LVWATSAN – Mwanza
Environmental and Social Impact Assessment Report for Water Supply and Wastewater Short-Term Investment Plan for Mwanza City – Tanzania

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May 31 2018

MOTT MACDONALD

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Mwanza Urban Water Supply and Sanitation Authority (MWAUWASA)

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Contents

Chapter	Title	Page
List of Abbreviations		1
Acknowledgement		2
Executive Summary		3
1	Introduction	8
1.1	Background and Justification	8
1.2	Rationale of the STIP Works	9
1.3	Project Benefits	10
1.4	Project Funding and Cost	10
1.5	Rationale of the ESIA Study	10
1.6	Objectives of the ESIA Study	11
1.7	Approach and Methodology	11
2	Project Description	14
2.1	Location and Accessibility	14
2.2	Site Description	15
2.3	Existing Utility Infrastructure	16
2.4	Proposed STIP Development Components	17
2.5	Project Activities	24
2.6 Waste Generation		24
2.7 Implementation		25
3	Policy, Legal and Administrative Framework	26
3.1	Overview of Vision 2025	26
3.2	National Policies	26
3.3	Legal Framework	29
3.4	Relevant Regulations and Guidelines	32
3.5	International Conventions	33
3.6	Institutional Framework for Management of the Environment	33
3.7	Role of European Investment Bank	34
4	Baseline / Existing Conditions	36
4.1	General	36
4.2	Physical Environment	36
4.3	Biological Environment	37
4.4	Socio-economic Environment	38
5	Stakeholder Consultation and Public Participation	42
5.1	Introduction	42

5.2 Stakeholders Identification and Analysis 42
5.3 Stakeholder Consultation Process 42
5.4 Overview and Legal Requirement 43
5.5 Consultations Conducted 43
6 Identification and Assessment of Impacts and Alternatives 55
6.1 Introduction 55
6.2 Methodology 55
6.3 Pre-construction, Planning and Design Phase 58
6.4 Construction Phase 58
6.5 Operation Phase 62
6.6 Decommissioning Phase 63
6.7 Project Alternatives 63
6.8 Cost-Benefit Analysis 64
7 Environmental and Social Mitigation Measures 65
7.1 Introduction 65
7.2 Pre-Construction 65
7.3 Construction 66
7.4 Operation 68
8 Environmental and Social Management Plan 70
8.1 Introduction 70
8.2 Implementation Arrangement of the Project Works and the ESMP 70
8.3 Reporting Arrangements 70
8.4 Cost estimates for ESMP 71
9 Environmental and Social Monitoring Plan 93
9.1 Introduction 93
9.2 Monitoring per Phase 93
10 Decommissioning 99
10.1 Decommissioning During Construction 99
10.2 Decommissioning after the end of project operation 99
11 Summary and Conclusions 101
12 References 102

Appendices

Appendix 1. Terms of Reference for ESIA study 103
Appendix 2. NEMC's Screening Decision 108
Appendix 3. NEMC's Review of STIP Scoping Report of 9/2016 109
Appendix 4. NEMC's Approval of the STIP Scoping Report of 4/2017 110
Appendix 5. MWAUWASA's Request Letters for Land to Accommodate the Facilities 112
Appendix 6. Letter from Ministry of Home Affairs Regarding Acquisition of Land for Butimba WTP 118

Appendix 7. Wastewater Treatment Plant Design Parameters 119
Appendix 8. Public Consultations 121
Appendix 9. Water Analysis Report for Butimba Site, 2010-14 134
Appendix 10. Environmental and Social Impact Tables 136
Appendix 11. Comments Received on the Draft ESIA 140

Tables

Table 2-1. STIP works implementation programme 25
Table 3-1. National Policies addressing environmental management relevant to the Project 26
Table 3-2. National laws addressing environmental management relevant to the project 29
Table 3-3. EIB documents presenting the general approach to environmental and social safeguards 35
Table 4-1. Comparison of Key Water Quality Measurements at Butimba Intake Site with TBS and WHO Drinking Water Standards 37
Table 5-1 List of key stakeholders for LVWATSAN STIP works 44
Table 5-2 List of Public Consultation Meetings Held 47
Table 5-3 Summary of Key Issues from Stakeholder and Community Consultations 48
Table 6-1 Summary of Broad Environmental and Social issues for Water Treatment Plant and Transmission Main 56
Table 6-2 Preliminary Number of Expected Project Affected People 62
Table 7-1. Impacts and mitigation measures during the Pre-construction Phase 65
Table 7-2. Impacts and Mitigation measures during the Construction Phase 66
Table 7-3. Impacts and Mitigation Measures during the Operation Phase 68
Table 8-1. Environmental and Social Management Plan for Raw Water Intake and Water Treatment Plant 72
Table 8-2 Environmental and Social Management Plan for Transmission Main and Booster Pumping Station 79
Table 8-3 Environmental and Social Management Plan for Sewerage System 85
Table 9-1. Environmental and Social Monitoring Plan 95
Table 10-1 Summary of Decommissioning Plan 100

Figures

Figure 1-1. Field inspections by ESIA Study Team 13
Figure 2-1. Project location 14
Figure 2-2. MWAUWASA service area 15
Fig 2-3 Site of Proposed Raw Water Intake at Butimba 17
Figure 2-4. Proposed Layout of Butimba Raw Water Intake and Water Treatment Plant 18
Figure 2-5 Route of transmission main from Butimba WTP to Sub-Igoma Reservoir 19
Figure 2-6 Proposed Sewerage Network 21
Figure 2-7. Proposed lay-out of Wastewater Treatment Plant 23
Figure 4-1. Typical vegetation at Butimba Water Treatment Plant site 38

List of Abbreviations

AFD	French Development Agency
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	Environmental 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
EU	European Union
EUR	Euro
GoT	Government of Tanzania
HIV/AIDS	Human Immunodeficiency Virus / Acquired Immune Deficiency Syndrome
IIP	Immediate Investment Plan (for LVWATSAN)
LS	Lender's Supervisor
LVWATSAN	Lake Victoria Water and Sanitation (Project)
LVBWB	Lake Victoria Basin Water Board
MCC	Mwanza City Council
MDG	Millennium Development Goals
MoWI	Ministry of Water and Irrigation
MSF	Multi-Stakeholder Forum
Mtaa/Mitaa	Swahili word for Small Community Area
MWAUWASA	Mwanza Urban Water Supply and Sanitation Authority
NEMC	National Environment Management Council
NGO	Non-governmental Organization
PFR	Project Formulation Report (for LVWATSAN)
PMC	Project Management Consultant (for LVWATSAN)
PMU	Project Management Unit (for LVWATSAN)
PPE	Personal Protective Equipment
RPF	Resettlement Policy/Planning Framework (for LVWATSAN)
SEP	Stakeholder Engagement Plan (for LVWATSAN)
SER	Supplementary Engineering Report (for LVWATSAN)
STD	Sexually Transmitted Diseases
STIP	Short-term Investment Plan (for LVWATSAN)
TANROADS	Tanzania National Roads Agency
TBS	Tanzania Bureau of Standards
USD	United States Dollar
WHO	World Health Organization
WSDP	Water Sector Development Project

Acknowledgement

The Mwanza Urban Water Supply and Sanitation Authority (MWAUWASA) would like to acknowledge the assistance and guidance received from various stakeholders for compiling this Environmental and Social Impact Assessment for the proposed water supply and wastewater works under the LVWATSAN Short-term Investment Plan for Mwanza City.

Special thanks are expressed to the PMC Unit who carried out the study and compiled the report in collaboration with MWAUWASA's Project Management Unit. The ESIA Team comprised of the following: Mr Wandert Bentham, MSc Biology; Eng Pius Mabuba, BSc Civil Engineering, MSc Water and Waste Water Engineering; Mr Yoswe Msongwe, B.A. Sociology, M.A. Development Studies; Eng Wilbert Bujiku, B.Sc. Environment Engineering; Mr. Jonas Christopher, BA Sociology; Eng Neneka Adam, B.Sc. Environment Engineering; Eng Tumaini Hatibu, B.Sc. Environment Engineering; and Eng Martha Chuwa, B.Sc. Environment Engineering.

Thanks also go to Mott MacDonald, the lead consultancy firm contracted by the EIB as the Project Management Consultant together with UWP Tanzania Ltd. Special appreciation to staff of Egis eau, the Supervision Consultant for providing relevant maps and drawings. The contribution of other stakeholders like Lake Victoria Basin Water Board, Lake Victoria Environmental Management Project II, Mwanza City Council, and Ilemela District Council is also appreciated. Last but not least, thanks also go to NEMC's Lake Zonal Office staff for their vital contributions and their assistance during various project consultations.

Executive Summary

1. Title of the Project

Environmental and Social Impact Assessment (ESIA) Report for Water Supply and Wastewater Short-term Investment Plan (STIP) for Mwanza City – Tanzania

2. Name of Proponent / Developer

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3. Introduction

The proposed STIP works are part of the ongoing LVWATSAN – Mwanza Project (2014-2020). The Project aims at protecting the Lake Victoria environment and wellbeing 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.

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. For example, the population of the area are also engaged in animal keeping which demands water for daily sustenance.

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 up to 100,000 people in households and industries in the wards of Igoma, Buswelu, Kishiri and Nyamhongolo. These will result in health and economic benefits. In addition, the Project is expected to create jobs especially during the construction phase.

4. Aim and Objectives of the ESIA Study

The purpose of conducting this ESIA study was to identify and assess potential impacts and mitigation measures associated with the proposed works and to achieve harmonization with relevant stakeholders. Mott MacDonald in association with UWP Consulting has been trusted with conducting the study for the proposed works. The overall objectives of the ESIA are to:

- Identify key environmental and social issues related to the proposed project, their impacts, and mitigation if negative.
- Compile an Environmental and Social Management Plan (ESMP) comprising notably environmental and social management measures as well as mechanisms for their implementation and its compliance monitoring in order to minimize the project's negative impacts and enhance the positive aspects.

This report has been developed based on procedures set out in the Environmental Management Act of 2005 and the Environmental Impact Assessment and Audit Regulations No.349 of 2005. The study has included screening and scoping, analysis of baseline conditions, stakeholder consultation meetings, document review, assessment of impacts, preparation of the ESMP, and report compilation.

5. Existing Water Supply and Sewerage Services

MWAUWASA draws raw water from Lake Victoria and after treatment this water is pumped via booster stations to four of five zones. The water intake is located at Capri Point where also the water treatment plant (WTP) is sited. Current production at the WTP is 105,000 m^3/day, and water is pumped to several distribution/storage tanks around Mwanza. The daily water production falls short of daily demand of Mwanza City.

The existing sewerage system is designed as a separate system and has a total length of about 27 km consisting of PVC, concrete and steel pipes (diameters DN150 to DN600 mm). It serves only the central business quarter and some surrounding areas. All sewage flows by gravity through collection lines to the Central Pumping Station near the MWAUWASA Central Zone offices in the City Centre from where it is transferred via a transmission main (DN400 and DN750 mm) to the existing wastewater treatment plant located at Butuja in Ilemela Municipality. The wastewater treatment plant is a stabilization pond system comprising of one anaerobic pond, one facultative pond and eight maturation ponds operating in series. It was built in the 1970's and rehabilitated in 2003. MWAUWASA provides a sludge disposal facility using on-site sanitation, discharging the sludge for treatment at existing wastewater stabilization ponds at Ilemela.

6. 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 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 after necessary pre-treatment. The sewerage network measures about 30 km and will have an estimated 14,000 connections.
- Construction of the Wastewater Treatment Plant (WWTP) in Nyamhongolo area, Igoma. The site to be acquired is for 39.5 ha for the WWTP located along the Mwanza-Musoma highway. The wastewater treatment plant will have a capacity of approximately 12,500 m^3/day. An alternative site at nearby Kanyama Village in Magu District is also under consideration.

Construction of the works is currently expected to start in October 2018 and to be completed in November 2020 including a 12-months defects liability period.

7. Project Alternatives

Several project alternatives have been considered during the design phase and relate to:

- No Project Alternative
- Rehabilitation and Expansion of existing water intake and treatment plant at Capri Point:
- Choosing another site for waste stabilization ponds
- Using a conventional sewerage treatment Plant instead of waste stabilization ponds.

8. Key National 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. The Proponent will adhere to the requirements of all the relevant Policies and legislation in implementing the STIP works and during their operation.

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 EIB's environmental safeguard measures include that the Bank's approach to financing projects is based on the precautionary principle, preventive action rather than curative treatment, environmental damage to be rectified at the source, the polluter pays, and that all projects financed by the Bank are subject to Environmental Assessment, normally carried out by its own staff, but if by others according to the requirements of the Bank.

9. Baseline Conditions

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) and are presented in a field screening matrix. This matrix 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 (DP) locations and distribution network. The site-specific conditions have been assessed based on Tanzanian legislative requirements, EU EIA Directives and EIB Environmental and Social Safeguards.

10. Stakeholder Consultation and Public Participation

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. 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.

11. 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.

(a) 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.

(b) 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 sewerage 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.

12. Cost-Benefit Analysis

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.

13. 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.

14. 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.

15. Decommissioning

The report provides guidance for 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, MWAUWASA will 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 Tanzania Occupational Safety and Health Agency will also be adhered to in preparing the methodology and during the decommissioning.

16. Summary, Conclusion and Recommendation

In a joint effort, the Government of Tanzania and the European Investment Bank are implementing the Lake Victoria Water and Sanitation Project – Mwanza Project (2014-2020) with the main overarching aim to achieve the Sustainable Development Goals (SDGs) for water and sanitation within Mwanza City and secondary town centres.

A systematic assessment of expected impacts of the interventions shows that the planned development is expected to lead to a number 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. The Resettlement Planning Framework will be followed to ensure fair and timely compensation to any persons affected by the Project.

It is recommended that this ESIA report be reviewed and approved by NEMC to allow the proposed STIP works to be implemented, provided that the recommended mitigation measures are adequately and timely implemented.

1 Introduction

1.1 Background and Justification

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 the 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.

The National Strategy for Economic Growth and Reduction of Poverty (MKUKUTA) commits Tanzania in achieving the Millennium Development Goals (MDGs), and subsequently the Sustainable Development Goals (SDG), for access to safe water, sanitation and a sustainable environment. For the SDGs this implies particularly addressing Goal 3: 'good health and well-being' and Goal 6: 'clean water and sanitation'. To provide the necessary foundation for success, Tanzania has implemented major reforms in the water and sanitation sector, including decentralization of service provision, full cost recovery and allowing an increasing role of the private sector. The MKUKUTA, the National Water Policy (NAWAPO), and the National Water Development Programme call for increased access to clean and safe water for both rural and urban population. The WSDP is now being implemented and will continue until 2025 with a pooled funding mechanism (basket) that has been established by the MoWI together with funding agencies, and to which water utilities and other WSS implementing entities can apply for funding.

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.

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.

Presently, the water utilities in Tanzania are categorized as follows:

- **Category A –** meet their annual recurrent expenses on salaries of staff, O&M as well as contribute to their annual development budget.
- **Category B –** meet costs of O&M except the salaries of the staff who are paid by Government.
- **Category C** – meet costs of O&M but receive Government subsidies to cover the salaries of staff, treatment chemicals and power costs.

MWAUWASA, the Project Beneficiary has been a Category A utility since 1998.

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 the 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.

MWAUWASA's service area covers the whole of Mwanza City and neighbouring areas of Magu District e.g. Kisesa. As such, the service area falls in the geographical jurisdiction areas of Mwanza City Council, Ilemela Municipal Council and Magu District Council. An assessment was carried out by COWI in 2016 to

assess the water supply service. It was found that the utility is unable to consistently attain satisfactory levels-of-service throughout the entire service area. The main causes were insufficient infrastructure due to limited investments, imbalance in the distribution system layout, unreliable power supply and sparse maintenance of existing facilities.

1.3 Project Benefits

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 100,000 people/households and industries in the wards of Igoma, Buswelu, Kishiri and Nyamhongolo. The works will result in increased health and economic benefits. In addition, the project will create jobs especially during the construction phase.

1.4 Project Funding and Cost

The proposed STIP works are part of the 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 total Project cost is estimated at EUR 104.5 million, including EUR 14.5 million provided by the Tanzanian government. The cost of the STIP works is estimated to amount to almost EUR 30 million, and is divided roughly equally divided between the water supply and the wastewater components.

