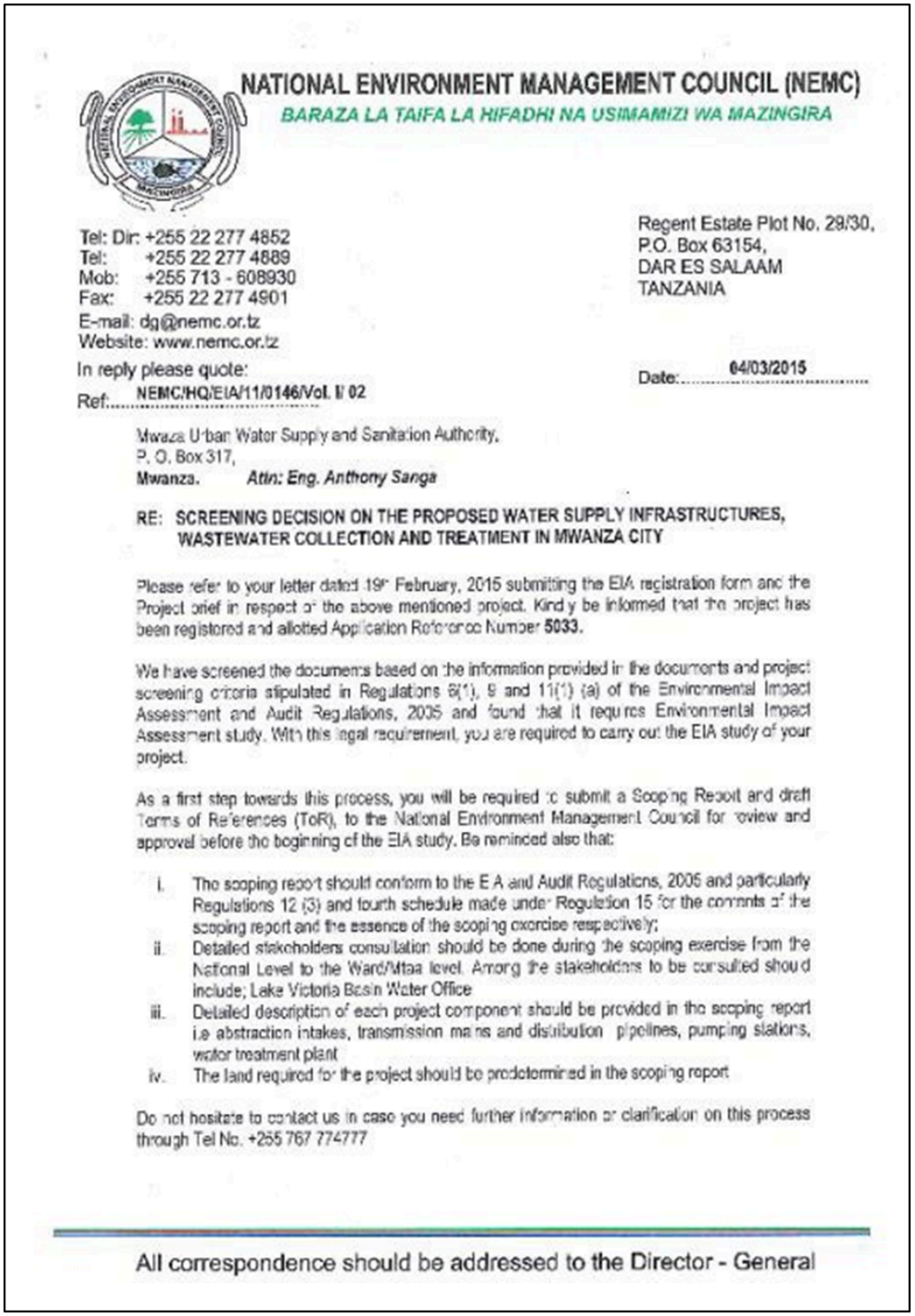
Tanzania Ministry of Water, 2006. Resettlement Management Framework (RMF) for Water Sector Development Programme

Glasson, John; Riki Therivel and Andrew Chadwick (URT) (1999). Introduction to Environmental Impact Assessment, 2nd Edition. London: UCL Press.

United Republic of Tanzania (URT) (1997). National Environmental Policy, Vice President's Office, Dar es Salaam

World Health Organization (2017) Guidelines for Drinking Water Quality, Geneva

APPENDIX II: NEMC 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
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E-mail: dg@nemc.or.tz
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Regent Estate Plot No. 29/30,
P.O. Box 63154,
DAR ES SALAAM
TANZANIA

In reply please quote:
Ref: NEMC/HQ/EIA/11/0146/Vol. II/ 02

Date: 04/03/2015

Mwaza Urban Water Supply and Sanitation Authority,
P. O. Box 317,
Mwanza. *Attn: Eng. Anthony Sanga*

RE: **SCREENING DECISION ON THE PROPOSED WATER SUPPLY INFRASTRUCTURES, WASTEWATER COLLECTION AND TREATMENT IN MWANZA CITY**

Please refer to your letter dated 19th February, 2015 submitting the EIA registration form and the Project brief in respect of the above mentioned project. Kindly be informed that the project has been registered and allotted Application Reference Number **5033.**

We have screened the documents based on the information provided in the documents and project screening criteria stipulated in Regulations 8(1), 9 and 11(1) (a) of the Environmental Impact Assessment and Audit Regulations, 2005 and found that it requires Environmental Impact Assessment study. With this legal requirement, you are required to carry out the EIA study of your 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. Be reminded also that:

i. The scoping report should conform to the E A 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;
ii. Detailed stakeholders consultation should be done during the scoping exercise from the National Level to the Ward/Mtaa level. Among the stakeholders to be consulted should include; Lake Victoria Basin Water Office
iii. Detailed description of each project component should be provided in the scoping report i.e abstraction intakes, transmission mains and distribution pipelines, pumping stations, water treatment plant
iv. The land required for the project should be predetermined in the scoping report

Do not hesitate to contact us in case you need further information or clarification on this process through Tel No. +255 767 774777

All correspondence should be addressed to the Director - General

APPENDIX III: NEMC REVIEW OF STIP SCOPING REPORT

NATIONAL ENVIRONMENT MANAGEMENT COUNCIL (NEMC)

BARAZA LA TAIFA LA HIFADHI NA USIMAMIZI WA MAZINGIRA

Telephone: + 255-28-2541679
Facsimile: + 255-28-2541679
E-mail: nemcmza@gmail.com
Location: Lake Victoria Basin Water Board, Igogo.