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 organization or individual / developer identify critical social and environmental issues associated with a project, and ensure that positive impacts are optimized while negative impacts are minimized 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 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 requires mandatory EIA. Item 1 (ii) in the First Schedule of the Regulations compels to 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 Objectives of the ESIA Study

Mott MacDonald in association with UWP Consulting have been trusted with the responsibility to conduct the ESIA study for the proposed works. The overall objectives of the ESIA are to:

- Identify key environmental and social issues related to the proposed project, their impacts, and mitigation if negative.
- Compile an Environmental and Social Management Plan (ESMP) comprising notably environmental and social management measures as well as mechanisms for their implementation and its compliance monitoring in order to minimize the project's negative impacts and enhance the positive aspects.

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 report has been developed based on procedures set out in the National Environmental Management Act, 2004, and Environmental Impact Assessment and Audit Regulations No.349 of 2005, related to data collection and review and stakeholder's consultation, as follows:

- **Screening and Scoping –**The project has been screened as mandatorily requiring EIA. Scoping was carried out to identify issues and impacts that are likely to be important and their terms of reference have been established for EIA.
- **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 EIS Team with a view to appreciating the design concepts, project components and implementation schedule as well as associated experiences.
- **Consultation Meetings –** The consultation process with the stakeholders was conducted in detail including meetings with community members and ward leaders, Mwanza City Council, Ilemela Municipal Council and Magu District Council 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.
- **Document Review –** Relevant documents were reviewed for an understanding of the assignment 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 as well as the policy and legal documents.

- **Field Assessment –** The sites where the Water Treatment Plant, Transmission Mains, Sewerage Pipes and Waste Stabilization Ponds will be built are well identifiable on the ground enabling determination of the exact physical environmental and social features to be directly or indirectly affected. Inspection of the route of the transmission main was challenging as it is long and runs through difficult terrain including rocky hills, inhabited areas, farmland, swamps, etc. 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, potential PAPs. The team also visited existing water supply and sewerage works including the water treatment plant at Capri Point, wastewater stabilization ponds at Ilemela, and water reservoirs at Nyashana, Igoma, Kisesa, Bwiru (Figure 1-1).
- **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.
- **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.

Figure 1-1. Field inspections by ESIA Study Team

Inspecting Railway crossing point in Butimba

Inspecting transmission main route in Lwanhima Ward

Investigating alternative pipe route in Bugarika Ward

Site visit to site for Water Treatment Plant at Butimba

2 Project Description

2.1 Location and Accessibility

The project is sited in Mwanza City in two districts: Ilemela and Nyamagana (Figure 2-1). The MAWUWASA service area is depicted in Figure 2-2.

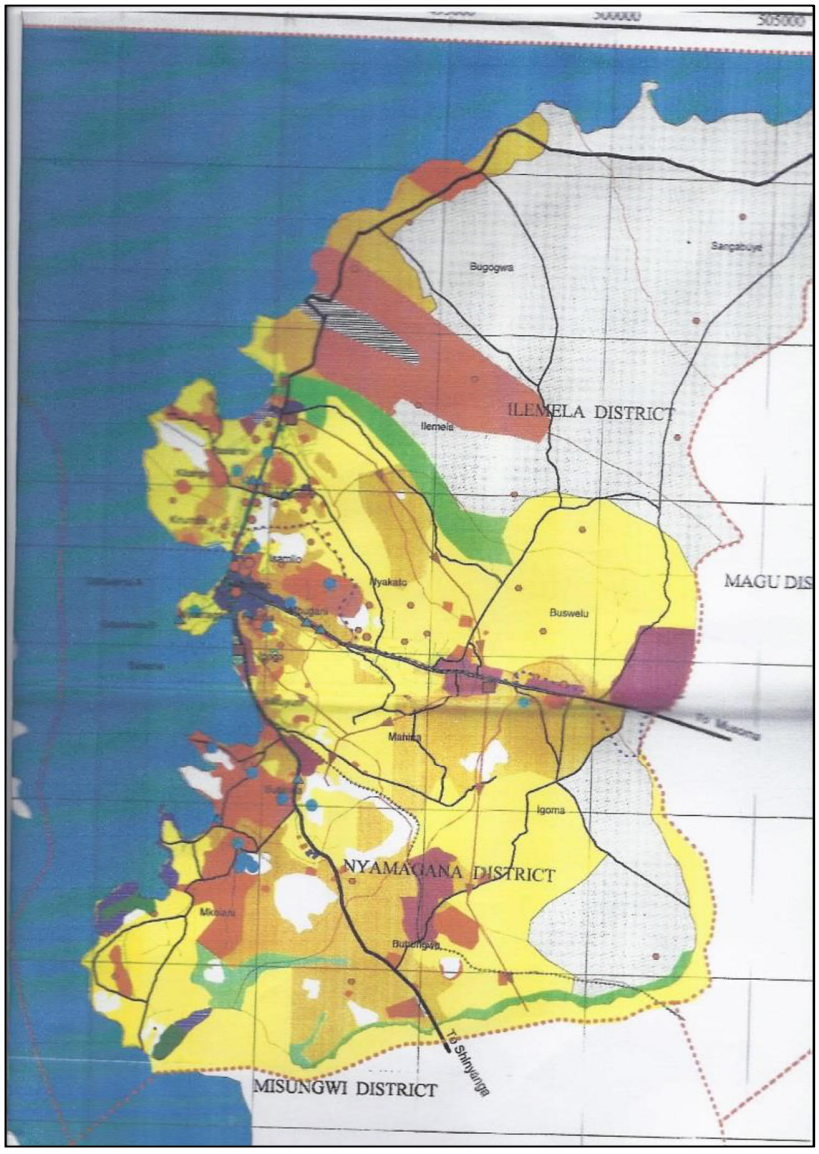

Figure 2-1. Project location

Source: COWI Project Brief, February 2015

Figure 2-2. MWAUWASA service area
Source: COWI Project Brief, February 2015

2.2 Site Description

Current zoning: Mwanza is zoned as an urban town with a mixture of residential, commercial, industrial and public space land uses.

Soils: The soils in the lake zone can be classified into three major groups: (i) sandy soils derived from granite; (ii) red loams derived from limestone; (iii) block clay soils.

Climate: Temperature and rainfall are influenced by proximity to Lake Victoria. Mwanza receives an annual average rainfall of 1,050 mm. Average daily temperature varies from 18°C in the cold season to 28°C in the hot season.

2.3 Existing Utility Infrastructure

2.3.1 Existing Water Supply Conditions

The main raw water intake from Lake Victoria and water treatment plant (WTP) are located at Capri Point in Mwanza City. There are two free standing reservoirs at the 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 WTP was first built in 2008. The plant produces between 63,000-96,000 m^3/day against a design capacity of 108,000 m^3/day. The current water demand is estimated as150,000 m^3/day. This 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 three (3) main booster stations, located in Mabatini, Bwiru and Nyegezi, and a smaller one (2^{nd} tier) at Kisesa. There are ten (10) active storage tanks with a capacity of 34,070 m^3. Current water supply coverage is given as 65%, with the number of metered customers standing at 453,000. Non-Revenue Water (NRW) is estimated at between 36-46%.

The *2040 Mwanza City Master Plan* (COWI, August 2016) targets increased development in 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 m^3/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.

2.3.2 Existing Wastewater Management Conditions

The existing sewerage system is designed as a separate system and has a total length of about 27.3 km consisting of PVC, concrete and steel (diameters DN150 to DN600)[1]. It serves only the central business quarter and some surrounding areas. All sewage flows by gravity through collection lines to the Central Pumping Station near the MWAUWASA Central Zone offices in the City Centre from where it is transferred via a transmission main (DN400 and DN750) to the existing wastewater treatment plant located at Butuja in Ilemela Municipality. The wastewater treatment plant is a stabilization pond system comprising of one (1) anaerobic pond, one (1) facultative pond and eight (8) maturation ponds operating in series. It was rehabilitated in 2003. The capacity of the plant is 7,000 m^3/day. The treated effluent is ultimately discharged into Lake Victoria.

2.3.3 Energy

Mwanza City is connected to the National Electricity Grid. Many households use electricity for lightning especially at night. The majority of households use charcoal and gas for cooking.

2.3.4 Transport and Communication

Mwanza City is accessible by air, road and water. Mwanza International Airport is served by Air Tanzania, Precision Air and Fast-jet. Charter flights services are also available. There is a good road network linking the neighbouring regions of Mara, Shinyanga, Bariadi and Geita which connect to other parts of Tanzania and neighbouring countries. Ship/boat services link to Musoma, Bukoba and islands in Lake Victoria. Telephone and email services are available from Vodacom, Airtel, Tanzania Telecommunication Company Limited (TTCL), Tigo and Zantel.

[1] DN – *diameter nominal*, internal bore diameter in mm of a (water) pipe.

2.4 Proposed STIP Development Components

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

2.4.1 Construction of Butimba Raw Water Intake and Pumping Station

This raw water intake facility and pumping station will be located close to the lake in a valley bottom marshland/wetland-like area surrounded by rocky hills (Figure 2-3). 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.

Fig 2-3 Site of Proposed Raw Water Intake at Butimba

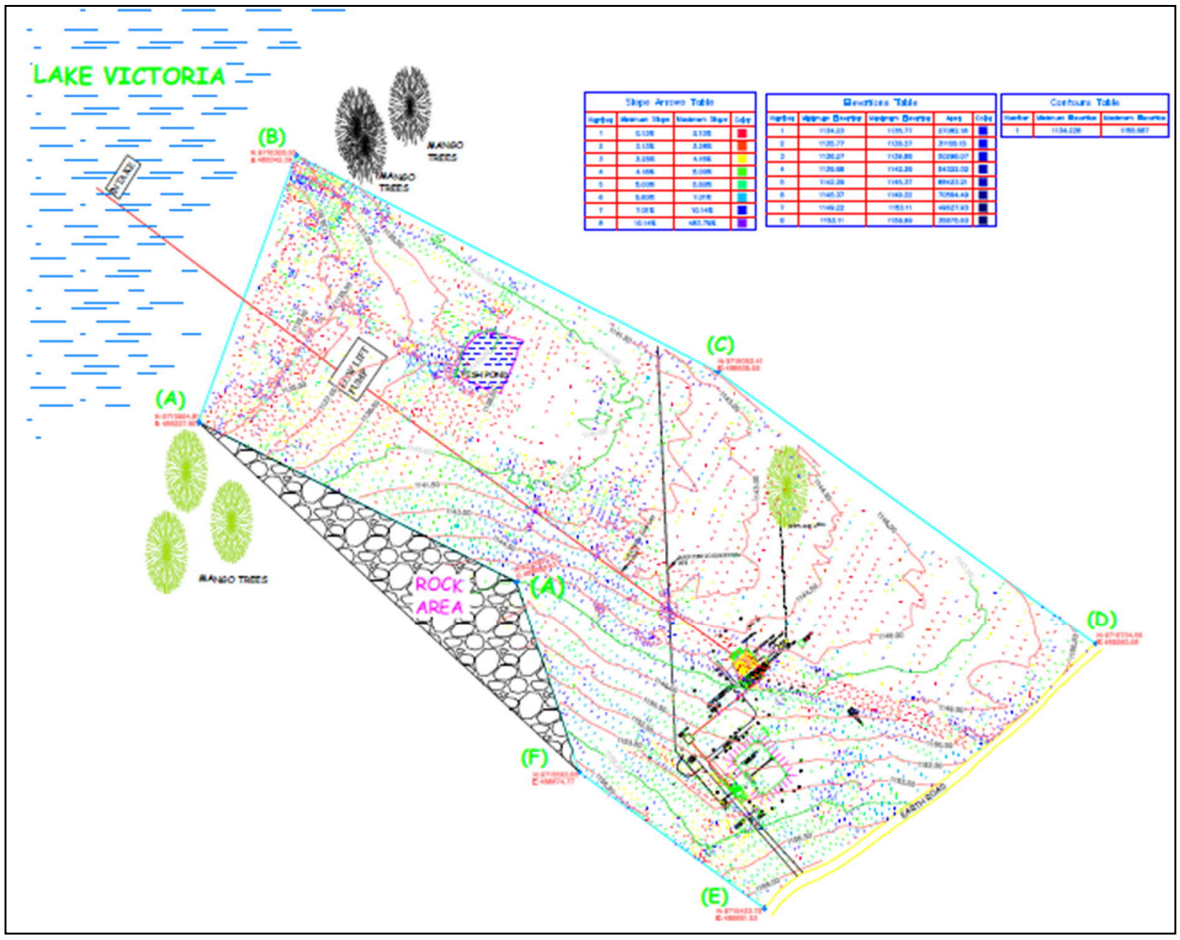

Figure 2-4. Proposed Layout of Butimba Raw Water Intake and Water Treatment Plant
Source: Egis eau Consultants, November 2017.

2.4.2 Construction of Butimba Water Treatment Plant (WTP)

The proposed design capacity is 40,000 m^3/day. The WTP site is located at the foot of the rocky hill that surrounds the area. The site is empty in terms of structures, covered by scattered bushes, thickets, *Cactus spp*. and *Senn spp*. and is currently used as a grazing/farming land. The proposed WTP is approximately 700 m from the lake/intake point within the same area owned by the Government (Butimba Prison). According to the agreed tendering procedure, the contract for the WTP will be "Design and Build" therefore details of the configuration and actual layout are not yet available.

2.4.3 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.

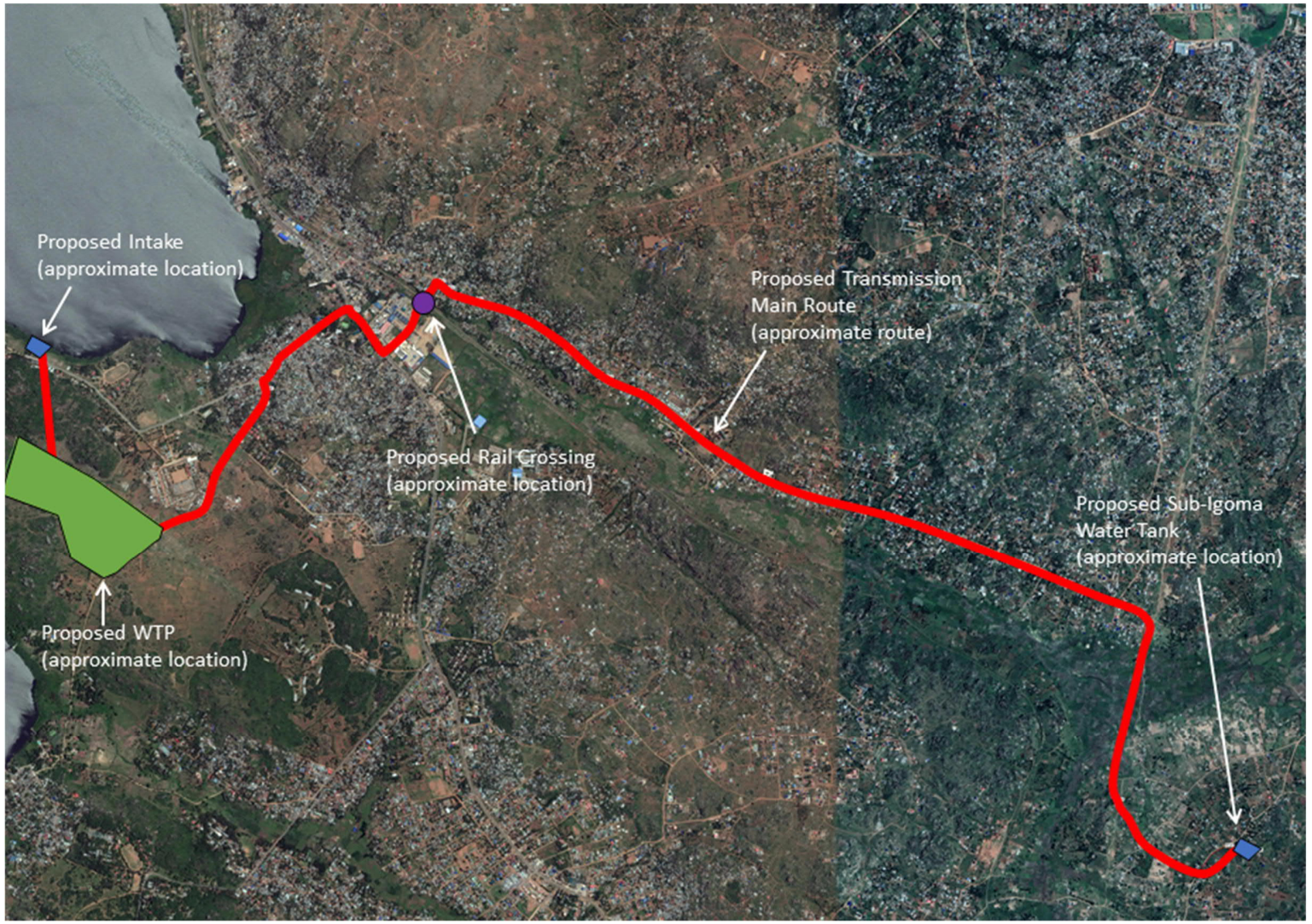

Figure 2-5 Route of transmission main from Butimba WTP to Sub-Igoma Reservoir

Source: Egis eau Consultants, March 2018

2.4.4 Construction of Sub-Igoma Reservoir and BPS at Sahwa, Lwanhima Ward

An area totalling approximately 1.65 ha is being 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 includes the smaller area of 1.16 ha. which had been earmarked earlier. An access road is in place but requires rehabilitation.