Mwanza Zonal Office,
P.O. Box 11045,
MWANZA,
TANZANIA.

In reply please quote:
NEMC/LZ/EIA/4/Vol.1/01

Date: 09/01/2017

MANAGING DIRECTOR
MWAUWASA
P.O. BOX317
MWANZA

REF: INTRODUCTION OF MOTT MACDONALD-PROJECT MANAGEMENT CONSULTANT AND ENVIRONMENTAL EXPERTS.

This is to acknowledge receipt of your letter dated 15/12/ 2016 which introduces Mott MacDonald-Project Management Consultant and new employed environmental experts namely Mr. **Wandert Benthem** and Mr. **Deus Deogratius Nshange** and of 27/09/2016 which submitted the screening report and Terms of Reference for the ***Environmental Impact Assessment for Short Term Investment Plan for Rehabilitation and Extension of Water Supply Infrastructure and Wastewater Collection and Treatment for Mwanza City***. Since the screening report was bearing the name of the consultant **Mr Ally Salim** and signed on behalf of him who declared not participated in its preparation and by notified NEMC through his letter dated 08/11/2016 ,you are obligated to bring a new screening report bearing new consultant(s) as you presented in your letter with reference No. UWSA/MZA/500/Vol2/71.

However, the submitted screening report does not have the detailed stakeholder consultation as recommended by screening decision letter NEMC/HQ/EIA/11/0146/Vol.1/02 (ii). Therefore, you are required to submit the new screening decision report and Terms of Reference (ToR) bearing the new employed environmental consultants' names and including all screening decision directives as outlined in screening decision letter NEMC/HQ/EIA/11/0146/Vol.1/02.

Yours in cooperation,

Boniphace.P.Guni
For Zonal Coordinator

CC: Mr Wander Benthem-International Environmental Expert
Mott MacDonald
Mwanza.

Mr Deus Deogratius Nshange-Local Environmental Expert
Mott MacDonald
Mwanza.

Appendix IV: NEMC Approval of STIP Scoping Report

(11)

NATIONAL ENVIRONMENT MANAGEMENT COUNCIL (NEMC)

BARAZA LA TAIFA LA HIFADHI NA USIMAMIZI WA MAZINGIRA

Telephone: +255-28-2541679
Facsimile: +255-28-2541679
E-mail: nemcmza@gmail.com
Location: Lake Victoria Basin Water Board, Igogo.

Mwanza Zonal Office,
P.O. Box 11045,
MWANZA,
TANZANIA.

In reply please quote:
NEMC/EIA/Vol.1/01

Date: 3/05/2017

MANAGING DIRECTOR
MWAUWASA
P.O. BOX317
MWANZA

PM - EB project
DEE discuss
5/5/17

MWANZA URBAN WATER AND SEWERAGE AUTHORITY
04 MAY 2017

REVIEW OF SCOPING REPORT AND APPROVAL OF TERMS OF REFERENCE FOR CONDUCTING ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE SHORT - TERM INVESTMENT PLAN FOR REHABILITATION AND EXTENSION OF WATER SUPPLY INFRASTRUCTURE AND WASTE WATER COLLECTION AND TREATMENT FOR MWANZA CITY

This is to acknowledge receipt of your letter dated 28/04/ 2017 attached with three copies of the Scoping Reports and draft of Terms of References (ToR) for undertaking EIA for the above mentioned project.

The Council has reviewed the Scoping Reports and draft of Terms of References (ToR) and found that they are generally adequate and can be used to guide EIA studies. Therefore we emphasize that you undertake the EIA studies, prepare the EIA reports and submit the EIS to the National Environment Management Council according to the requirements of EIA and Audit Regulations, 2005. However, the ToR should take note of the following.

1. All key stakeholders are consulted and their views and concerns addressed. Records of meetings, communication and comments should be provided. Consultation forms should bear recent dates and each consulted stakeholder should sign against his/her name as the law requires. Submission of documents which do not observe this requirement will be sent back to the developer for corrections;
2. All experts involved in the studies are named in the EIA report and provided with original signature (not scanned signatures or forged signatures) of the registered environmental experts. The non-registered experts to be involved in the study should not sign the EIA reports instead

Page **1** of **2**

APPENDIX V: MWAUWASA'S REQUEST LETTERS FOR LAND TO ACCOMMODATE THE FACILITIES

AIE

45

Mamlaka ya Majisafi na Usafi wa Mazingira
Jijini Mwanza

Simu: 255-28-2500547
Fax: 255-28-2503231
Email: info@mwauwasa.go.tz

Barabara ya Makongoro,
S. L. P. 317,
MWANZA.

Kumb. Na. UWSA/MZA/500/VOL.II/127

02 Mei, 2017

Mkurugenzi,
Halmashauri ya Manispaa Ilemela,
S. L. P. 735,
MWANZA.

YAH: ENEO LA UJENZI WA MABWAWA YA KUTIBU MAJITAKA NYAMHONGOLO

Mamlaka ya Majisafi na Usafi wa Mazingira Jijini Mwanza (MWAUWASA) imepata ufadhili kutoka Benki ya Uwekezaji ya Ulaya (EIB) na Shirika la Maendeleo la Ufaransa (AFD), Pia Serikali ya Tanzania inachangia sehemu ya fedha zitakazotumika kwa ajili ya kutekeleza Mradi wa majisafi na usafi wa mazingira. Fedha zilizotolewa zinalenga kutumika katika ujenzi wa miundombinu pekee.

Eneo la Mashariki ya Jiji la Mwanza ilipo Manispaa ya Ilemela liliainishwa na MWAUWASA kujengewa miundombinu ya majisafi na majitaka katika mradi huu. Uamuzi huu ni kutokana na umuhimu wa huduma kwa wananchi wa Manispaa ya Ilemela. Ili kuweza kufanikisha mradi huu MWAUWASA iliomba maeneo ambayo yatajengwa miundombinu.

Mradi huu pamoja na kujenga miundombinu ya majisafi katika maeneo ya Buswelu na Igoma, pia unahusu ujenzi wa miundombinu ya majitaka katika eneo la Nyamhongolo. Ujenzi wa Mabwawa ya kutibu majitaka katika eneo hili litaweza kutibu majitaka yote yanayotoka kwenye makazi na viwanda kwa maeneo ya Mwatex, Nileperch Pepsi, Cocacola, Serengeti, Igoma, Ndofe, Buswelu, Nyamhongolo na Kisesa.

Aidha, barua yako yenye kumb.Na IMC/L/RV/71/7 ya tarehe 07/03/2017 inaelezea juu ya gharama za fidia kwa wamiliki wa viwanja eneo la Nyamhongolo lililopendekezwa kujengwa mabwawa ya majitaka lenye ukubwa wa ekari 92.2 (sawa na mita za mraba 36,896) ambazo ni Tsh 120,000/= kwa mita ya mraba kwa kiwanja kilichopimwa, na Tsh 90,000/=kwa mita ya mraba kwa kiwanja ambacho hakijapimwa. Gharama hizi MWAUWASA haiwezi ikamudu, na pia mradi huu hauna fedha kwa ajili ya kulipa fidia kwa ajili ya maeneo.

APPENDIX VI:PUBLIC CONSULTATIONS

S/No.	Issues & Comments from the Community/Institutions	Remark/Action by the E&S Study Team
1.	How will Nyamagana Municipality benefit with the sanitation service while the proposed site for the construction WWTP is located in Ilemela Municipality?	The proposed construction of WWTP will serve the entire Mwanza city to relieve the existing Ilemela WWTP which is also located in Ilemela Municipality.
2.	The land value for the proposed construction of Igoma WWTP is relatively high as many landowners possess formal title deeds.	The valuation will be made in accordance with the Land Regulations of 2001 (assessment of the value of land for compensation) under section 179 of the Land Act No. 4 of 1999 and the Village Land Act No. 5 of 1999.
3.	Why was the Mkuyuni area not considered the location for the proposed construction of WWTP as initially recommended during the design stage?	The proposed construction of Igoma WWTP is the best location for drainage of wastewater flowing from both domestic and industrial areas by gravity and it will connect a large wastewater scheme. However, the new Mkuyuni WWTP will be covered under the Long-Term Investment Plan (LTIP) as per newly prepared Mwanza City 2040 Master Plan.
4.	The interventions of water supply and wastewater infrastructure should be inclined with the new prepared Mwanza City Master Plan to avoid unnecessary compensations.	The Short-Term Investment Plan (STIP) is based on the newly prepared Mwanza City 2040 Master Plan.

5.	The coverage of sewerage system in Mwanza City is minimal compared to the total area.	According to the 2040 Master Plan, MWAUWASA is planned to raise the wastewater collection services from 5% (2015) up to 40% (2040) and service 40,000 (2015) to 850,000 inhabitants (2040).

Appendix 6-2. Meeting held in Ilemela Municipal Council on 10 March 2017 Venue: Municipal Executive Director's Office

Date: 10 March 2017

S/No.	Issues & Comments from the Community/Institutions	Remark/Action by the E&S Study Team
1.	People are highly accepting the project and asking about the project period and commencement date.	The STIPs project is under design review stage and MWAUWASA has employed the Design Consultant who is carrying out the Detailed Engineering Designs (DED) and preparation of Tender Documents (TD) for the period of 4 months from February 2017. Subsequently, the procurement stage to follow.
2.	The effluents from proposed Igoma WWTP should conform with the permissible/allowable standards before discharging into water receiving bodies or Sur surface.	The design of WWTP has incorporated the treatment of wastewater to meet the permissible/allowable standards by the responsible authorities.
3.	Does the Lender/EIB considered the provision of the compensation rights to the Project Affected Persons (PAPs)?	The Lender/EIB is not injecting the funds for the compensation of the PAPs, instead any compensation arrangements will be carried out by the Government of Tanzania through the MoWI / MWAUWASA.

S/No.	Issues & Comments from the Community/Institutions	Remark/Action by the E&S Study Team
4.	The location of proposed Igoma WWTP is the best location as it is easily accessed and located at the lower point for free drainage of wastewater from the sewerage system.	This proposed Igoma WWTP will lower O&M costs since the wastewater scheme will not involve the pumping system as the existing Ilemela WWTP.
5.	The Water Supply component under STIPs has not extensively covered Ilemela Municipality by comparing with the coverage of Nyamagana Municipality.	The design review is done by the procured Supervising Consultation to include other areas under Ilemela Municipality.
6.	Some of the land owners for the proposed Igoma WWTP possess formal land tenure (modern title deeds with surveyed plots) and others possess informal land tenure (customary title deeds with un-surveyed plots).	Valuation of assets will be done in accordance with the Land Regulations of 2001 (assessment of the value of land for compensation) under section 179 of the Land Act No. 4 of 1999 and the Village Land Act No. 5 of 1999.
7.	Does the design of WWTP consider the provision of a buffer zone by considering that there are existing residential	The buffer zone requirement is at least 200m (preferably 500m) downwind according to the Design Manual (Tanzania Guidelines for water supply and wastewater, 2009). The developer shall be responsible to maintain the acceptable minimal

	houses within 150m of the proposed site vicinity?	buffer of 100m to avoid encroachment by the nearby community, livestock grazing and agricultural activities within the vicinity of the proposed location.