2.4.5 Installation of Transmission Main Sub-Igoma BPS to Igoma Existing Reservoir

Approximately 5.5 km of transmission mains will be 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 roads reserve. In some sections, the pipeline crosses rocky hills, farmlands, properties and crosses several local roads, streams and footpaths, and a graveyard.

2.4.6 Disconnection and Reconnection of Igoma Existing Reservoir

The reservoir has a capacity of approximately 4,800 m^3 and will receive water from 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 as outlet from the reservoir) and connection of the new transmission main from Sub-Igoma BPS (new inlet to the reservoir).

2.4.7 Distribution Main

A distribution main will be installed to augment water supply to areas traversed by the transmission main in 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 minimise damage to property.

2.4.8 Sanitation

The sanitation/wastewater works will comprise of sewerage network and a waste water treatment plant.

The sewerage network will be constructed to cover households in five wards i.e. Igoma, Kishiri, Nyamhongolo, Buswelu and Nyakato as shown on figure below. Wastewater from institutions and industries in those wards will also be collected. The total length of the sewerage network will be approximately 30 km, with an estimated 14,000 connections.

Proposed Sewerage Network

Figure 2-6 Proposed Sewerage Network
Source: Egis eau Consultants, November 2017.

The WWTP will have a capacity of 12,500 m^3/day.

The first phase of the plant, included in the STIP projects was determined to be designed for a capacity of 12,500 m^3/day, which will be sufficient to cover the load up to 2025 depending on how soon the sewer network will be expanded from what is installed under the STIP contract.

A total of eleven (11) ponds will be built, comprising of four (4) anaerobic, four (4) facultative and four (3) maturation ponds.

The total retention time will be around 20 days and it is expected that Helminth eggs will be reduced by more than 99 % and that the E coli content in the effluent will be less than 100 counts/100 ml, assuming $5x10^7$ counts/100 ml in the raw wastewater. Pond technology is not applicable to the nitrification of ammonia (NH3) to nitrate (NO3), which is a prerequisite for biological nitrogen removal, i.e. the occurrence of nitrification and nitrogen removal is not likely(COWI 2017), hence these nutrients will remain. A buffer zone of 100m is being allowed for in the design and land acquisition provision. The buffer zone will have a garden with trees planted.

The detailed WWTP design parameters are given in Appendix 7.

Most sludge is generated in the anaerobic ponds and they will need de-sludging when they are about 1/3 full. The subsequently facultative and maturation ponds may not or only rarely need emptying of sludge.

Sludge shall be removed in the dry season and dewatered on sludge drying beds. Reject water is returned by gravity to the anaerobic ponds. The dewatering cycle is about 20 days and hereafter the dewatered sludge shall be removed from the sludge drying beds and disposed of.

The proposed site for the Wastewater Treatment Plant (WWTP) is in the Nyamhongolo area, in Igoma Ward, along the Mwanza-Musoma Highway. The land acquisition process is in progress. The proposed site is in a designated industrial area, but it is currently used as farmland and livestock-fattening area, with a few building inside the designated area. There are housing estates/settlements which are located approximately 150 meters from the site. The proposed layout map of the plant is shown in figure below.

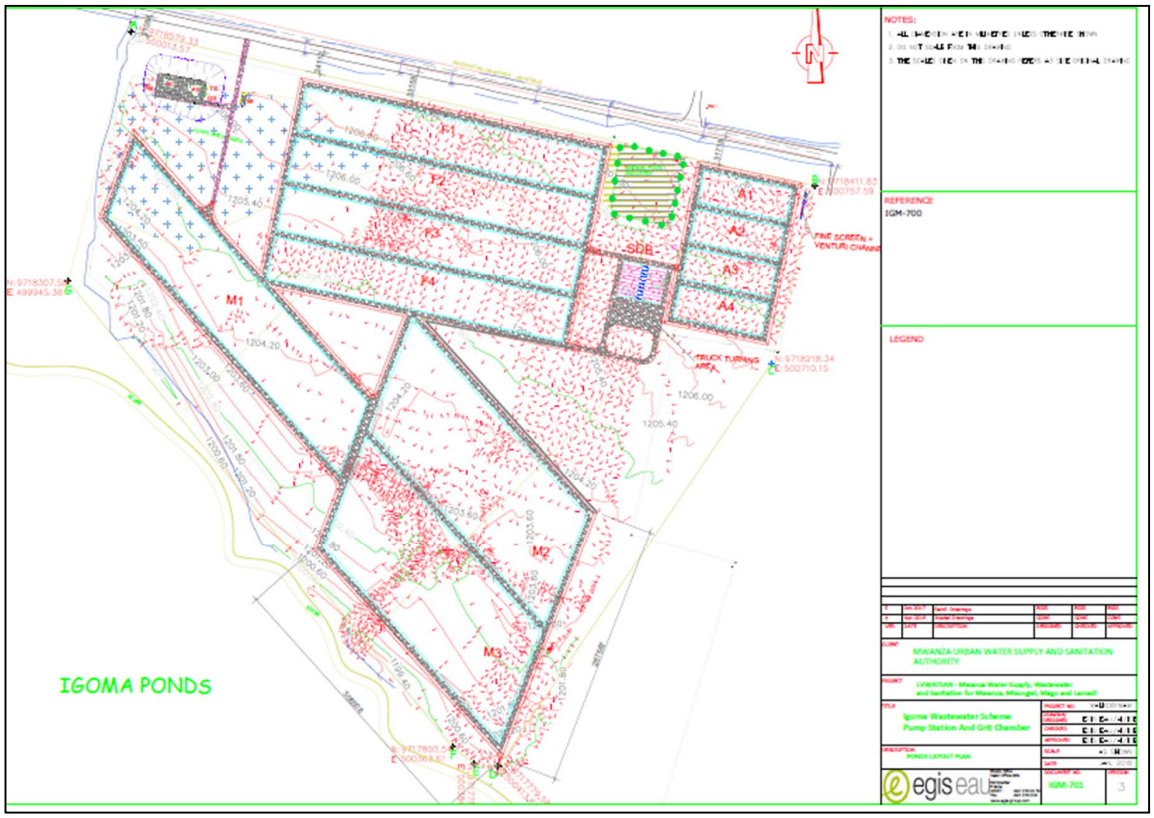

Figure 2-7. Proposed lay-out of Wastewater Treatment Plant

Source: Egis eau Consultants, November 2017.

Consultations are being held regarding the viability of an alternative site located at Kanyama Village in Bujora Ward, Magu District, some 2 kilometers from Nyamhongolo following the high cost of compensation on the existing location.. The environmental conditions at this site are quite similar to the Nyamhongolo site but acquisition of the site would be cheaper in terms of resettlement/compensation costs. The final decision will be made by the Proponent/Government in consultation with the Project Lenders.

	
WWTP Site at Nyamhongolo	Alternative WWTP Site at Kanyama Village

2.5 Project Activities

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

2.5.1 Pre-Construction

Activities to be undertaken during pre-construction phase include:

- Site mobilization
- Clearing of the site areas required, levelling, excavation, etc
- Demarcation of any access/service roads
- Mobilization of construction materials, equipment and machinery

2.5.2 Construction

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

- Clearing of the site areas required, levelling, excavation, etc;
- Demarcation/construction of any access/service roads
- Transportation of construction materials such as sand, aggregates, cement, water pipes, waste water pipes, timber, and roofing materials. The actual quantities will be known after preparation of the tender documents (BOQs). Sand and aggregates will be sourced from approved quarries in the vicinity of Mwanza City. Other materials will be obtained from suppliers in Dar es Salaam or elsewhere depending on availability/price.
- Construction of the works - intake, water treatment plant, transmission main, sewerage network and the wastewater treatment plant.

2.5.3 Operation

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:

- Normal running of the facilities to provide necessary services as per design
- 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 wastes produced during the operation of the water treatment plant and wastewater treatment plant.

2.5.4 Decommissioning

The anticipated design period for the structures to be constructed is 25 years. Proper decommissioning plans will be required after the design period. This is elaborated in Chapter 10.

2.6 Waste Generation

2.6.1 Waste during construction

Major wastes streams likely to be generated will be associated with the construction activities. These include:

- Spoil soils resulting from earthworks during construction

- Wood and metal scraps
- Packaging such as plastics, oil containers, cans, boxes, etc.
- Liquid wastes (domestic)
- General refuse such as food scraps

The solid wastes will be disposed of at the Mwanza City solid waste dump currently located in Buhongwa Ward, in accordance with standing regulations. The liquid wastes from the different construction sites will be disposed through on-site septic tank systems at each site.

2.6 2 Sludge waste during operation of the Water Treatment Plant

- The Water Treatment Plant component will be a 'design and build' contract, and as such, the key design and construction features are not yet established. However, it is expected that the processes will result in sludge production during backwash water from sand filters, mainly composed of mineral matter (hydroxides).
- Sludge Drying Beds will be used to store and dry the sludge as 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 which will be incorporated in the design. Ultimately, they will be disposed of at Buhongwa Solid Waste Dump after the sludge beds are full.

2.7 Implementation

Construction of the works is currently expected to start in October 2018 and to be completed in November 2020 including a 12-months defects liability period as in table below.

Table 2-1. STIP works implementation programme

	Task	Start Date	Duration	Completion Date
1.	Construction of Butimba WTP	24 Oct 2018	24 months	09 Nov 2020
2.	Construction of Transmission Main and Sub-Igoma Reservoir	25 Oct 2018	24 months	05 Nov 2020
3	Construction of Sewerage System	25 Oct 2018	24 months	05 Nov 2020

3 Policy, Legal and Administrative Framework

This Chapter presents the policies, legal framework and institutions that are or may be relevant to the preparation of the ESIA for the STIP Works under LVWATSAN Project.

3.1 Overview of Vision 2025

Tanzania's Development Vision 2025 was promulgated in 1999 and envisions that Tanzania will be transformed into a middle income country by the year 2025. The Vision 2025 aims at achieving a high-quality livelihood for Tanzania's people, attaining good governance through the value of law and to develop a strong and competitive economy. By this milestone, the economy will have been transformed from a low productivity agricultural economy to a semi-industrialized one led by modernized and highly productive agricultural activities which are effectively integrated and buttressed by supportive industrial and service activities in the rural and urban areas. Consistent with this vision, the Tanzania of 2025 should be a nation imbued with five main attributes - high quality livelihood; peace, stability and unity; good governance; a well educated and learning society; and a competitive economy capable of producing sustainable growth and shared benefits.

Water is considered a key factor in the socio-economic development and the fight against poverty in Tanzania just like in other countries. Deliberate efforts are therefore needed in the management of the water resources to sustain the desired pattern of growth and consumption, and to ensure that all the socio-economic activities maximize their capacities, as articulated in the Vision 2025.

3.2 National Policies

The government has been developing and reviewing national policies to address environmental management in various sectors. The aim these policies is to provide guidance towards regulated development in different sectors. National policies that address environmental management relevant to this project include those summarized in Table 3-1 below.

Table 3-1. National Policies addressing environmental management relevant to the Project

SN	Policy	Year
1.	National Environmental Policy	1997
2.	National Water Policy	2002
3.	National Land Policy	1995 (revised 1997)
4.	Community Development Policy	1996
6.	National Gender Policy	2002
7.	National Policy on HIV/AIDS	2001
8.	National Employment Policy	1997
9.	National Cultural Policy	1997
10.	Forest Policy	1998

3.2.1 National Environmental Policy of 1997

The National Environmental Policy elaborates on the importance of EIA in the implementation of various development activities. NEP. Paragraph 64 states that “it is a context of an EIA regime that policy guidance on choice to maximize long-term benefits of the development and environmental objectives can be revealed and decided upon’’. On public consultation the policy on Paragraph 66 states that: “One of the cornerstones of the EIA process will be the institutions of public consultations and public hearing in EIA procedures”. In this context, the project proponent has observed the requirements of this policy: stakeholder’ consultative meetings have been conducted concerning the proposed works during project awareness and sensitization done by UN-Habitat as well as consultation done by ESIA team.

3.2.2 National Water Policy of 2002

The National Water Policy (NAWAPO) directs adoption of a holistic basin approach that integrates multi-sectoral and multi-objective planning and management that minimizes negative impacts on water resources development so as to ensure sustainability and protection of the resource and its environment. The Policy underscores the importance of a holistic approach by stating that “all water abstractions and effluents discharges into water bodies shall be subjected to a water use permit or discharge permit to be issued only for a determined beneficial use and for a specified period of time. On issues of urban water supply and sewerage, the policy goal is to have wastewater treatment systems which are environmentally friendly. Accordingly, the Project Proponent will seek to ensure that domestic and industrial wastewater is not haphazardly discharged by constructing proper waste water treatment facilities, as well as ensuring proper disposal of sludge from the water treatment plant. The Proponent will apply for water use permits for the new raw water intake and for waste water effluent discharge permit as required.

3.2.3 National Land Policy of 1995, revised in 1997

This Policy advocates for equitable distribution and access to land by all citizens. It aims to ensure that existing land rights including customary right of the smallholders (i.e. peasants and herdsman who form a majority of the country’s population) are recognized and clarified to promote rapid social and economic development of the country and secured by the law. The Policy recognizes the need of protecting environmentally sensitive areas, and emphasizes on protecting of 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, and the need for conservation and preservation of prehistoric/historic sites and buildings. The Proponent will adhere to the requirements of this Policy in planning and implementing the proposed STIP works.

3.2.4 Community Development Policy of 1996

One of the key 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. The proposed STIP works are in line with this Policy as they will contribute to the realization of a clean and healthy environment in Mwanza City and its environs. In addition, the Proponent will work with other stakeholders to carry out community sensitization programmes relating to provision of water and wastewater services.

3.2.5 National Gender Policy of 2002

The key objective of this policy is to provide directives and guidelines that will ensure that gender sensitive plans and strategies are developed in all sectors and institutions. While the policy aims at

establishing the strategies to eradicate poverty, it puts emphasis on gender equality and equal opportunity of both men and women to participate in development undertakings and to value the roles played by each member of the society. This Project will implement the Policy by ensuring equal employment opportunities during the project cycle. The measures undertaken by the Proponent will also be in line with the Women and Gender Development Policy of 2000 whose overall objective is to promote gender equality and equal participation of men and women in economic, cultural and political matters. During project implementation the Proponent will seek to promote fair opportunities for both women and men.

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 of 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 will work with the Contractors and other stakeholders to carry out sensitization activities on HIV/AIDS for employees/labourers during different project phases. These efforts will be made under the overall umbrella of the National Health Policy of 2003, underpinned by the Public Health Act. No.1 of 2009.

3.2.7 National Employment Policy of 1997

The aim of this Policy is to provide strategies for employment creation and sustainability. In line with this Policy, the Proponent will collaborate with the project contractors to provide employment opportunities for local residents during project implementation. The Project will provide good employment opportunities for skilled and semi-skilled and unskilled workers. On a long-term basis, the Project will contribute to transfer of skills and technology to local residents and others who will be employed so that after their contract terms they can engage in self-employment.