Appendix 6-3. Meeting with Igoma Industrial area community Venue: MWAUWASA office-Nyakato Zone, Buzuruga

Date: 17 March 2017

S/No.	Issues & Comments from the Community/Institutions	Remark/Action by the E&S Study Team
1.	Wastewater from industries located in Igoma light industrial area is currently regulated by the Lake Victoria Basin Water Board (LVBWB) before discharging into the water receiving bodies. What authority will take over the regulation process after the completion of Igoma Wastewater Scheme under STIPS?	MWAUWASA will own all infrastructure for Igoma Wastewater Scheme and will set the permissible/allowable standards according to Tanzania Standards for effluents from these industries before discharging into the conventional sewer pipe that will be regularly monitored by both MAWAUWASA and LVBWB.
2.	Does the design for Igoma wastewater scheme consider the domestic wastewater from surrounding households?	The design has incorporated both domestic and industrial wastewater that will drain by gravity to the proposed Igoma Wastewater Treatment Plant (WWTP).
3.	The proposed WWTP is the source of odour and nuisance from the untreated sewage to the surrounding communities.	The buffer zone should be maintained by planting trees e.g., *senn.spp* around the perimetered fence to avoid the possible odour and nuisance from the untreated sewage channelled to the ponds.

4.	The costs of industrial and domestic sewage desludging are relatively high due to the absence of off-site sewerage system around the Igoma area.	The sewage desludging costs will lower during the operation phase of the proposed Igoma Wastewater Scheme as the wastewater tariffs are usually charged by 50% of their respective supplied water supply tariffs by MWAUWASA.
5.	People are highly accepting the project and asking about the project period and commencement date.	The STIPs project is under design review stage and MWAUWASA has employed the Design Consultant who will carry out the Detailed Engineering Designs (DED) and preparation of Tender Documents

S/No.	Issues & Comments from the Community/Institutions	Remark/Action by the E&S Study Team
		(TD) for the period of 4 months from February 2017. Subsequently, the procurement stage to follow.
6.	The current improper management of industrial WW through discharging the effluents on the land have raised conflicts from the surrounding communities.	The proposed Igoma Wastewater Treatment Plant (WWTP) will resolve these conflicts from the surrounding communities since these effluents from industries will be conveyed into the conventional sewer pipes before discharging into these ponds. The responsible authorities will regulate the discharge of effluents from the ponds to ascertain that they meet allowable/permissible TBS Standards to avoid surface- and groundwater pollution of the surrounding locations.
7.	Does the design of WWTP consider the provision of a buffer zone by considering that there are existing residential houses within 150m of the proposed site vicinity?	The buffer zone requirement is at least 200m (preferably 500m) downwind according to the Design Manual (Tanzania Guidelines for water supply and wastewater, 2009). The developer shall be responsible to maintain the acceptable buffer of 100m to avoid encroachment by the nearby community, livestock grazing and agricultural

		activities within the vicinity of the proposed location.
8.	Who will bear the cost of connection to the new sewerage system during the operation phase of Igoma wastewater scheme?	The new customers will bear associated costs for all necessary fittings and pipeworks from their premises to the manhole or inspection chamber of the wastewater scheme.

Appendix 6-4. Meeting with Nyamhongolo ward community in Ilemela Municipal Council Venue: Nyamhongolo ward office

Date: 22 March 2017

S/No.	Issues & Comments from the Community/Institutions	Remark/Action by the E&S Study Team
1.	Why was the alternative site for the proposed Igoma WWTP not considered as some of the residential houses are 150m within this proposed vicinity?	The developer shall be responsible to maintain the acceptable min. buffer of 100m to avoid encroachment by the nearby community, livestock grazing and agricultural activities within the vicinity of the proposed location. This location is the best site since it is located at the lower point for free drainage of wastewater from the sewerage system.
2.	Why are the peri-urban areas like Nyamadoke not extensively covered under STIPs compared to the proposed areas which already have an existing distribution network?	After completion of STIPs project, MWAUWASA will proceed with the arrangements to connect new customers to these uncovered peri- urban areas. According to the Mwanza City 2040 Master Plan, MWAUWASA is planned to connect the total projected population of 1,968,000 inh. (2040) from the current coverage of 453,000 inhabitants (2015) which stands at 65%.

3.	Why the proposed pipeline layouts for both transmission main and distribution networks was not presented to the community beneficiaries for further understanding of the project?	The final drawings for STIPs are under design review by the procured Supervision Consultant (SC). During ESIAs stage, the drawings will be presented to the community beneficiaries for the general understanding of the project.
4.	Is the on-going construction of the Water Supply project at Nyamadoke area connected to the proposed project under STIP?	The on-going construction of the Water Supply project at Nyamadoke is implemented by Ilemela MC through Rural Water Supply and Sanitation Programme (RWSSP) which is jointly financed by Government of Tanzania (GoT) through Ministry of Water and Irrigation (MoWI) and World Bank.
5.	Will the cost of water tariffs be reduced after the completion of the STIP project?	The costs of water tariffs are regulated by EWURA as per national laws and regulations with the involvement of all stakeholders and come out with viable actual costs of water tariffs for each Water Utilities Companies (WUC).

S/No.	Issues & Comments from the Community/Institutions	Remark/Action by the E&S Study Team
6.	This proposed WWTP is the source of odour and nuisance from the untreated sewage to the surrounding communities.	The buffer zone should be maintained by planting trees e.g., *senn.spp* around the perimeter fence to avoid the possible odor and nuisance from the untreated sewage channelled to the ponds.
7.	Why did the project propose the construction of Igoma Mid-Level Reservoir while there is the	The project aims to increase the required hydraulic heads in the distribution networks since these two

	existing Igoma High-Level Reservoir?	tanks will be interconnected during the operation phase.
8.	Why is Nyamhongolo ward proposed for the construction of Igoma WWTP and not a water supply project?	STIP covers both water supply and wastewater components and all project communities will enjoy these services after their completion.
9.	What is the status of the compensation arrangements for PAPs to be relocated from the proposed Igoma WWTP.	The compensation arrangements are awaiting the final decision between MWAUWASA and Ilemela MC. During the consultation meeting with the land owners, MWAUWASA and the Ilemela municipality held on **24th February 2017** (The minutes attached), the land owners proposed the valuation costs of **TShs. 120,000/=** per m^2 for those who own the surveyed land and **TShs. 90,000**/= per m^2 for those who own the unsurveyed land. The valuation costs as per market values for land proposed by Ilemela MC are **TShs. 75,000/=** per m^2 for those who own the surveyed land and **TShs. 50,000**/= per m^2 for those who own the unsurveyed land.
10.	People are highly accepting the project and asking about the project period and commencement date.	The STIPs project is under design review stage and MWAUWASA has employed the Design Consultant who will carry out the Detailed Engineering Designs (DED) and preparation of Tender Documents (TD) for the period of 4 months from February 2017. Subsequently, the procurement stage to follow.

Appendix 6-5. Meeting with Buswelu ward community in Ilemela Municipal

Council Venue: Buswelu ward office

Date: 23 March 2017

S/No.	Issues &Comments from the Community/Institutions	Remark/Action by the E&S Study Team
1.	What is the scope of the project under STIP?	The scope of work includes the construction of raw water intake, Water Treatment Plant and High Lift Pump at Butimba Prison/navy area, construction of transmission main to the respective proposed storage reservoirs, construction of Booster Pumping Stations (4 in Nos.) at their designated sites, construction of reservoirs (> 4 in Nos. with various storage capacities), construction of distribution networks, and construction of a new wastewater scheme at Igoma area in Nyamhongolo ward. Also, this project involves the refurbishment of existing Mabatini BPS, and connection and disconnection of pipeworks at the storage reservoirs' inlets and outlets.
2.	If the compensation funds to the PAPs from the GoT failed due to the financial constraints, what would be the fate of the project/	The compensation arrangements are awaiting the final decision between MWAUWASA and Ilemela MC after receiving the comments on the valuation costs of the land from the land owners.
3.	Will the cost of water tariffs be reduced after the completion of STIPs project?	The costs of water tariffs are regulated by EWURA as per national laws and regulations with the involvement of all stakeholders and come out with viable actual costs of water tariffs for each Water Utilities Companies (WUC).
4.	Explain the tank location for the proposed	The selected tank location for Buswelu Reservoir was Buswelu hill

S/No.	Issues &Comments from the Community/Institutions	Remark/Action by the E&S Study Team
	Buswelu Storage Reservoir?	which is at a high point enough to command the hydraulic flows to the targeted areas.
5.	Many projects fail due to improper community awareness.	This project aims to involve the community beneficiaries in the planning, designing, construction and operation of water and wastewater infrastructures as per National Water Policy (NAWAPO) of 2002.
6.	Does the project consider the free-in house connections of water from the distribution network?	The new customers will bear associated costs for all necessary fittings, valves and pipe work from their premises to the water meter point. Subsequently, all associated costs from the installed water meter point The water supply system will be borne by MWAUWASA.
7.	The coverage of sewerage system in Mwanza city is minimal compared to the total area.	According to the 2040 Master Plan, MWAUWASA is planned to raise the wastewater collection services from 5% (2015) up to 40% (2040) and service 40,000 (2015) to 850,000 inhabitants (2040).

Appendix 6-6. Meeting with Buhongwa ward community in Nyamagana Municipal Council Venue: Buhongwa ward office

Date: 30 March 2017

S/No.	Issues &Comments from the Community/Institutions	Remark/Action by the E&S Study Team
1.	People are highly accepting the project and asking about the project period and commencement date.	The STIPs project is under design review stage and MWAUWASA has employed the Design Consultant who will carry out the Detailed Engineering Designs (DED) and preparation of Tender Documents (TD) for the period of 4 months from February 2017. Subsequently, the procurement stage to follow.
2.	The design consideration in avoidance of unnecessary loss of properties e.g., land, etc. for the proposed pipeline way leave.	The proposed pipeline routes traverse at large extent to the existing road reserves to avoid or minimise the possible loss of properties e.g., land, etc.
3.	The tank location for the proposed Buhongwa Storage Reservoir has to meet the water demand for the entire community due to the complexity of the topography of the area.	The design has considered the selection of location for the construction of the proposed Storage Reservoir at the highest point in order to command the hydraulic flows in the distribution system with the desired pressure heads.
4.	The pipes should be laid at the required depths to avoid unnecessary water leakages due to incidents of vandalism from the communities.	All pipes will be laid at the required trench depths as per designs.

5.	What will be the quality of pipeline materials, specifically poly pipes in order to avoid unnecessary bursting and thus, increase the water losses in the distribution system.	The quality of pipeline materials will comply with the design specifications and will be verified by the material test results through the accredited material laboratories by the responsible parties.
6.	What is the role of community participation in the project?	This project aims to involve the community beneficiaries in the planning, designing, construction and operation of water and wastewater infrastructures as per National Water Policy (NAWAPO) of 2002.

S/No.	Issues &Comments from the Community/Institutions	Remark/Action by the E&S Study Team
7.	Multiple incidences of water related/water borne diseases e.g., typhoid, diarrhoea, cholera, etc due to inaccessibility to clean and safe water.	The accessibility to clean and safe water by the community beneficiaries will prevent the eruption of these existing water related diseases and thus, improve the health of the project communities.
8.	What will be the compensation arrangements for the persons who will voluntarily release their portions of land during the project implementation.	MWAUWASA will compensate those persons who release their portions of land especially where the project needs large land takes such as the storage reservoirs, water and wastewater treatment plants, and BPS sites as per national valuation procedures.
9.	The consideration for construction of the proposed Buhongwa Storage Reservoir will minimise the incidences of eruption of the diseases due to water leakages which tend to	Post chlorination will be done at the tank before water flows to the end-users.

	decrease the concentration of residual chlorine in relation with the time of travel which is long.	