3.2.8 Cultural Policy of 1997

This Policy covers a wide range of issues relating to both living cultural heritage and historical and archaeological remains, which is termed as “cultural property”. The Policy requires that “all land development shall be preceded by Cultural Resource Impact Studies”. Within the STIP works area, no major cultural or historical sites are known to be present in any of the proposed project intervention sites based on the previous studies. The Proponent will provide directions to Contractors to adhere to the requirements of this Policy in case historical or cultural sites including graves are found, and take appropriate measures with the involvement of local leaders and other municipal/city conservation authorities as appropriate.

3.2.9 Forest Policy of 1998

The aim of the policy is to enhance the contribution of the forest sector to the sustainable development of Tanzania and the conservation and management of natural resources for the benefit of present and future generations. This goal is to be realized through effective management of forest area, conservation of forest biodiversity, water catchments and soil fertility, and enhancing national capacity to manage and develop the forest sector in collaboration with other stakeholders. The policy provides the foundation, together with the Forest Act (2002) for Participatory Forest Management and encourages community and private sector involvement in forest management through village land forest reserves, individual, group and community forests. The Proponent will participate in activities for conservation of the water intake

area at Butimba and conservation of Nyashishi River which will receive the effluent discharged from the WWTP.

3.3 Legal Framework

A number of Laws have been enacted to provide a legal basis for implementation of the national policies as shown in Table 3-2 below.

Table 3-2. National laws addressing environmental management relevant to the project

SN	Legislation
1.	Environmental Management Act No. 20 of 2004
2.	Land Act No. 4 of 1999
3.	Village Land Act, Cap 114 – No. 5 of 1999
4.	Land Acquisition Act, Cap 118 R.E. of 2002
5.	Land Use Planning Act – No. 6 of 2007
6.	Urban Planning Act No. 8 of 2007
7.	Occupational Health and Safety Act No. 5 of 2003
8.	Workers Compensation Act No. 20 of 2008
9.	Public Health Act No. 1 of 2009
10.	Employment and Labour Relations Act No. 6 of 2004
11.	Engineers Registration Act No. 15 of 1997 and Amendment Act No. 24 of 2007
12.	Contractors Registration Act No. 17 of 1997
13.	Architects and Quantity Surveyors (Registration) Act No. 16 of 1997
14.	Local Government (District) Authorities Act – No. 7 of 1982
15.	Energy and Water Utilities Regulatory Authority (EWURA) Act, Cap 414 of 2006
16.	Water Resources Management Act No.11 of 2009
17.	Water Supply and Sanitation Act No. 12 of 2009

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. The Proponent will ensure that planning, construction and operation of the STIP works conforms to the requirements of the Act.

3.3.2 Land Act No. 4 of 1999

The Act covers land-use planning processes and land-use management and guidance to land ownership in Tanzania, which are of primary importance to LVWATSAN Project. The law vests all land in the President in trust for all citizens. The law recognizes the value attached to any piece of land and as such any land rights transfer is subject to compensation. The President is empowered to revoke the Right of Occupancy of any landholder for the public or national interest shall the need arises. The Proponent will work with all key stakeholders to ensure that processes of land acquisition and compensation are followed in line with the requirements of the Act, in conjunction with other relevant legislation.

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. The Proponent will ensure that project activities on village land will adhere to the requirements of this Act.

3.3.4 Land Acquisition Act, Cap. 118 of 2002

This Act among other things specifies 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 also defines the requirements for and restrictions on compensation. The acquisition of the land for public use is within the provision of this Act. The Proponent will initiate and implement processes for valuation, compensation and acquisition of the land required for the proposed project works in accordance with the requirements of this Act.

3.3.5 Land Use Planning Act – No. 6 of 2007

This Act, among other provisions, specifies standards, norms and criteria for the protection of beneficial uses and the maintenance of the quality of the land. It also 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 encourage development of technology to prevent, or minimize adverse effects that endanger human health and welfare. The Proponent will be guided by the provisions and recommendations of the Act in relation to use of project technology.

3.3.6 Urban Planning Act No. 8 of 2007

This Act provides procedures for the preparation, administration and enforcement of land use plans in urban areas. The Act further provides for the protection of buildings or groups of buildings of special architectural or historic interest. In so far as the proposed works will be constructed in the environs of Mwanza City, the Proponent will take necessary steps to adhere to the requirements of this Act.

3.3.7 Occupational Health and Safety Act No. 5 of 2003

This Act gives provisions for the protection of workers from occupational hazards, as well as 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 applies to pre-construction, construction as well as operation stages of the Project. The Proponent will adhere to the requirements of the Act, including provision of safety gears to workers and visitors, provision of supply of clean and safe water to workers, sanitary convenience, washing facilities and first aid facilities, and fire prevention issues.

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. The Act requires that all employees be registered with the Fund. The Proponent will adhere to the requirements of the Act, and will strongly advise Contractors and any other service providers for the Project to comply with the requirements as well.

3.3.9 Public Health Act No. 1 of 2009

This Act provides for the promotion, conservation and maintenance of public health with a view of ensuring sustainable public health services. The Act also prohibits discharges into a sewer or into drains that may cause malfunctioning of drainage systems. The Proponent will ensure that any negative project

impacts are properly mitigated in accordance with this Act, the National Environmental Management Act, and other relevant legislation.

3.3.10 Employment and Labour Relations Act No. 6 of 2004

This Act gives provides for safeguarding of core labour rights; establishes basic employment standards; provides a framework for collective bargaining; and provides for the prevention and settlement of disputes. The Proponent will seek to ensure that the Contractors adhere to the requirements of the Act and other labour requirements.

3.3.11 Engineers Registration Act No. 15 of 1997 and Amendment Act No. 24 of 2007

These Acts together regulate the engineering practice in Tanzania by providing for registration of engineers and monitoring their conduct. The legislation establishes the Engineering Registration Board (ERB) and requires any foreign engineer to register with ERB before practicing in the country. The Proponent will ensure that both local and foreign engineers who will be engaged in this Project abide with these requirements.

3.3.12 Contractors Registration Act No. 17 of 1997

This Act requires contractors to be registered by the Contractor Board (CRB) before engaging in practice. It requires foreign contractors to be registered by the Board before gaining contracts in Tanzania. The Proponent will comply with this law requirement during the recruitment of contractors for project implementation by engaging registered contractors or sub-contractors only.

3.3.13 Architects and Quantity Surveyors (Registration) Act No. 16 of 1997

This Act requires architects and quantity surveyors (QS) to be registered with the Board of Architects and Quantity Surveyors before practicing, whether local or foreign. The Proponent is committed to ensuring that the construction work is to be contracted to registered Architects and Quantity Surveyors.

3.3.14 Local Government (District) Authorities Act – No. 7 of 1982

This Act provides for the protection and management of the environment on the part of the District Council. District Councils are required to take the necessary measures to control soil erosion and desertification; to regulate the use of poisonous and noxious plants, drugs or poison; regulate and control the number of livestock; maintain forests; manage wildlife; ensure public health; provide effective solid and liquid waste management protect open spaces and parks etc. Since the project will be implemented in area of jurisdiction of Mwanza City Council, Ilemela Municipal Council and Magu District Council, the Proponent will work with these authorities to ensure that the land is well protected and the environment is well-managed as required by this Act.

3.3.15 Energy and Water Utilities Regulatory Authority (EWURA) Act, Cap 414 of 2006

This Act spells out EWURA's duties and functions, and covers the electricity, petroleum, and natural gas and water sectors. Role and functions are further specified in various regulator tools, e.g. registration, regulations, rules, licenses, contracts etc. In addition to technical and economic regulation, EWURA's responsibilities also include promoting/monitoring competition in the sectors. The proposed STIP works will improve the Proponent's (i.e. MWAUWASA) water and sanitation services coverage. MWAUWASA will continue to follow this Act while discharging its functions.

3.3.16 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; and provides for participation of stakeholders and the general public in implementation of the National Water Policy.

The Proponent will abide with the requirements of the Act while utilizing the water from Lake Victoria and also while eventually discharging treated waste water back to the lake or streams. The Proponent will accordingly apply for the necessary water use permit and wastewater discharge permit in relation to the STIP works.

3.3.17 The Water Supply and Sanitation Act No. 12 of 2009

This Act provides for sustainable management and adequate operation and transparent regulation of water supply and sanitation services with a view to give effect to the National Water Policy, 2002. It also provides for the establishment of water supply and sanitation authorities as well as community owned water supply organizations, appointment of service providers, and related matters. The Act states obligations of water supply and sanitation authorities to provide water supply and sanitation services, indicates their functions, powers and duties.

The relevant Water Supply Regulations were promulgated in 2013. The Proponent will adhere to the stipulations of this Act and the Water Supply regulations in the course of operating the completed project works so as to maximize benefit to the project beneficiaries.

3.4 Relevant Regulations and Guidelines

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

The Regulations provide guidelines and procedures for undertaking Environmental Impact Assessment and Environmental Audits. 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 is the minister responsible for 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 corrected accordingly.

The Regulations further provide for periodic reviews and alterations of environmental management plans as necessary, ensuring that environmental management is optimized at all stages of projects through best practices. Policies and laws that relate to EIA aim at promoting sound environmental management.

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. This EIS has been prepared in cognisance of the Regulations, and the Proponent is committed to adhering to all other requirements of the Regulations while implementing the ESMP.

3.4.2 Environmental (Registration of Environmental Experts) Regulations of 2005 GN 348/2005

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's 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, advice NEMC on matters regarding registration, practice and conduct of environmental impact assessors.

The Proponent has utilized registered EIA Experts to prepare the EIS and will adhere to the regulations when it is time to undertake the Environmental Audit.

3.4.3 Other National Environmental Regulations and Standards

NEMC and Tanzania Bureau of Standards (TBS) have published other regulations and standards which are of relevance to the STIP Works. The list includes the following:

- 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 845: 2005 – Air Quality Specification (Environmental Quality Standard)
- TZS 845: 2006 Air Quality Specification
- TZS 932:2006 General Tolerance Limits for Environmental Noise.

3.4.4 Land (Forms) Regulation of 2001

The Land Regulations were made under section 179 of the Land Act 1999, and provide all specific forms required for Management and Administration, Granted Right of Occupancy, Mortgage, Lease, Easement, Co-occupancy and others including compensation forms (Forms 69 and 70). These will be adhered to by the Proponent in the course of acquiring private land for the works especially Booster Pump Station and WWTP.

3.5 International Conventions

Tanzania has signed and ratified four major international conventions related to the Environment namely:

- United Nations Convention to Combat Desertification and Drought (UNCCD)
- United Nations Framework Convention on Climate Change (UNFCCC)
- RAMSAR Wetlands Convention
- Convention on Biological Diversity (CBD)

The Project Proponent will seek to adhere to the principles and requirements of these international conventions as applicable with support and collaboration of other stakeholders including MOWI, NEMC, and LVBWB.

3.6 Institutional Framework for Management of the Environment

3.6.1 Central Government Agencies

At the national level, the institutional and legal framework for sustainable management and development of water resources and wastewater treatment falls under the Ministry of Water and Irrigation. The ministry issues policy guidance and provides legal frameworks, water user permits, 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. Other units include the National Water Board and Basin Water Boards and catchment and Sub-Catchment

Water Committees. The STIP Works under LVWATSAN Project fall within the jurisdiction of Lake Victoria Basin Water Board.

The Minister responsible for Environment (VP Office) is the overall responsible for all matters relating to environment, responsible for all policy matters, necessary for the promotion, protection, and sustainable management of Environment in Tanzania. The Director of Environment coordinates various environmental management activities being undertaken by other agencies and promotes the integration of environment consideration into policies, plans and programmes, strategies and projects. EMA Cap 191 gives NEMC the overall responsibility of undertaking enforcement, compliance, review and monitoring of Environmental Impact Assessment.

- 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.

3.6.2 Regional and District Administrative Structures

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.

3.7 Role of European Investment Bank

The European Investment Bank, being the European Union's long-term lending institution, is one of the STIP Works project financiers, along with AFD and Government of the United Republic of Tanzania.

Environmental protection and improvement, and benefits to people's welfare form key operational priorities for the European Investment Bank. 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 3-3).

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 3-3. 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	2013
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

Environmental considerations are taken into account at all stages of the project cycle. In the case of co-financing with other institutions, the EIB may agree to apply the environmental standards of the co-financing institution, where these are comparable to EU standards, in the light of local conditions. However, the EIB will always carry out its own independent assessment.

The EIB's environmental safeguard measures include that:

- The Bank's approach to financing projects is based on the precautionary principle, preventative action rather than curative treatment should be taken, environmental damage should be rectified at source and the polluter should pay, according to the Treaty Establishing the European Community;
- All projects financed by the Bank are the subject of an Environmental Assessment (EA), normally carried out by its own staff, but if by others according to the requirements of the Bank.

For this purpose, projects are screened into four categories, based on the guidelines of the EU Environmental Impact Assessment (EIA) Directive:

Category A Those for which an EIA is mandatory (Annex 1 of the Directive);

Category B Those for which the competent authority determines the need for an EIA according to specified criteria (Annex II of the Directive, with ref. to Annex III);

Category C For which a limited environmental assessment, if any, is required according to any likely adverse environmental impacts of the project (projects outside the scope of the Directive);

Category D No environmental assessment required.

All projects financed by the EIB are screened according to potential impacts on nature conservation sites. Where the impacts are expected to be significant, a special biodiversity assessment is carried out.

The main responsibility for scrutinizing the environmental aspects of projects lies with the Bank's Projects Directorate, who undertake the environmental assessment of projects at the EIB. However, environmental management is further reinforced by a number of dedicated support units to provide direction and advice on the Bank's environmental policy, ensure a consistently high quality of assessment, improve awareness and create stronger capacity for external dialogue with relevant third parties.

EIB's Environmental and Social Handbook (2013) provides generic guidance on performing EIA, and specific information on, among others, involuntary resettlement stakeholder engagement, and objectives and structure of an Environmental and Social Management Plan (ESMP).

EIB therefore closely monitors and advises LVWATSAN Project Mwanza on the environmental and social issues of the Project, based on its own environmental and social safeguard policies and those of Tanzania.

4 Baseline / Existing Conditions

4.1 General

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) and are presented in a field screening matrix presented in Table 6-1. This matrix 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 environmental legislation requirements, EU's EIA Directives and EIB's Environmental and Social Safeguards.

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

4.2 Physical Environment

4.2.1 Climate

The average annual rainfall of area is about 700 to 1050 mm. Under normal conditions the rainfall is distributed mainly during two periods, namely the short rains in October-December and the long rains from March to May. There is a dry spell from January to March and frequently these rains are of an erratic pattern. Farmers respond to this situation by staggered planting of crops over a period of many weeks. The rain tends to fall in localized storms rather than in a generalized downpour and so may be unevenly distributed in quite a small area. Water erosion tends to increase with the length of the dry season and the weaker vegetation cover.

4.2.2 Topography and Soils

The districts where project will be located areas are generally on sloping, rocky terrain, and have sandy loamy soils that are well-drained; other areas have red loams derived from limestone and block clay soils. The first group has moderate natural fertility and steadily deteriorates under conditions of continuous cultivation. The second and the third groups of soils are higher agricultural potential but tend to be found in areas of low rainfall.

4.2.3 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). The water table is generally between 1.5-2.5m.

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 is comprised of savannah, forests and wetlands.

4.2.4 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 4-1. Comparison of Key Water Quality Measurements at Butimba Intake Site with TBS and WHO Drinking Water Standards

	Parameters at Butimba Raw Water Intake Site (2015)	**TBS Standards**	**WHO**
Turbidity (NTU)	*3.6*		0.5
Ph	*8.4*	6.5 – 8.5	
E. Coli	*100*	2	0
TDS (mg/l)	*46.8*	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

Source: COWI (2015) and WHO (2017)

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.

4.2.5 Noise Emission

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

4.3 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.

Figure 4-1. Typical vegetation at Butimba Water Treatment Plant site

4.4 Socio-economic Environment

4.4.1 Introduction

Mwanza town was founded in 1892 as a regional Administration and Commercial Centre to control export production of the cotton growing areas in the Lake Victoria Zone. In 1978 Mwanza obtained the status of Municipality in line with the local government structure established in 1972. In 2000, Mwanza was further promoted to a City status. Mwanza City is popularly known as the 'rock city' due to the Bismarck rocks protruding from the depths of Lake Victoria which comprises some of its landmass.

Mwanza is a hub of commerce, transport, regional cooperation and economic development in the lake zone. Mwanza City / Region is a business gateway for neighbouring countries of Uganda, Kenya, Rwanda, Burundi and Democratic Republic of Congo. The per capita income of Mwanza residents stands at an average of USD 21 per month.

Administratively, Mwanza City is comprised of two Districts, namely Nyamagana and Ilemela. There are also two Divisions and a total of 21 Wards.

4.4.2 Population

According to 2012 national census population of Mwanza City was approximately 706,000 persons. The annual natural growth rate of 3.2% and the population density is 134 people/km^2, being the second largest city in the country, after Dar es Salaam.

4.4.3 Employment

Most Mwanza people are self-employed. According to the 1998 Mwanza Environmental profile report, 4% of people were self-employed, 32% were employed and 27% were unemployed. Most of the employed people work in the service sector, while those who are self-employed involved in petty trade, land tilling, micro-fishing activities, etc.

4.4.4 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 characterised 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.

4.4.5 Health Services

Mwanza City has good health facilities such as Bugando Medical Centre, Sekou Toure Regional Referral Hospital, Hindu Union Hospital, Mwananchi Hospital and the Aga Khan Health Centre. There are government health centres / dispensaries in all wards, plus several privately-owned health facilities.

4.4.6 Water and waste-water management services

Water and sewerage services are provided by MWAUWASA. The existing water treatment plant located at Capri Point produces between 63,000-96,000 m^3/day. The water supply coverage rate is 65%. The central sewerage system covers only the central part of the City Centre and a few neighbourhoods such as Kirumba and Pasiansi. The wastewater treatment plant located in Ilemela Municipality has a capacity of 7000 m3/day.

4.4.7 Education

MWANZA City is endowed with many educational facilities such as primary schools, secondary schools and vocational training centres, 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.

4.4.8 Agriculture

Agriculture remains the backbone of the region's economy and contributes largely to employment levels raw materials, food and exports. Smallholder farmers responsible for 90% of all farm produce underutilize arable land, as production systems remain archaic in tillage, storage and processing. Major food crops in the region are maize, cassava, sorghum, millet, sweet potatoes and legumes (beans/peas). Maize and root tube crops of cassava and sweet potatoes constitute about 71% of all food crops grown in the region. It is estimated that only 29% of the irrigable land area of 1,430 ha of Nyamagana and Ilemela Districts is under irrigation, indicating a sizable potential for further agricultural development.

Livestock keeping and business are important socially/economically in Mwanza City, and Mwanza Region. Major livestock includes cattle, goats and sheep. Cattle account for about 67% of the total livestock production. Livestock business is mostly done on live animals, hides and skins.

4.4.9 Cross Border Trade

Mwanza Region is a business gateway for neighbouring countries of Uganda, Kenya, Rwanda, Burundi and Democratic Republic of Congo. Taking advantages 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.

4.4.10 Industries

There are over 60 major industries in Mwanza including fish processing plants, cotton seed oil industries, manufacture of beverages, confectioneries; ginneries; foam and plastic industries; soap factories and animal feeds processing. The fishing industry is one of the major contributors to Mwanza City's economy, as well as that of the country.

4.4.11 Informal Sector

The informal business sector is quite extensive in Mwanza like in many parts of Tanzania, and employs a large number of people. These include selling old clothes, vegetables (at open spaces), carpentry, selling small items like cosmetics, shoes, etc.

4.4.12 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 a few high-class hotels such as 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.

4.4.13 Communication and Transport

Mwanza City is served with relatively satisfactory infrastructure such as railway, airport, shipping, roads, communication networks, energy, etc. The City is connected to Kenya and Uganda by marine transport, which also connects it to the regional capitals of Bukoba and Musoma.

There are several small docking facilities owned by individuals and companies who own small and medium sized boats. There is also a boat assembling facility at Pasiansi in Ilemela district known as Pasiansi Boat Yard.

Mwanza City is served with air transport daily, with about 35 to 40 flights daily. Regular passenger airlines include ATCL, FastJet and Precision Airways, Eagle, and hire/shuttle services. There are also cargo aircraft mainly ferrying fish fillet to Europe and the Middle East.

4.4.14 Investment Potential

According to the Mwanza Investment Profile (Mwanza RC Office 2013), the following are areas of great investment potential:

- Agro industries
- Irrigation farming
- Tanneries
- Milk processing plant
- Lake transportation
- Air transport investment opportunity
- Telecommunication
- Establishment of TV stations
- Tourism and hotels business
- Investment in education business
- Fishery industries including production of fishmeal
- Large scale fishing
- Mining

4.4.15 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 Stakeholder 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 Mwanza City Council. 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.

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) be identified and their opinions considered during project planning, design, construction, and operation and decommission phases.

5.5 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 is important to be 'inclusive' rather than 'exclusive.'

5.5.1 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, project were explained and responses of participants were discussed and noted. Also, representatives of a number of key organisations were contacted and discussions held. The outcome of these consultations is reflected in **Appendix** 6.

Table 5-1 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
	Vice President's Office Division of Environment	- Coordination of the EMP, Act and guidelines - Environmental Monitoring and Auditing - Advise 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 and Irrigation	- Parent Ministry for the Project Proponent - Issuing polices on water resources management and planning - Enforcement of laws/regulations in water resources management and supply r - 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 Health Authority (OSHA)	- Issuing certificates of compliance and Designated Authority for occupational safety issues - Monitoring health and safety issues working sites

Level	Institutions	Roles and responsibilities
	EWURA	Regulating provision of water supply services in urban areas including tariff-setting
Regional Level	Regional Administrative Secretary	- Oversee/advise 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 use permits -Monitoring water quality
	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 potential/actual PAPs - Safeguarding project assets
Project Level	MWAUWASA	- Project Proponent - Project implementation - Consultation with stakeholders - Project monitoring and internal auditing

Level	Institutions	Roles and responsibilities
		- Tendering Responsibilities
	UN Habitat	-Technical Support for Stakeholder Engagement
	Mott MacDonald	- Provision of technical support
	UWP (Tanzania) Ltd	- Provision of technical support through PMC
	Egis eau (Supervision) Consultant	- 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

5.5.2 Stakeholders Consulted

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

(i) National Level:

- NEMC
- MOWI (Sector Environment Unit)

(ii) Regional-based Institutions:

- TANROADS
- TARURA
- LVBWB
- LVEMP II
- TANESCO
- TRC
- Mwanza Zonal Water Quality Laboratory
- 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 leaders
- Ward / Mtaa leaders
- Water Use Associations
- Individual stakeholders / groups
- Members of the public

5.5.3 Public consultation meetings:

Public consultation meetings were held at 'mitaa' level in all the wards affected/targeted by the main STIP Works. The meetings were arranged after a series of consultations with the Ward Executives officers and Mtaa Chairpersons/Executive Officers. The list of meetings is shown in the table below:

Table 5-2 List of Public Consultation Meetings Held

	Name of Mtaa	Ward	Date of Meeting	Project Works
1.	Mtakuja	Nyamhongolo	19/11/2017	Sewerage System
2.	Kashishi			Sewerage System
3.	Bulola A	Buswelu	9/12/2017	Sewerage System
4.	Bulola B			Sewerage System
5.	Busenga			Sewerage System
6.	Zembwela			Sewerage System
7.	Mwembeni	Igoma	24/11/2017	Sewerage System
8.	Kishiri A		29/11/2017	Sewerage System
9.	Shamariwa A		2/12/2017	Sewerage System
10.	Mbugani		3/12/2017	Sewerage System
11.	Ndofe		14/12/2017	Sewerage System
12.	Kishiri B			Sewerage System
13.	Kangaye A+B	Nyakato	26/11/2017	Sewerage System
14.	Majengo Mapya		28/11/2017	Sewerage System
15.	Igoma Magharibi A + Igoma	Kishiri	24/11/2017	Sewerage System
16.	Mkapa + Dr Shein		25 & 27/11/2017	Sewerage System
17.	Kambarage	Butimba	28/02/2018	Transmission Main
18.	Tambuka Reli		02/03/2018	Transmission Main
19.	Amani + Hospitali		10/03/2018	Transmission Main
20.	Kanyerere + Nyangulugulu		21/03/2018	Transmission Main
21.	Majengo	Mkolani	18/02/2018	Transmission Main
22.	Igwambiti C	Lwanhima	10/02/2018	Transmission Main
23.	Sahwa		14/02/2018	Transmission Main/Sub-Igoma BPS
24.	Bugayamba		17/02/2018	Transmission Main
25.	Kanindo	Kishiri	19/03/2018	Transmission Main
26.	Mtakuja + Shamariwa A	Igoma	11/03/2013	Transmission Main
27.	Mwabuki (Kanyama Village)	Bujora	05/05/2018	Sewerage System

5.5.4 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 5-3 Summary of Key Issues from Stakeholder and Community Consultations

	Issue	ESIA Team Response
1.	Benefits of the sewerage system	The sewerage system is part and parcel of the STIP works 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
2.	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.
3.	Compensation of PAPs	Valuation of properties and compensation of PAPs will be done in accordance with 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.
4.	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 zone will be maintained between WWTP and residences. Location selected is the optimum site based on technical considerations.
5.	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
6.	Sewerage connection costs and monthly charges	Except for internal pipe work 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.
7.	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 especially youth for unskilled or semi-skilled jobs. Multi-sector Forum and Grievance Redress Committees will be utilized to enhance continuous community engagement
8.	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.
9.	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 6 gives the main issues raised by the stakeholders at each meeting in detail, together with the responses from the ESIA Study Team.

PICTURES OF INSTITUTIONAL/WARD LEVEL CONSULTATIONS

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

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

Consultative Meeting with Nyamhongolo ward Officers

Consultative Meeting with Nyamhongolo ward Officers

Consultative Meeting with Buswelu Ward Officers

Consultative Meeting with Buswelu Ward Officers

Consultative Meeting with Buhongwa Ward Officers

Consultative Meeting with Buhongwa Ward Officers

Consultative Meeting with Butimba Ward Officers

Consultative Meeting with Butimba Ward Officers

Consultative Meeting with Lwanhima ward Officers

Consultative Meeting with Lwanhima ward Officers

Consultative Meeting with Igoma ward Officers

Consultative Meeting with Igoma ward Officers

Consultative Meeting with LVBWB Staff

Consultative Meeting with LVBWB Staff

Consultative Meeting with Mkolani Ward Staff

Consultation Meeting with Lwanimha Ward Staff

PICTURES OF PUBLIC CONSULTATION MEETINGS AT MTAA LEVEL

N.B. Names of Mitaa - Clockwise from top left: Mtakuja (Nyamhongolo), Majengo Mapya (Nyakato), Kanyama (Magu), Igwambiti C (Lwanhima), Mbugani (Kishiri) and Kanyerere (Butimba)

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 Methodology

The standard approach for undertaking ESIA was employed in this study. The main techniques applied were the collection and analysis of the project documents, design documents and other relevant information on the project; and field visits in all key locations. Key impacts and their significance were identified and assessed based on experience gained in other but similar developments, in Tanzania and abroad. Site inspection covered the proposed areas for the intakes, treatment plants, transmission main corridor, storage reservoir, distribution network routes, Domestic Points (DPs) and faecal sludge/wastewater treatment sites. The impacts and their magnitude and receptor sensitivity were assessed and the overall significance was determined and can be seen in Appendix 10.

Table 6-1 below gives a summary of the broad environmental and social issues associated with the STIP works.

Table 6-1 Summary of Broad Environmental and Social issues for Water Treatment Plant and Transmission Main

Proposed Function / Facility	Overview of facilities	Flora vegetation cover & types species of concern	Existing surface water resources	Groundwater resource & quality	Archaeological & heritage sites	Aquatic resources	Terrestrial fauna & habitats (species of concern)	Nearby human settlements and establishments	Adjacent economic activities	Land use	Likely social/economic interruption or displacement
Butimba Intake and Raw Water Pump Station	The new intake facility and raw water pumping station will be located close to the lake in a valley marshland -wetland-like area surrounded by rocky hills. The entire site is under government ownership (Butimba Prison)	Vegetation species callandra species fern plants, common elephant grass. No critical habitats + conservation concern	No perennial rivers/streams that flows across the site adjacent areas Seasonal streams are likely. Lake Victoria is the nearest water body	Potentially high water table (geotechnical + hydro geological surveys required)	Nil	Fish species at the intake area potentially no species of critical habitats + Conservation	Disturbed area in marshland area dragon flies, birds, amphibians and snakes are likely. No critical habitats & species of conservation concern	Butimba Prison and its staff quarters approx. 800m to the southwest from raw water pumping station	Paddy and maize fields open area used for livestock grazing within Prison area	Agriculture and grazing	Some paddy fields will be used for installation of the raw water pumping station. No compensation likely to be necessary as farming is seasonal and land belongs to the Government.
Butimba Water Treatment Plant (WTP)	The WTP site is located at the foot of the rocky hills that surrounds the area. The site is empty in terms of structures, covered by scattered bushes thickets cactus spp and senn spp currently used as a grazeland. The proposed WTP is approximately 700m from the lake intake point.	Scattered bushes thickets	No perennial rivers/streams that flows across the site adjacent areas. Seasonal streams are likely Lake Victoria is the nearest water body	Unlikely (geotechnical + hydro-geological surveys	Nil	Nil	Disturbed area potential availability of reptiles particularly lizards + snakes	Butimba Prison and its staff quarters approx. 800 m to the southwest from raw water pumping station	Paddy and maize fields open area used for livestock grazing within prison area.	Minimal	Nil
Transmission main from Butimba Intake to Sub-Igoma BPS located at Sahwa Centre in Lwanhima Ward	The new transmission main will be installed in order to supply water to Sub-Igoma BPS. The pipe route follows road reserves and also traverses farmlands and some properties in re-aligned sections.	No critical habitats + species of conservation concern	Stream crossing nearby the railway crossing.	Geotechnical + hydro-geological survey	Nil	Nil		Households, institutions and commercial establishments along the corridor.	Paddy fields crossing in Sahwa area plains, erosion risks - existing & developing gullies	Roads and railway reserve areas and farmlands	Paddy fields along Sahwa area flood plain
Sub-Igoma reservoir and BPS	At least 1.16 ha is needed for the construction of the reservoir and pump station and ancillary units	No critical habitats + species of conservation concern	Nil	None	Nil	Nil	nil	Households and some social/commercial establishments	Agriculture and livestock; some shops	Households and farmland	Compensation will be required for the land being acquired
Transmission main from Sub-Igoma Reservoir and BPS to Existing Igoma Reservoir	The pipe will follow road reserve but may cross some farmland and affect a minimal number of residential properties	No critical habitats + species of conservation concern	A few streams may be crossed	Geotechnical + Hydrogeological survey	Nil	Nil	nil	Nearby human settlements and establishments	Agriculture and livestock; some shops	Households and farmland	Compensation may be required for the land being acquired

6.3 Pre-construction, Planning and Design Phase

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

6.3.1 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:

(i) Consulting Engineering teams for concept and design development;

(ii) Environmental and social impacts studies teams;

(iii) Building economists or Quantity Surveyors to establish quantities of construction materials and assessing project economic viability;

(iv) Surveying teams and technicians for topographical and geotechnical investigations;

(v) Local laboratories for construction materials testing.

The preconstruction phase Negative Impacts

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

(i) **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.

(ii) **Temporary obstruction of access roads** – by topographic survey and geotechnical investigation teams.

(iii) **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.

(iv) **Traffic increase –** motor vehicles in the area to facilitate topographic survey and geotechnical investigation.

(v) **Noise** – from geotechnical investigation equipment and hydraulic augers or from transport of equipment to proposed project site.

(vi) **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 Construction Phase

6.4.1 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.

6.4.2 Negative Impacts

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.

(ii) **Disturbance to cultural, historical or archaeological artefacts 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 be 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 has already similar structures and therefore the impact of the additional buildings on the scenery is expected to be small.

(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 will accelerate soil erosion which if not abated it will result into 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 to 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 will be carried out during 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 and cause some traffic disruptions.

(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. Contamination could also result from mismanagement of used oil and used oil filters.

(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 relatively long time under dry weather conditions.

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 missions associated with temporary mean speed reduction on the roads directly affected and in the surrounding road network.

(x) **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.

(xi) **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.