Appendix 6-7. Meeting with Butimba ward community in Nyamagana Municipal Council Venue: Butimba ward office

Date: 31 March 2017

S/No.	Issues &Comments from the Community/Institutions	Remark/Action by the E&S Study Team
1.	People living in the hilly areas do not get the access to the water supply services due to poor pressure.	After completion of STIPs project, the people living in these hilly areas will get the access to the water supply services by gravity with desired pressure heads since the selection of the reservoir's location was based on the areas with highest points to enable free hydraulic flows to the nodes as per design.
2.	Will the cost of water tariffs be reduced after the completion of STIPs project?	The costs of water tariffs are usually regulated by EWURA as per national laws and regulations with the involvement of all stakeholders and come out with viable actual costs of water tariffs for each Water Utilities Companies (WUC).
3.	People are highly accepting the project and asking about the project period and commencement date.	The STIPs project is under design review stage and MWAUWASA has employed the Design Consultant who will carry out the Detailed Engineering Designs (DED) and preparation of Tender Documents (TD) for the period of 4 months from February 2017. Subsequently, the procurement stage to follow.
4.	The size of the pipelines to be laid for both transmission mains and distribution networks.	The pipeline sizes for both transmission mains and distribution networks will be known after completion of the Detailed Engineering Designs (DED) by Design Consultant. Currently, the project

		is under design review stage following the rejection of the first design by MWAUWASA submitted by the previous Design Consultant (COWI).
5.	The multiple incidences of pipe leakages on the existing distribution network as the pipes are exposed on the surfaces.	The pipes will be laid at the proposed trench depths by the design to avoid such incidences of water leakages due to impaired quality of poly pipes when exposed on the surface and vandalism.
6.	The community involvement in the project.	This project aims to involve the community beneficiaries in the planning, designing, construction and operation of water and wastewater infrastructures as per National Water Policy (NAWAPO) of 2002. This will also avoid or minimise the impacts on the loss of

S/No.	Issues &Comments from the Community/Institutions	Remark/Action by the E&S Study Team
		properties, e.g., land, etc by considering the possible desig alternatives to prevent the compensation process.
7.	People are highly accepting the project and asking about the project period and commencement date.	The STIPs project is under design review stage and MWAUWASA has employed the Design Consultant who will carry out the Detailed Engineering Designs (DED) and preparation of Tender Documents (TD) for the period of 4 months from February 2017. Subsequently, the procurement stage to follow.
8.	Labour force (employment)	The project will provide the temporary jobs to the local residents and hence, enhance the local economy and involvement of the community for ownership purposes.

9.	Bad experience from previous projects is Soil erosion due to improper backfilling of the pipeline trenches after completion of the construction phase.	With this project all pipeline trenches will be backfilled as per requirement. If trees or plants uprooted, the Environmental and Social Management Plan (ESMP) to be followed by the contractor for the mitigation purposes.
10.	Is this project considered to lower the current cost of connection to the new customers as they are relatively high?	After the completion of the project the current cost of connection of new customers to the distribution network will be lowered as the coverage of water supply will be upgraded. High connection costs are attributed to poor coverage of water supply schemes, thus necessitating these customers to share the costs of the water supply extension works.

Appendix 6-8. Meeting with Igoma ward community in Nyamagana Municipal Council Venue: Igoma ward office Date: 3 April 2017

S/No.	Community/Institutions	Remark/Action by the E&S Study team
1.	People are highly accepting of the project and they will benefit with both water supply and wastewater services under STIPs project.	Noted.
2.	When the design of STIPs project was conducted and how the community was involved during this stage.	The first design of STIPs project started in October 2014 by COWI (the Design Consultant) and managed to submit the final documents on early January 2017.The community beneficiaries have been involved in the planning and designing of their water and wastewater infrastructures as per NAWAPO of 2002 requirements.

3.	Does the existing Igoma reservoir continue in supplying water after the completion of STIPs project.	The existing Igoma reservoir will be connected to the transmission main from the proposed Butimba Water Treatment Plant to relieve the already overloaded Capri-Point Water Treatment Plant by disconnecting the existing transmission main from Mabatini BPS. This existing Igoma reservoir will be interconnected with the proposed sub-Igoma reservoir to supply the water to the community.
4.	Some people have constructed their buildings above the existing water infrastructures and will be affected during the construction of STIPs project.	The pipeline routes for STIPs project will traverse on the existing road reserves to avoid unnecessary resettlement of the people. However, the land taken for pipeline routes when traversing the farms or plots are less than 10% of the total areas, thus considered as a minor impact and temporal.

S/No.	**Issues &Comments from the Community/Institutions**	**Remark/Action by the E&S Study team**
5.	The operation of the existing Fumagila Water Supply project at Igoma area which is partially functional after completion of the proposed project under STIPs.	The existing Fumagila Water Supply project at Igoma area is under Nyamagana MC through Rural Water Supply and Sanitation Programme (RWSSP). This STIPS project will be operated by MWAUWASA after completion.
6.	The compensation procedures for the PAPs need to be fair and transparent.	The compensation procedures will be made in accordance with the Land Regulations of 2001 (assessment of the value of land for compensation) under section 179 of the Land Act No. 4 of 1999 and the Village Land Act No. 5 of 1999.

7.	The loss of land/properties when the pipeline routes traverse the existing people's farms or plots.	The trench width for the pipeline route is approximately 2 ½ ft. or 750mm and the maximum depth of 1000mm below the Ground Level. Subsequently, the land takes for this pipeline routes are less than 10% of the total areas, thus other temporarily activities may continue after the pipeline laying (usually the pipeline routes are marked with pipeline posts for easy identification of the existing water infrastructures and accessories and avoid unknowingly encroachment).
8.	The project financiers?	The Project is jointly financed by the European Investment Bank (EIB), the Agence Française de Développement (AFD) and GoT. Both EIB and AFD have signed two loan agreements with GoT for an amount of EUR 45 million each for the financing of 86% of the investment costs associated to the extension and upgrading of water supply and sanitation in Mwanza City and satellite towns (Misungwi, Magu, Lamadi), as well as sewerage systems in the towns of Bukoba and Musoma. The total Project cost is estimated at EUR 104.5 million, including August 2016. EUR 14.5 million provided by the Tanzanian government.
9.	Soil erosion due to improper backfilling of the pipeline trenches after completion of the construction phase.	All pipeline trenches will be backfilled as per requirement. If trees or plants uprooted, the Environmental and Social Management Plan (ESMP) to be followed by the contractor for the mitigation purposes.