Overview of the ARAP Process for STIP Works

Simultaneously to the present ESIA study and in accordance with the project's Resettlement Planning Framework (RPF, January 2016) MWAUWASA as the Project Proponent is preparing a (Abbreviated) Resettlement Action Plan (RAP or ARAP) for all planned STIP works under Contract 3. This will describe the impact of involuntary resettlement and specify the procedures that will be followed to identify, evaluate and displace or compensate Project Affected People (PAP), and define the actions to be undertaken during all phases of displacement or compensation. The ARAP report will also demarcate the Institutional responsibilities for A/RAP implementation; arrangement for implementation, monitoring and evaluation as well as reporting.

Preparation of the A/RAP will be conducted in line with the Tanzanian laws and procedures to ensure full, fair and prompt compensation payments to eligible project- affected-persons prior to execution of the project. It will also take into account the EIB's Environmental and Social Handbook (2013) / World Bank's safeguard policies (Operational Policy on Involuntary Resettlement - OP 4.12). The EIB's Environmental and Social Standards provides policies, principles and standards which set out the context for the protection of the environment and human wellbeing, and which is aligned to international best practice. Standard 6 of EIB's Environmental and Social standards refers to Involuntary Resettlement which is of particular relevance to the LVWATSAN – Mwanza Project.

All project components will be screened on possible Project Affected People (PAP) that may result from the works. There may be more PAPs if the works are inappropriately timed and implemented, for example when pipes are constructed in agricultural lands during the cropping season, in which case people need to be compensated for lost or damage to crops or allowed to harvest before project implementation.

Overall, the impacts will include land, houses, infrastructure (roads, telecommunication systems, water supply pipes), minor structures like fences, pavements and foundations, flower beds, trees/crops and a grave at the WWSP site. All measures are being made to ensure maximum avoidance or minimization of negative impacts. Alongside, is the formation and effective usage of Grievance Redress Mechanism (GRM) during stakeholder consultations.

Accidental damage which may occur during construction works, for example to structures such as buildings, infrastructure, trees, fences, etc. will be dealt by the Contractor in collaboration with the developer, and cannot be considered within the framework of the present report due to the unknown about whether this will happen and if so, where and when.

The A/RAP report will also include an overview of the Policy, administrative and legal frameworks; Socio-economic baseline data and census of PAPs; record of the Stakeholder consultation, PAPs assessment, preparation of inventory and valuation of affected assets. As per Tanzania law, the final valuation report will have to be approved by the Chief Government Valuer, in the Ministry of Lands and Human Settlement.

Expectations on PAPs:

Basing on an analysis of the technical designs and pipe alignments for the sewerage collection pipes as well as the water intake and treatment site, the project resettlement impact seems to be moderate. No relocation will be caused because of acquisition of the land for water intake and treatment site because the land belongs to the government institution i.e. Tanzania Prisons. Mostly the Transmission Main pipeline route will traverse through the land reserves under government agencies like TARURA/TANROADS, Tanzania Railways Limited and TANESCO. A few houses are expected to be affected at the Sub-Igoma Reservoir and BPS at Sahwa site. The sewerage collection pipes will be laid along the existing roads, preferably buried at the centre of some of the roads – so no resettlement cases are expected. The acquisition of the land for the Waste Water Stabilization Ponds is expected to affect approximately 18 existing land owners for whom compensation will be necessary.

It is expected that the final ARAP will be completed and submitted by June 2018.

(xii) **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).

(xiii) **Vandalism of construction materials and damage to pipelines –** Leakages will or may increase due to vandalism of construction materials or damage of existing pipe lines.

(xiv) **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) is being prepared as part of the RAP (Resettlement Action Plan) preparation process, which after review and approval by MoWI and EIB will be fully implemented prior to commencement of the construction works. A preliminary analysis has indicated that the estimated number of PAPs is 38 as shown in table below. Confirmation of the PAPs will be done based on the final drawings, followed by valuation and compensation in accordance with the Resettlement Policy Framework.

Table 6-2 Preliminary Number of Expected Project Affected People

SN	Contract	Number of PAPs (Preliminary)
1.	Transmission Main (Butimba-Buhongwa-Igoma)	2
2.	Sub-Igoma Booster Station (Buhongwa)	15
3.	Sewerage System	20
4.	Water Treatment Plant – Butimba	1
	Total PAPs	*38*

6.5 Operation Phase

6.5.1 Positive Impacts

Main positive impacts of the intervention are:

(i) Rehabilitated and extended water supply system offering a more reliable source of safe drinking water to a larger portion of the population.

(ii) Reduced incidence of diseases due to more and better-quality potable water resulting in a healthier population.

(iii) Safe disposal of sewage and other waste water from domestic, commercial and industrial sources in areas that will be served d by the sewerage system.

(iv) 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.

(v) 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. Sales from construction materials will have value added tax that goes to the government.

6.5.2 Negative Impacts

The are a few negative impacts that are expected from the operation of the water treatment and waste water treatment works as outlined below:

(i) 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.

(ii) Discharge of effluent from sewerage treatment plant may cause pollution of the soil and surface and water courses if there is inadequate treatment or inadequate precautions.

(iii) 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.

(iv) There will be production of sludge from the various water treatment stages

(v) There will be settled sludge from the waste stabilization ponds which should be well kept and dried.

(vi) There may be a bird influx in the sewerage treatment area due to availability of nutrients in the stabilization ponds causing some nuisances like droppings.

(vii) Effluent from the waste water treatment could pose aesthetic and health risks unless treated properly in accordance with official standards

(viii) Health risks to laboratory attendants during mixing of water treatment reagents/chemicals.

(ix) Vandalism of water supply appurtenances along the transmission main and distribution system.

6.6 Decommissioning Phase

(i) Spoiling o scenery due to disused buildings
(ii) Debris /dust from demolition activities
(iii) Sludge from the waste stabilization ponds

6.7 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.

6.7.1 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 fulfil the purpose of the project, the objective of the National Environment, Water and Public Health Policies or MWAUWASA's 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.

6.7.2 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.

6.7.3 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.

6.7.4 Choosing another Site for Waste Stabilization Ponds

Consultations are being held regarding the viability of an alternative site located at Kanyama Village in Bujora Ward, Magu District, some 2 kilometers from Nyamhongolo following the high cost of compensation on the existing location. The environmental conditions at this site are quite similar to the Nyamhongolo site but acquisition of the site would be cheaper in terms of resettlement/compensation costs. The final decision will be made by the Proponent/Government in consultation with the Project Lenders.

6.7.5 Water treatment and distribution options

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).

6.7.6 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.

6.8 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.

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

Table 7-1. 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.
(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 works. • Disruption of traffic movement during survey and geotechnical investigations should be minimized by introducing traffic management plan. • Institute speed limit (40km/hr) to all project vehicles within the project area to be surveyed and subjected to geotechnical investigations.
(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 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 area and institute punishment to traffic rules offenders.

7.3 Construction

Table 7-2. Impacts and Mitigation measures during the Construction Phase

Nr	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 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	• Operations house / buildings for facilitates the project will be designed to blend well with the surrounding buildings. • Landscaping will be carried out to match the existing surroundings.
(iv)	Resettlement and disturbance to residents, including those who use land for cultivation	• Carry out valuation of the properties within the project areas and effect compensation.
(v)	Disturbance, 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. • Part of the charges for purchase of construction materials shall channelled back for the rehabilitation or reinstatement of the borrow 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.
(vii)	Soil erosion	• Protection of steep slope with reinforcement. • Provision of silt trap to prevent sedimentation. • Construction activities especially land excavation should be carried out during dry seasons.

Nr	Impact	Mitigation measures
		• Avoid excessive clearance of trees and enhance tree planting and landscaping.
(viii)	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 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.
(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.
(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.
(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.
(xii)	Injuries to or damage inflicted on neighbours from falling into trenches and open pits for inspection chambers. Poor public safety during construction – risk to life.	• 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 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 dangers of falling into open trenches. • Constant surveillance from security to make sure that there are no “uninvited guests” in the project area.

Nr	Impact	Mitigation measures
(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 Contractor’s Environmental or Safety Officer the responsibility to ensure that the surroundings are kept clean. • All excavated spoil should be well managed through levelling or tipped into low lying areas or borrow areas which are no longer useful. • Trash and waste shall be well collected and removed from the site to 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 at the sanitary land fill in Mwanza City. • 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 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

Table 7-3. Impacts and Mitigation Measures during the Operation Phase

Nr	Impact	Mitigation measures
(i)	Noise 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 by proper vehicle maintenance and operational procedures
(iii)	Odour nuisance from wastewater stabilization ponds and insect breeding	• Provide adequate buffer zone from the wastewater stabilization ponds including tree planting. Provision of 100m buffer zone has been made in the land acquisition processes. • Locate anaerobic ponds furthest from residences • Ensure continuous flow especially at entry point

Nr	Impact	Mitigation measures
(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 and sampling procedures	• Appropriate training and equipment • Safe storage and handling of chemicals • Good Operational 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)	Possible overflowing of waste water treatment ponds during floods	• Stabilization pond walls/embankment should be built higher than maximum expected flood levels (50-year flood) • There should be no habitations close to the ponds especially downstream for at least 500m • Construction of flood water diversion channel upstream of the WWTP
Decommissioning Stage		* Prepare Action Plan for Decommissioning including Mitigation Measures as discussed in Chapter 10

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 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 8-1. 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
Pre-construction						
(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. • 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
(iv) - Disturbances from increased motor vehicles in the area to facilitate topographic survey and geotechnical Investigation	• Allow only necessary traffic for works. • Disruption of traffic movement during survey and geotechnical investigations should be minimized by introducing traffic management plan. • Institute speed limit (40km/hr) to all project vehicles within the project area to be surveyed and subjected to geotechnical investigations.	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.	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
hydraulic augers and from motor vehicles	• Noise levels should be monitored and where it happens to be higher than 85dB (A), PPE in form of ear muffs or ear plugs shall be provided to all those working near the equipment including the operators.					
(vi) - Likely motor accidents with pedestrians	• Sensitize drivers of project vehicles to observe speed limits in all area and institute punishment to traffic rules offenders.	Design Engineer	Every day during investigations No motor Vehicle	No motor Vehicle accidents	500	Project Cost
Construction						
(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 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.	Contractor	During extraction of construction materials	As set in the EMP for borrow sites	500	
(iii) - Deterioration of original land use, scenic and visual quality including	• Operations house 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.	Lead Consultant/ Contractor	During construction of the project	Ensure design and construction blends well	1000	

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
partial reduction of the wetland area	• Design should minimize wetland area utilized for the construction			with surroundings		
(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. • Part of the charges for purchase of construction materials shall channelled back for the rehabilitation or reinstatement of the borrow areas.	Contractor	During sources of Construction materials	As set in the EMP for borrow pits/sites	2000	
(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 slope with reinforcement. • Provision of silt trap to prevent sedimentation. • Construction activities especially land excavation should be carried out during dry seasons. • Avoid excessive clearance of trees and enhance tree planting and landscaping.	Contractor	Measures applied as construction works proceed otherwise once every month during construction	All loose soils and bare soils protected from erosion	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 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 hydro • Carbon 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	• 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
the construction site and material hauling routes	• 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 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 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	Supervising Engineer/ Contractor	Every day	Zero injuries	2500	

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
	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 Contractor’s Environmental or Safety Officer the responsibility to ensure that the surroundings are kept clean. • All excavated spoil should be well managed through levelling or tipped into low lying areas or borrow areas which are no longer useful. • Trash and waste shall be well collected and removed from the site to 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 land fill 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.	Supervising Engineer. Contractor	Every day	Good house keeping	2000	Project Cost
(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 house keeping	--	

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
Operation						
(i) - 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 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 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 8-2 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
Pre-construction						
(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
(iv) - Disturbances from increased motor vehicles in the area to facilitate topographic survey and geotechnical Investigation	• Allow only necessary traffic for works. • Disruption of traffic movement during survey and geotechnical investigations should be minimized by introducing traffic management plan. • Institute speed limit (40km/hr) to all project vehicles within the project area to be surveyed and subjected to geotechnical investigations.	Design Engineer	Once every week during preconstruction	No complaints	500	Project Cost
(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 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
(vi) - Likely motor accidents with pedestrians	• Sensitize drivers of project vehicles to observe speed limits in all area and institute punishment to traffic rules offenders.	Design Engineer	Every day during investigation	No motor Vehicle accidents	500	Project Cost

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
			No motor Vehicle			
Construction						
(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 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.	Contractor	During extraction of construction materials	As set in the EMP for borrow sites	500	
(iii) - Deterioration of original land use, scenic and visual quality	• Operations house 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.	Lead Consultant/ Contractor	During construction of the project	Ensure design and construction blends well with surroundings	1000	
(iv) - Resettlement and Disturbance to some of the Residents	• Carry out valuation of the properties within the project areas and effect compensation.	Project Proponent	Before the project starts	Ensure all Affected personnel are		

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
particularly who will be affected by the Project				Compensated and leave the area before start of initial project activities.		
(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 slope with reinforcement. • Provision of silt trap to prevent sedimentation. • Construction activities especially land excavation should be carried out during dry seasons. • Avoid excessive clearance of trees and enhance tree planting and landscaping.	Contractor	Measures applied as construction works proceed otherwise once every month during construction	All loose soils and bare soils protected from erosion	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 tipping site and vice versa will be carried out during off peak periods during the day.	Contractor	Once every Week	No complaints	500	

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
	• 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. • 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 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	• 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.	Supervising Engineer/ Contractor	Every day	Zero injuries	2500	

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
inspection chambers. Poor public safety during Construction – Risk to life. Poor safety at Work place.	• 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 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 Contractor’s Environmental or Safety Officer the responsibility to ensure that the surroundings are kept clean. • All excavated spoil should be well managed through levelling or tipped into low lying areas or borrow areas which are no longer useful. • Trash and waste shall be well collected and removed from the site to district waste collection point. • Consult the district council about the suitable trash/waste dumping site and their procedures.	Supervising Engineer. Contractor	Every day	Good house keeping	2000	Project cost

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
	• 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 land fill 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 house keeping	--	
(xiv) - 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		
Operation						
(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.	Project Operator (MWAUWASA)	Monthly during operation	No complaints from surroundings	2000	
(ii) Oils/fuels leakages	• Regular servicing of pumps and engines • Regular cleansing operations ensuring no flow into surface water courses/groundwater	Operator (MWAUWASA	Continuously	Minimal leakages		
(ii) 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		

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
Total					***25,500***	

Table 8-3 Environmental and Social Management Plan for Sewerage System

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
Pre-construction						
(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 engineer s cost
(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).	Design Engineer	At the start of the project	Soil erosion is controlled	2000	Part of the Project cost
(v) - Noise from geotechnical Investigation equipment hydraulic augers and 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 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
(vi) - Likely motor accidents with pedestrians	• Sensitize drivers of project vehicles to observe speed limits in all area and institute punishment to traffic rules offenders.	Design Engineer	Every day during investigation s No motor Vehicle	No motor Vehicle accidents	500	Project Cost

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
Construction						
(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 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.	Contractor	During extraction of construction materials	As set in the EMP for borrow sites	500	
(iii) - Deterioration of original land use, scenic and visual quality	• Operations house 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.	Lead Consultant/ Contractor	During construction of the project	Ensure design and construction blends well with surroundings	1000	
(iv) - Resettlement and disturbance to some of the residents particularly who depend on these	• Carry out valuation of the properties within the project areas and effect compensation.	Project Proponent	Before the project starts	Ensure all Affected personnel are Compensated and leave the area before		

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
plot for cultivation or entrepreneurship activities				start of initial project activities.		
(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 privately owned, the contractor employed by the Project Proponent will be buying the construction materials and thus contributing towards restoration of the borrow sites. • Part of the charges for purchase of construction materials shall channelled back for the rehabilitation or reinstatement of the borrow areas.	Contractor	During sources of Construction materials	As set in the EMP for borrow pits/sites	2000	
(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 slope with reinforcement. • Provision of silt trap to prevent sedimentation. • Construction activities especially land excavation should be carried out during dry seasons. • Avoid excessive clearance of trees and enhance tree planting and landscaping.	Contractor	Measures applied as construction works proceed otherwise once every month	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
			during construction			
(viii) - Nuisance and inconveniences 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 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 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. • 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	• Sensitization and health awareness campaigns to all involved in the project including service providers.	Contractor	Once every week on weekends	All employees Sensitized and examined	3000	Part of HIV/AIDS

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
(HIV/AIDs, STIs or STDs)	• 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.					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 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 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.	Supervising Engineer/ Contractor	Every day	Zero injuries	2500	
(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 house keeping	2000	Project cost

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
	• Assign Contractor's Environmental or Safety Officer the responsibility to ensure that the surroundings are kept clean. • All excavated spoil should be well managed through levelling or tipped into low lying areas or borrow areas which are no longer useful. • Trash and waste shall be well collected and removed from the site to 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 land fill 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 house keeping	--	
Operation						
(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/MWAUWASA	Continuously	No complaints from neighbouring communities		

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
(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 by leakage of effluent from wastewater stabilization ponds or sewerage pipes	• Use high quality rubber mats to prevent leakages from the waste stabilization ponds • Consider construction of artificial wetland to provide additional treatment of effluents before final discharge • 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,	Design Engineer/ MWAUWASA	At design stage/ Continuously	As per national effluent discharge standards		
(v) - Health risk to laboratory attendant during waste water treatment and sampling procedures	• Appropriate training and equipment • Institute good operational procedures	Project Operator (MWAUWASA)	Monthly during operation	No risks		
(vi) Nuisance/Health risks due to mishandling of sludge	• Appropriate training and equipment • Institute good operational procedures	Project Operator (MWAUWASA)	Monthly during operation	No risks		
(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.	Project Operator (MWAUWASA)	Monthly during operation	No vandalism or damage		
(viii) Possible overflowing of waste water treatment ponds during floods	• Stabilization pond walls/embankment should be built higher than maximum expected flood levels (50-year flood) • There should be no habitations close to the ponds especially downstream for at least 500m					

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Estimated Cost (USD)	Remarks
	• Construction of flood water diversion channel upstream of the WWTP					
Total					***29,500***	

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 table below.

9.2 Monitoring per Phase

9.2.1 Pre-Construction

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

(i) Appointment of a Health, Safety and Environment (HSE) Officer within the Supervision Consultant's Team and how he/she carries out the assigned responsibilities.

(ii) Maintenance and checking of construction equipment ready for work at site and during the actual works.

(iii) Training and sensitization of the staff on safety aspects and environmental issues.

(iv) HIV/AIDS sensitization campaign planned and implementation.

(v) 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:

(i) Implementation of mitigation measures.

(ii) HIV/AIDs sensitization campaigns implementation.

(iii) 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 of the quality of any effluents discharged to water sources. The City Council/Ilemela Municipal Council will be responsible for monitoring the social impacts

(i) 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

(ii) Monitoring quality of effluent from the wastewater treatment plant

(iii) Monitoring air and noise pollution from the various components of the system.

(iv) Environmental degradation control measures such as soil erosion.

(v) Occupational health and safety measures, and related incidences.

(vi) Management of Solid and liquid wastes generated from the water treatment plant and from the wastewater treatment plant.

(vii) 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:

(i) Resulting debris is managed and disposed of appropriately.

(ii) Handling of process sludges and chemical residues

(iii) Health and safety issues from abandoned buildings

(iv) Handing over processes as relevant

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

Table 9-1. Environmental and Social Monitoring Plan

Nr	Impact	Project Phase	Frequency	Parameters	Standards/Targets	Responsibility	Monitoring cost (US$)
-(i)	Vegetation loss through clearance	Pre-construction	Weekly	Area of land left bare	Vegetation lost in necessary areas only	Design Engineer	-
		Construction	Weekly	Area of land left bare	Vegetation lost in necessary areas only	Supervision Consultant	-
(ii)	Temporary obstruction of access roads	Pre-construction	Weekly	Number of road-closure incidences	Minimal number and length of road closures	Design Engineer	-
		Construction	Weekly	Number of road-closure incidences	Minimal number and length of road closures	Supervision Consultant	-
(iii)	Soil erosion	Construction	Weekly	Area of land left bare	Minimal area left bare without soil control measures	Supervising consultant	2000
		Demobilization	Rainy season	Area of land left bare	Minimal area left bare without soil control measures	Mwanza City Council	1000
(iv)	Traffic increase	Pre-construction	Weekly	Number of project vehicles at site	Minimum number of vehicles	Design Engineer	--
		Construction	Weekly	Number of project vehicles at site	Minimum number of vehicles	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)	Noise within set limits; 85dB(A)	Supervising contractor	1000

Nr	Impact	Project Phase	Frequency	Parameters	Standards/Targets	Responsibility	Monitoring cost (US$)
(vi)	Likely increase in motor accidents	Pre-construction/	Daily	Number of accidents involving project vehicles	No major traffic accidents	MWAUWASA	-
		Construction			No major traffic accidents		
(vii)	Disturbances to historical and archaeological finds during site clearance	Construction	Daily	Number of cultural and archaeological finds	All finds to be reported	Supervision Consultant	-
(viii)	Deterioration of original land use, scenic and visual quality	Construction	During construction	Area of land whose use has changed from original	Approved drawings to be followed. Good landscaping to be done	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	All PAPs to be properly compensated	MWAUWASA	Depending on approved Valuation process
(x)	Disturbance, particularly land scarring at borrow sites or sources of construction materials	Construction	Weekly	Number of new borrow pits	Full utilization of approved borrow/quarry areas; Minimal number of new borrow pits	Supervision Consultant	500
(xi)	Nuisance from noise and vibration from construction equipment	Construction	Weekly	Level of Noise (dB)	Noise within set limits; 85dB(A)	Supervising contractor	500
(xii)	Contamination of water from leakages of fuels and lubricants from construction equipment	Construction	Weekly	Number of major spills reported	Zero major spills	Supervision Consultant	-

Nr	Impact	Project Phase	Frequency	Parameters	Standards/Targets	Responsibility	Monitoring cost (US$)
(xiii)	Spread of diseases (HIV/AIDs, STIs or STDs)	Pre-construction, Construction and Demobilization	Monthly	Number of sensitization activities held	Monthly activities held	LGA	-
(xiv)	Injuries to or damage inflicted on passers-by	Construction	During construction	Number of reported cases on injury/falling into pits	Zero injuries	Supervising consultant Mwanza City Council	500
		Demobilization	During demolition	Number of reported cases on injury/falling into pits	Zero injuries	Mwanza City Council	1000
(xv)	Injuries from work-related activities	Construction	During construction	Number of reported cases on injury/falling into pits or other injuries	Zero injuries	Supervising consultant Mwanza City Council	500
		Operation	Throughout the operation phase	Number of reported cases on other injuries	Zero injuries	MWAUWASA	-
		Demobilization	During demolition	PPE to workers	Zero injuries	Mwanza City Council	500
(xvi)	Vandalism and damage to the pipe system	Operation	Weekly	Number of reported cases	Zero cases	MWAUWASA	-
(xvii)	Disturbance from pumps, and engines	Operation	Monthly	Level of Noise (dB)	Within set limits; 85dB (A)	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	Within set effluent standards	MWAUWASA/ NEMC/ LVBWB	1000
(xix)	Odour nuisance from wastewater stabilization ponds	Operation	Weekly	Number of days when odour nuisance was unusually high	Zero days	MWAUWASA/NEMC	200

Nr	Impact	Project Phase	Frequency	Parameters	Standards/Targets	Responsibility	Monitoring cost (US$)
(xx)	Influx of birds around wastewater stabilization ponds	Operation	Daily	Comparative (qualitative) number of birds observed	Not to exceed tolerable levels	MWAUWASA	-
(xxi)	Leakage from sewerage pipes	Operation	Weekly	Number of leakages reported		MWAUWASA	-
(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	Zero	MWAUWASA	-
(xxiii)	Employment creation	Pre-Construction	During technical investigations	Number of people employed as labourer Number of entrepreneurs benefitting directly from project operations	Maximum number within budget limits	Mwanza City Council	-
		-Construction	During construction	Number of people employed as labourer Number of entrepreneurs benefitting directly from project operations	Maximum number within budget limits	Mwanza City Council.	-
						Total	9200

10 Decommissioning

This chapter provides guidance to 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, there may be rehabilitation of the infrastructures within this specified duration.

10.1 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).

10.2 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 Plant
4) Dismantling of High-lift Pump Station
5) Dismantling of water storage reservoirs
6) Uprooting of water distribution network, including house connections and meters, and backfilling
7) Dismantling of the Wastewater Treatment Plant
8) 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.

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Table 10-1 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)	De-sludging of waste stabilization ponds and safe disposal	Nuisance/health hazards	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 Sell materials for reuse if in good condition	Tbd	Tbd
(iii)	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 goggles Provide site holding fence Sell materials for reuse if in good condition	Tbd	Tbd
(iv)	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 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 positive impacts notably improved water supply and sewerage for 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.

It is recommended that this ESIA report be reviewed and approved by NEMC to allow the proposed STIP works to be implemented, provided that the recommended mitigation measures are adequately and timely implemented.

12 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 water supply infrastructure, wastewater collection and treatment for Mwanza Town
- COWI, 25 July 2016. Design Briefs for the planned STIP and LTIP works being part of the Mwanza Master Plan
- COWI, January 2017. Master Plan, including STIP and LTIP
- COWI, January 2017. Component 2 Task 10: Environmental Impact Assessment Screening for Design Purposes – Screening Report
- COWI, January 2017. LVWATSAN Project Short Term Investment Plan, Wastewater Design Report
- EIB, February 2013. Environmental and Social Datasheet for LVWATSAN
- EIB, 2013. Environmental and Social Handbook
- EIB/UN-HABITAT, December 2015. Stakeholder Engagement Plan for LVWATSAN
- Mwanza Regional Commissioner's Office (2013), 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 1. Terms of Reference for ESIA study

The Terms of Reference (ToR) for the Environmental and Social Impact Assessment (ESIA) Study for Rehabilitation and Expansion of Water Supply Infrastructure and Wastewater Collection and Treatment in Mwanza Town, i.e. the Short-Term Investment Plan (STIP), were developed according to the requirement of the Environment Impact Assessment and Audit Regulations, GN No.349/2005 in making an Environmental Impact Statement.

The purpose of the ToR is to provide formal guidance to the proponent and ESIA Consultant of the Project on the kind of issues that should be addressed during the ESIA process. The terms of reference form the basis for subsequent review processes. In these ToR, strategies for addressing the issues identified during scoping have been incorporated to make the ESIA more focused and project specific.

DESCRIPTION OF THE PROJECT

The present project comprises a consultancy services to undertake detailed engineering design, tender document preparation and supervision of short term interventions works for water supply and wastewater collection and treatment in Mwanza City. The 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 Republic of Tanzania 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 EUR 14.5 million provided by the Tanzanian government. Capital costs for the planned STIP works in Mwanza City have been estimated at some EUR 15 million.

The beneficiaries of the project are the population of Mwanza City represented by respective Councils of Mwanza City, Ilemela and Nyamagana and Mwanza Urban Water Supply and Sanitation Authority. The project is one of several interventions under the Lake Victoria Water and Sanitation (LVWATSAN) Program for improving and attaining the strategic goal of sustainable, efficient and economic water services provision in Misungwi town and their vicinities.

OBJECTIVES

Part IV of the EIA Regulations GN No. 349 of 2005 provides the general objectives for carrying out EIA. The objectives of the EIA are:

- To ensure that environmental considerations are explicitly addressed and incorporated into the development decision making process;
- To anticipate and avoid, minimize or offset any adverse significant biophysical, social and relevant effects of the developmental proposal;
- To protect the productivity and capacity of natural systems and ecological processes to maintain their functions
- To promote development that is sustainable and optimizes resource use and management opportunities;
- To establish impacts that are likely to affect the environment before a decision is made to authorize the project; and
- To enable information exchange, notification and consultations between stakeholders.

ENVIRONMENTAL ASSESSMENT REQUIREMENTS

The Environmental Management Act, Cap 191 (Act No. 20 of 2004) requires that an EIA be undertaken for all new projects that may cause adverse environmental and social impacts. Under the Environment Impact Assessment and Audit Regulations, 2005 the proposed project is categorized as an EIA obligatory project for which a full EIA is required. The activities associated with this type of services fall under schedule 1 of the EIA and Audit Regulations item 21 titled water supply.

STUDY AREA

To undertake a comprehensive assessment of all key issues related to the project, the core area has been determined to be several areas within the greater Mwanza City area.

ENVIRONMENTAL IMPACT ASSESSMENT SCOPE OF WORK

Task 1: Description of the Proposed Project

The Consultant shall give details of:

- Description of projective and rationale, designs, activities in each phase, components, boundaries, land use planning, land ownership, wastes and waste management;
- Location of all project-related development and operation sites;
- General layout of facilities - diagrams of facilities, design basis, size, and sources of utilities;
- Pre-construction activities and construction activities;
- Organizational relationships, mandates and interactions among the different parties to be involved in the project.

Task 2: Description of the Environment

The Consultant shall:

1. Provide general description of the project environment and sources of information for anyone requiring a more extensive description (especially the EIA reviewers);
2. Description of the physical, biological and socio-economic and cultural environments;
3. Relevant baseline data of various parameters including topography, air quality, hydrology and water quality specific to the project area;
4. Identify features that are particularly important in the project area i.e. maps at appropriate scales to illustrate the surrounding areas likely to be environmentally and social affected if any;
5. Identify areas that may require special attention during project implementation.

The ESIA shall specifically focus on the ecological components in the environment to ensure that the proposed development does not harm the well-being of these characteristics.

Task 3: Legislative and Regulatory Considerations

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

Task 4: Determination of Potential Impacts of the new Proposed Project Component

Under this activity the Consultant shall:

1. Describe the methods used for impact identification, assessment and analysis; wherever checklists are used these will be appended to the EIS report;
2. Identify issues and concerns in order to find suitable remedies;
3. Identify linkages among project components and the issues;
4. Identify where project activities or elements interact with social and biophysical environment (direct impacts):
5. Identify indirect impacts of the project on the environment;
6. Address issues related to land acquisition, land use planning and suitability of the selected or proposed sites for the project, and copies of relevant permits will be appended to the EIS report;
7. Identify cumulative impacts that may be anticipated;
8. Identify residual impacts if any;
9. Predict probability, magnitude, distribution and timing of expected impacts;
10. Propose and analyse alternatives, and provide reasons for a preferred alternative;
11. Forecast what will happen to the affected environmental components if the project is implemented as is or if the alternatives (e.g. sites and routes) are chosen.

Task 5: Estimation of the significance of the impacts

The Consultant shall:

1. Determine which environmental components are mostly affected by the project or its alternatives;

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

Task 6: Development of Management Plan to Mitigate Negative Impacts and develop a monitoring plan
The Consultant shall:
1. Determine appropriate measures to avoid or mitigate undesirable impacts, including the management of waste in all project implementation phases;
2. Assess and describe the anticipated effectiveness of proposed measures;
3. Ascertain regulatory requirements and expected performance standards;
4. Determine and assess methods to monitor impacts for prediction accuracy, and remedial measures for effectiveness;
5. Determine and assess methods to monitor for early warning of unexpected effects;
6. Re-assess project plans, design and the project management structure;
7. Describe follow-up scheme and post-project action plan for achieving EIA objectives; and
8. Assess the level of financial commitment by the project proponent for the management and monitoring plan, and follow up activities.

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

Task 7: Institutional set-up
The Consultant shall review the institutional set-up - Community, Ward, District levels - for implementation of the Management and Monitoring Plans recommended in the environmental assessment. The assessment shall identify who should be responsible for what and when.

Task 8: Recommendations
The Consultant shall:
1. Highlight key concerns and considerations associated with the acceptance and implementation of recommended actions;
2. Determine resource requirements for implementing recommendations;
3. Determine capacity and resourcefulness of the client to meeting such commitment;
4. Explain rationale for proposed development and benefits and costs vis-à-vis the no-project option;
5. Ascertain degree of public acceptance of /or reaction to recommendations.

Task 9: Environmental and Social Impact Statement (ESIA)
The assessment shall result in an EIS which focuses on findings of the assessment, conclusions and recommended actions, supported by summaries of data collected etc. This shall be a concise document limited to significant environmental issues. The report format will be as per Environment Impact Assessment and Audit Regulations, G.N. No. 349 of 2005.

Task 10: Review
The review report from NEMC may require further input (data collection, consultation inputs, etc.). The Consultant shall undertake to provide extra information and inputs until the project review is satisfactorily concluded.

Task 11: Public involvement
The assessment shall establish the level of consultation of the affected stakeholders before designing the project level of involvement in the running and maintenance of the project facilities as this is an important aspect for both environmental, social and project sustainability. Adequate consultation with stakeholders, including but not limited to the Lake Victoria Basin Water Board, will be conducted and stakeholder concerns will be considered and addressed in the EIS report.