Appendix 6-9. Meeting with Lake Victoria Basin Water Board (LVBWB) Venue: LVBWB Boardroom, Igogo area

Date: 6 April 2017

S/No.	LVBWB Comments	Remark/Action by the E&S Study Team
1.	As per NAWAPO of 2002, all water abstractions and effluent discharges into water receiving bodies shall be subjected to a water use permit/water right or discharge permit to be used for a determined beneficial use and for a specified period of time.	Noted.
2.	The current improper management of industrial WW through discharging the effluents on the land have raised conflicts from the surrounding communities.	The proposed Igoma Wastewater Treatment Plant (WWTP) will resolve these conflicts from the surrounding communities since these effluents from industries will be conveyed into the conventional sewer pipes before discharging into these ponds. The responsible authorities will regulate the discharging of the effluents from the ponds to ascertain if they meet the allowable/permissible TBS Standards to avoid the surface and groundwater pollution of the surrounding locations.
3.	The project should avoid the surface and groundwater pollution during the construction phase.	The pollutants such as fuel spoils from site trucks, vehicles, and equipment's, and solid wastes should properly be handled at the designated disposal sites.
4.	The improper pre-treatment of effluents from the industries e.g., textile industries will lead into the failure of Igoma WWTP due to high chemical	Thorough monitoring of the industrial effluents should be done by responsible parties e.g., MWAUWASA and LVBWB before discharging into the conventional sewerage system to check the

	contents which interfere the biological treatment of these ponds.	compliance with the permissible/allowable standards according to Tanzania Standards.

Appendix 6-10. Meeting with Kisesa

Ward Venue: Kisesa ward office

Date: 6 April 2017

S/No.	Issues & Comments from the Community/Institutions	Remark/Action by the E&S Study Team
1.	People are highly accepting the project and asking about the project period and commencement date.	The STIPs project is under design review stage and MWAUWASA has employed the Design Consultant who will carry out the Detailed Engineering Designs (DED) and preparation of Tender Documents (TD) for the period of 4 months from February 2017. Subsequently, the procurement stage to follow.
2.	The role of community participation in the project.	This project aims to involve the community beneficiaries in the planning, designing, construction and operation of water and wastewater infrastructures as per National Water Policy (NAWAPO) of 2002.
3.	The loss of land/properties when the pipeline routes traverse the existing people's farms or plots.	The trench width for the pipeline route is approximately 2 ½ ft. or 750mm and the maximum depth of 1000mm below the Ground Level. Subsequently, the land takes for this pipeline routes are less than 10% of the total areas, thus other temporarily activities may continue after the pipeline laying (usually the pipeline routes are marked with pipeline posts for easy identification of the existing water infrastructures and accessories and avoid unknowingly encroachment).

Appendix 6-11. Summary of amalgamated issues from public sensitization meetings for communities within the sewerage system area

S/No.	Questions/Issues	Responses Given
1.	What is the cost of the connection and how much will the consumer pay?	The cost of laying the main sewerage pipes will be met by the Project which is funded by EIB/AfD/GoT. A certain number of consumers will be connected for free during the Project; but after that MWAUWASA will charge a connection fee. At the moment connection charges have not been developed and so are not yet in place
2.	How will the affected people be compensated?	The main sewer pipes will be laid within the road reserve or in the middle of the road, so no PAPs are expected.
3.	How will the sewerage pipes be connected in unplanned areas?	The main sewers will be laid along the recognized roads only to avoid demolition of existing houses. Connection from individual houses will be done along the open spaces like connection of water supply in squatter areas
4.	What will be the monthly service fees?	As per current system, the sewer service charge will be 50% of the monthly water bill
5.	If a household does not have a water connection can they be connected to the sewerage sewer?	This is not possible.
6.	Who will be responsible for repair of the sewer pipe if it gets broken somewhere?	MWAUWASA is responsible for maintenance starting from the chamber downwards; the customer is responsible for upstream repairs, but MWAUWASA can provide technical advice if necessary.

7.	Will it be compulsory for households to be connected to the sewer line?	It is not compulsory, but households are strongly advised to get connected through legal procedures.
8.	Can the project be speeded up to enable faster availability of the service?	This is well-noted.
9.	At what stage is the Project?	The Project was at pre-tender stage (at the time of the meeting)
10.	It is possible to change the location of the waste stabilization ponds as otherwise the nearby households will be greatly affected by the odour.	The site selected was the best option technically. Efforts will be made during the design and operation to minimize odours from the ponds. A tree buffer zone will also be established.
11.	The people/beneficiaries should be consulted at all stages of the Project.	This is the usual practice for the Project and is well-noted.
12.	Many of the communities are faced with a big water supply shortage. Why is this?	This is due to the low water production rate of the existing intake/treatment plant at Capri Point and that is why a new intake/treatment plant is planned at Butimba Prisons.
13.	If someone's property is demolished what will be the procedure for compensation?	Identification of affected people and valuation of their properties will be done in accordance with the Government laws / regulations and the Project Resettlement Framework. In case the damage will happen during construction phase, then the Contractor will be responsible for compensating the affected person

14.	What will be the arrangements and cost for connection?	Households with appropriate infrastructure and near the main sewerage pipe will be connected for free if it is done during the duration of the Project.
15.	Can MWAUWASA provide educational information leaflets on the proposed sewerage system?	This request will be passed on to the senior-level Project leadership for consideration.
16.	What can consumers do to reduce the	Customers can take simple measures such as closing the tap when

S/No.	Questions/Issues	Responses Given
	monthly water bills which are already very high?	no water is really required, repairing leaking pipes, etc. Adults should also educate / instruct their children to avoid misuse of water
17.	Customers face the nuisance of their water supply being cut off even when the outstanding bill is very small.	MWAUWASA needs all funds due from water bills to enable it carry out its operations efficiently, so customers are requested to pay all their bills on time.
18.	Will there be opportunity for households to be connected even after the Project has ended?	This will depend on MWAUWASA's capacity and availability of funds after the Project. After the end of the project, modalities will be worked out for household connection including costs
19.	What internal preparations are required before a household can be connected?	Internal waste water plumbing leading to the septic tank should be well-connected as it will be the basis for connection to the sewer line. MWAUWASA technicians will provide further advice on the spot in case other modifications are required.

20.	Adding 50% to the water bill will increase the burden to poor households.	This is the rate which has been set by EWURA and is based on analysis of the costs of providing the service.
21.	Are customers allowed to install a domestic booster pump to enable them get water?	This is not allowed as it deprives or reduces supply to other users in the distribution area given that there is a shortage of water.
22.	As the water supply service is very poor, efforts should be directed at improving the water supply first.	The LVWATSAN Project has components of water supply improvement as well as sewerage, so both are going hand-in-hand to improve services delivery.
23.	The proposed sewerage system is good as it will also reduce quarrels between neighbours due to surface outflows of waste water from households.	This is noted.
24.	Why are customers charged water service charge while there is no water; what can aggrieved customers do?	Service charge is a necessary part of the water bill as approved by EWURA. But this can be suspended for individual customers if they request officially to MWAUWASA.
25.	Top officials of MWAUWASA should visit service areas to be acquainted with water supply problems faced by the populace.	This is well-noted and will be conveyed to the senior-leve management of MWAUWASA.
26.	Why is it that commercial water vendors are always getting water while households do not have?	This depends on the distribution system as they could be connected differently and depends from area to area.
27.	Will all households be connected to the sewer line? How will sewerage infrastructure be laid given the	It depends on the location of the house and relative level/distance from the main sewer pipe and whether there are no major obstructions. In

	haphazard location of the houses?	addition, the household must be connected to water supply.
28.	The polluted water in Mirongo river should be treated before entering the lake as it is a major source of pollution.	This is well noted. MWAUWASA will liaise with other stakeholders to investigate the technical and financial possibilities.
29.	What will be done technically to enable all types of household wastewater to enter the sewerage pipe?	This is a technical issue that will be handled accordingly. It depends on the location of the house and relative level/distance from the main sewer pipe and whether there are no major obstructions.
30.	Can a household using a pit latrine also be connected?	A household must have an internal waste water plumbing system that can be connected to the main sewer pipe.
31.	Who will be responsible for paying compensation for those affected by the Project?	Funds will be sought by MWAUWASA/Government of Tanzania to pay compensation as per Project agreement where necessary. Donor/Lenders funds are set for construction activities and not compensation
32.	More efforts should be taken to conserve dwindling fish stocks in Lake Victoria	This is the responsibility of other government ministries and stakeholders and there are ongoing programmes / efforts in this regard.
33.	Good public toilets should be built to serve as examples for the community.	LVWATSAN has a project component dealing with public and school sanitation under which good/exemplary public toilets have been constructed.
34.	Will there be any employment opportunities for local youth?	It is one of the expectations and stipulations of the LVWATSAN Project that local people/youth be given employment opportunities especially for unskilled or semi-skilled labour. Contractors are expected to provide these opportunities.

Appendix 6-12. Summary of amalgamated issues from public sensitization meetings for water treatment plant and transmission main areas

S/No	Questions/Issues	Responses Given
1.	When will the project start and when will it be completed?	The actual construction is expected to start by mid-2018 and be completed by 2020 because there are several processes to be accomplished before the construction phase.
2.	The project should be implemented fast as the communities are faced with major water problems.	This is well-noted. MWAUWASA, the Government and Lenders are keen for the Project to be implemented quickly, but the tender/construction processes must be done carefully.
3.	Will there be compensation in relation to the distribution pipes or is it only for the main transmission main?	Normally the distribution pipes follow free roads or paths which are identified in close collaboration with the community leadership, so do not entail compensation.
4.	How many water kiosks will be established to meet the demand?	Necessity, location and number of water kiosks will be decided by MWAUWASA in collaboration with the relevant community leadership after the transmission main has been laid and water has started to flow.
5.	Will there be reduced connection fees for poor households as it is with REA?	Connection fees are set by EWURA based on the utility's requests, but normally it is a flat rate for all domestic consumers.
6.	We request for guidance on where we can get good quality pipes for household pipe connections.	Customers wishing for such technical guidance are advised to contact the relevant Zonal Manager or the Customer Relations Unit for further guidance. The MWAUWASA free phone number – 0767 080 825, was availed to all community members for contact.
7.	What will be the arrangements for a household to be connected to the new pipe?	MWAUWASA will lay additional distribution pipes once the transmission main has been built.

		Applications from new customer connections will be received and processed as per current procedures.
8.	When will the valuation of affected properties be done? We request that the compensation payments are not delayed, not wait until affected people go to court.	One of the key requirements of the Project's Resettlement Policy Framework is that resettlement/compensation issues are settled before start of construction, so there should be no need for a project- affected person to have to go to court to get compensated. All procedures will be adhered to ensure full, fair and prompt compensation.
9.	Will households located in higher areas also benefit? (This came from residents of Tambuka Reli and Kambarage).	The situation will be analysed once the transmission main has been laid. Existing supply pipes may need to be re-connected to the new distribution mains to ensure better supply to all customers.
10.	How will the old pipes also be connected to the new system?	The situation will be analysed once the transmission main has been laid. Existing supply pipes may need to be re-connected to the new distribution mains to ensure better supply of water to all customers.
11.	When will MWAUWASA do away with the myriad connections from the main pipe instead of bringing the main pipe closer to the consumers?	MWAUWASA is aware of the inconveniences and losses related to having myriad small pipes all connected to the distribution main. Re- connection measures are planned to ensure distribution efficiency and reduction of water leakages.
12	After laying and burying the Transmission Main, are community members allowed to continue using the land for farming?	In principle this is not allowed because of the possibility of accidents if the pipe bursts as it has very high pressure. The land must also remain open to allow periodical services / inspections by MWAUWASA.

13	As the transmission main is passing through our areas, will we also benefit from it?	The Transmission Main pipe is big (mm 600) and the pressure of water is very high and technically water cannot be tapped while being transmitted. Water tanks are being constructed in different places for distribution and small distribution pipes will be laid tosupply water to the different areas to supplement current supply.
14	We need to caution young people who expect to get employment opportunities, while some are lazy and when given opportunities some complain of hard work, or complain of low payment and run away. They should be prepared, and the hard workers will get opportunities.	Good observation and well noted.

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