The assessment will provide a framework:

- For coordinating the Environmental and Social Impact Assessment with other government agencies, and
- For obtaining the views of affected groups, keeping records of meetings, other activities, communications, and comments on their disposition.

Consultation with various stakeholders has been conducted during the Scoping Exercise and further consultation will be conducted during the detailed ESIA Study.

TIME SCALE

It is expected that the detailed assessment will be completed within a period of three months, including the review process with NEMC.

PERSONAL REQUIREMENT

The Client shall deploy Consultants / Experts with the demonstrable practical experience in conducting ESIA studies and other specialists including:

- Environmental Scientist (EIA registered Expert and Team leader)
- Health and Safety Expert
- Sociologist
- Water Engineer

Additional experts will be consulted when needed.

REPORT STRUCTURE

Prepare ESIA report which will contain the following information:

- Executive summary;
- Acknowledgement;
- Acronyms;
- Introduction;
- Project background and description;
- Policy, administrative and legal framework;
- Baseline or existing conditions;
- Assessment of impacts and identification of alternatives;
- Impacts management or environmental mitigation measures;
- Environmental and social management plan
- Resource evaluation or cost benefits analysis;
- Decommissioning;
- Summary and conclusion
- References; and
- Appendices;

The cover page of the ESIA report will have the following information:

- Title of the proposed project
- Location of proposed development
- Developer;
- Lead consultants;
- Contact address and phone; and
- Date of submission.

The ESIA report will also constitute an executive summary that contains the following information.

- Title and location of the project or undertaking;
- Name of the proponent and contact;
- Names and addresses of experts or firms of experts conducting EIA;
- Brief outline and justification of the proposed project or undertaking showing:
    - A brief description of the project environment;
    - Project stakeholders and their involvement in the EIA process;

- Explanation on why some impacts are not addressed;
- List of developer, consultant, local planning authorities and other people and organizations consulted
- Results of public consultation
- Description of the major significant impacts;
- Alternative considered;
- Recommendations and plan for mitigation of the impacts;
- Environmental and social management;
- Proposed monitoring and auditing; and
- Resource evaluation or cost benefits analysis.

OUTPUT

The Consultant shall submit to NEMC 15 copies of the ESIA report for the review process, finally shall submit five copies of final ESIA and accompanied by one electronic version and five Non-technical executive summary for both Swahili and English version as stipulated in the Environment Impact Assessment and Audit Regulations, G.N. No. 349 of 2005.

Record of Meetings

The Consultants shall provide records of the names of organizations, government departments and individuals whose views will be obtained. The records will also provide description of views and information that will be obtained.

References

The Consultant shall provide a list of all information sources used, including unpublished documents and sources in the ESIA report.

Appendix 2. NEMC's Screening Decision

NATIONAL ENVIRONMENT MANAGEMENT COUNCIL (NEMC)

BARAZA LA TAIFA LA HIFADHI NA USIMAMIZI WA MAZINGIRA

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

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 EA 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 3. NEMC's Review of STIP Scoping Report of 9/2016

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 4. NEMC's Approval of the STIP Scoping Report of 4/2017

(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-Eib Project
Dee Dee cuss
5/5/17

MWANZA URBAN WATER AND SEWERAGE AUTHORITY
RECEIVED ON
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

they should only be acknowledged. Failure to observe this requirement, it will constitute to an offense as per Environmental Management Act Cap 191;

3. All material sources and estimations, Architectural and structural design should be well described.
4. Identify all negative impacts and their mitigation measures
5. Use specific and the most current data on the physical, biological, socio-economic and cultural environments
6. In the studies include an expert in waste water management ; and;
7. Append in the final EIS the letter approving ToR and the revised ToR

Upon submission of the EIS you will be required to pay to the Council charges for the review and approval processes amounting to **Euro 15,000/= (Fifteen Thousand Euro)** as described by ***The Environmental Management (Fees and Charges) (Amendment) Regulations, 2016.*** This cost excludes transport costs of three officers from Mwanza to project site and return which has to be incurred by MWAUWASA. The payment should be made through **NEMC CRDB Bank A/c No. 0150005055800.** Once payment has been effected, please send the pay in slip to our office located at Maji, Igogo, Mwanza for evidence and record keeping. Prior to the review, representatives of the TAC will visit the proposed project areas to inspect the sites and verify the adequacy of the EIS.

Should you need additional information or clarification on this matter, please, contact us through Tel. No. +255 28 254 1679 or 0767153776

Yours sincerely,

Bodiphace.P.Guni

For: Zonal Coordinator

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

Mr Wander Benthem-International Environmental Expert
Mott MacDonald
Mwanza.

Appendix 5. MWAUWASA's Request Letters for Land to Accommodate the Facilities

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 liliilopendekezwa 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.

Hivyo, MWAUWASA inaomba kama itawezekana wananchi hao wapimiwe maeneo mengine ili kupisha eneo hilo lijengewe miradi hiyo ya mabwawa ya majitaka.

Aidha Mamlaka ipo tayari kuchangia gharama za upimaji wa maeneo mapya ambayo wananchi hao wanaweza kupimiwa.

Tunatanguliza shukrani za dhati.

Eng. Anthony Sanga
MKURUGENZI MTENDAJI

Nakala:

Katibu Mkuu
Wizara ya Maji na Umwagiliaji
S.L.P. 456
DODOMA

Katibu Tawala Mkoa Mwanza
S.L.P. 119
MWANZA

Mkurugenzi Halmashauri ya Jiji Mwanza
S.L.P. 1333
MWANZA

MAMLAKA YA MAJISAFI NA USAFI WA MAZINGIRA JIJINI MWANZA

Simu: 255-28-2500547
Nukshi: 255-28-2503231
Barua pepe: info@mwauwasa.go.tz

Maji House,
Barabara ya Balewa,
S.L.P 317,
MWANZA.

Kumb.Na.UWSA/MZA/500/Vol. III/108 **12 Oktoba, 2017**

MKUU WA GEREZA,
GEREZA LA BUTIMBA,
S.L.P 1073,
MWANZA.

YAH: MAOMBI YA KUPATIWA RASMI ENEO KWA AJILI YA UJENZI WA CHANZO CHA MAJI NA CHUJIO LA KUSAFISHA MAJI KATIKA ENEO LA GEREZA BUTIMBA

Tafadhari husika na somo tajwa hapo juu.

MWAUWASA inatekeleza mradi wa majisafi na usafi wa mazingira katika jiji la Mwanza. Mradi huu unafadhiliwa na Serikali ya Jamuhuri ya Muungano wa Tanzania pamoja na washirika wa maendeleo ambao ni Benki ya Maendeleo ya Ulaya (EIB) pamoja na shirika la maendeleo ya Urafansa(AFD)

Mradi huu umeanza toka Mwaka 2015 katika hatua za usanifu ambapo MWAUWASA iliandika barua mbili Kwa ajili ya kuomba eneo hilo zenye kumb. No. UWSA/MZA/500/Vol. I/88 na UWSA/MZA/500/Vol. I/135 kwa ajili ya kuomba eneo hilo. Kumekuwa na ushirikiano wa kutosha kutoka kwenye ofisi yako wakati wote wa mchakato wa usanifu ambapo Serikali ya Mkoa wa Mwanza pamoja na Wizara ya Maji na Umwagiliaji ina taarifa rasmi kwamba eneo hilo linafaa kwa ajili ya ujenzi wa chanzo kipya cha maji.

Kwa kuwa sasa tumefikia hatua ya utekelezaji wa mradi tunaomba ofisi yako tukufu utupatie kibali rasmi kwa ajili ya kuanza kazi za ujenzi. Eneo linalohitajika ni mita za mraba 220,000 (220,000 m^2). Ujenzi huu unatarajiwa kuanza rasmi mwezi Januari 2018 na kukamilika mapema mwaka 2021. Eneo hili linaanzia ziwani hadi nchi kavu kama linavyoonyeshwa kwenye ramani zilizoambatishwa.

Eneo hili ni kwa ajili ya ujenzi wa chanzo kipya cha maji kinachotarajiwa kuhudumia wananchi wote wa maeneo ya Butimba, Mkuyuni, Nyegezi, Buhongwa, Igoma mpaka Kisesa. Pia meaneo ya Usagara wilayani Misungwi yanategemewa kuhudumiwa na chanzo hicho.

Kwa umuhimu huo na huduma inayotegemewa kupatikana kwa wananchi nadhani ofisi yako italipatia suala hili kipaumbele ili kuweza kupewa kibali maalumu ili kazi za ujenzi ziweze kuanza bila kuchelewa.

Natanguliza shukrani kwa ushirikiano wako.

Wako,

MAMLAKA YA MAJISAFI NA USAFI WA MAZINGIRA JIJINI MWANZA

Manyama Meck Manyama
Kaimu Mkurugenzi Mtendaji

Nakala.

Mkuu wa Magereza wa Mkoa
S.L.P 1073
MWANZA.

MHE. Mkuu wa Mkoa
Mkoa wa Mwanza
S.L. P 119
MWANZA.

MAMLAKA YA MAJISAFI NA USAFI WA MAZINGIRA JIJINI MWANZA

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Maji House,
Barabara ya Balewa,
S.L.P 317,
MWANZA.

Kumb.Na.UWSA/MZA/500/Vol. III/121 24 Oktoba, 2017

MKURUGENZI WA JIJI
JIJI LA MWANZA
SLP 1333
MWANZA

YAH: MAOMBI YA KUPATIWA RASMI ENEO KWA AJILI YA UJENZI WA TANKI LA MAJI NA KITUO CHA KUSUKUMIA MAJI BUHONGWA ENEOLA SAHWA PAMOJA NA KUONYESHWA MIPAKA YA BARABARA KWA AJILI YA KUPITISHA MITANDAO YA MABOMBA.

Tafadhari husika na somo tajwa hapo juu.

MWAUWASA inatekeleza mradi wa majisafi na usafi wa mazingira katika Jiji la Mwanza. Mradi huu unafadhiliwa na Serikali ya Jamhuri ya Muungano wa Tanzania pamoja na washirika wa maendeleo ambao ni Benki ya Maendeleo ya Ulaya (EIB) pamoja na Shirika la Maendeleo la Ufaransa(AFD)

Kwenye mradi huu, ambao sasa uko katika hatua za usanifu, tunategemea kujenga Chanzo kipya cha maji katika eneo la Butimba Magereza, tanki na kituo cha kusukuma maji eneo la Sahwa na maji hayo yatasambazwa maeneo ya Buhongwa, Sahwa, Kanindo, kata yote ya Lanhima pamoja na maeneo ya Igoma na Nyamhongolo. Maeneo haya ni yale ambayo kwa sasa yanapata maji kwa kiwango kidogo sana na mengine hayana maji kabisa.

Ili kufanikisha utekelezaji wa mradi huu tunaomba kupewa kiwanja cha kujenga tanki na kituo cha kusukumia maji eneo la Sahwa. Eneo linalotakiwa ni kama linavyooneshwa kwenye ramani zilizoambatishwa. Vipimo na "coordinates" zake zimeoneshwa kwenye ramani ukurasa wa kwanza na wa tatu.

Aidha, tunaomba kuoneshwa mipaka ya barabara kama ilivyoainishwa kwenye ramani kutoka eneo la Relini Buhongwa hadi Tanki la maji Igoma. Hii itasaidia kuepusha uhamishaji wa miundombinu ya maji wakati ambapo Halmashauri ya Jiji na TARURA watakapokuwa wanafanya ujenzi wa barabara shughuli ambayo mara nyingi hutumia fedha nyingi.

Kwa umuhimu huo na huduma inayotegemewa kupatikana kwa wananchi, ni matarajio yetu kwamba ofisi yako italipatia suala hili kipaumbele ili kuweza kupewa eneo husika kwa kufuata taratibu zilizopo na kupata kibali maalumu ili kazi za ujenzi ziweze kufanyika kwa wakati kweye maeneo hayo.

Natanguliza shukrani.

Deogratias Magayane
Kaimu Mkurugenzi Mtendaji

Nakala kwa : MH. Mkuu wa mkoa
Mkoa wa Mwanza
S.L. P 119
Mwanza.

Meneja wa TARURA
Halmashauri ya jiji la Mwanza
S. L. P 1333
MWANZA.

Appendix 6. Letter from Ministry of Home Affairs Regarding Acquisition of Land for Butimba WTP

JAMHURI YA MUUNGANO WA TANZANIA
WIZARA YA MAMBO YA NDANI YA NCHI
(Jeshi la Magereza)

Anwani ya Simu :" MAGEREZA"
Simu namba: (+255) - 022 : 2110314-6
Fax: (+255)-022: 2113737
Email: pcp @ prisons.go,tz
Unapojibu tafadhali taja:

Ofisi ya Kamishna Jenerali wa Magereza,
S. L. P. 9190
DAR ES SALAAM.

Kumb. Na.HQC.59/C/XI/37 8 Mei, 2018

Mkurugenzi Mtendaji,
Mamlaka ya Majisafi na Usafi wa Mazingira
Jijini Mwanza (**MWAUWASA**),
S.L.P. 317,
MWANZA.

Yah: **MAOMBI YA KUPATIWA RASMI ENEO KWA AJILI YA UJENZI WA CHANZO CHA MAJI NA CHUJIO LA KUSAFISHA MAJI KATIKA ENEO LA GEREZA BUTIMBA MWAMBAO WA ZIWA**

Tafadhali rejea barua yako Kumb. Na.UWSA/MZA/500/Vol.V/45 ya tarehe 27 Disemba, 2017 ikihusu somo tajwa hapo juu.

2. Napenda kukujulisha kuwa Mamlaka ya juu ya Wizara ya Mambo ya Ndani ya Nchi imeridhia mapendekezo yetu kuhusu ombi lako la kupatiwa rasmi eneo kwa ajili ya ujenzi wa chanzo cha maji na chujio la kusafisha maji katika eneo la Gereza Butimba, Mwambao wa Ziwa Victoria kama ulivyoomba.

3. Hivyo basi, kulingana na mapendekezo yaliyowasilishwa Wizarani, Wataalamu wa pande zote mbili wanatakiwa wakutane mapema kujadili hatua zote muhimu zinazotakiwa kuchukuliwa ili kufanikisha suala hili mapema. Wataalamu wa Ofisi hii wako tayari kukutana na wataalamu wakati wowote kuanzia sasa, hivyo pendekeza tarehe kwa ajili ya Kikao hicho. Aidha, kutokana na hali halisi ya kibajeti tunaomba gharama za Kikao chetu zitoke MWAUWASA.

Nakushukuru kwa ushirikiano wako.

Dr. J. A. Malewa
KAMISHNA JENERALI WA MAGEREZA

Appendix 7. Wastewater Treatment Plant Design Parameters

Pond Design Calculations			
Design temp	T	22	°C
Design flow	Q	12,500	m³/day
Anaerobic Ponds			
BOD in inlet	$L_{i,a}$	300	mg BOD/l
Eggs in inlet		500	eggs/l
Volumetric BOD loading	λ_v	320	g BOD/(m³*day)
Depth	D_a	4.0	m
Min. surface	A_a	2,930	m²
Min. volume	V_a	11,719	m³
Hydr. retention time	θ_a	0.94	days
Adopted retention time	$\theta_{a,adopt}$	2.0	days
BOD removal	$R_{BOD,a}$	64	%
BOD in effluent	$L_{e,a}$	108	mg BOD/l
Egg removal	$R_{egg,a}$	84	%
Eggs in effluent		80	eggs/l
Design surface	$A_{a,d}$	6,250	m²
Design volume	$V_{a,d}$	25,000	m³
Sludge Drying Beds			
Desludging		8,333	m³
Accumulated sludge	s	0.040	m³/(PE*yr)
Desludging, every	n	3	yr
Yearly sludge accumulation	s_{tot}	3,000	m³/yr
Cycle time		20	days
Operation		120	days/yr
Layer of applied sludge		0.30	m
Sludge drying beds	$A_{sb,d}$	1,667	m²
	A_p	0.022	m²/person

Maturation Pond 2			
BOD in inlet	$L_{i,m2}$	51	mg BOD/l
E coli in inlet	$N_{i,m2}$	26,320	counts per 100 ml
Depth	D_{m2}	1.2	m
Surface BOD loading	λ_s	129	kg BOD/(ha*day)
Hydr. retention time	θ_{m2}	4.8	days
	k_b	0.11	days^{-1}
BOD in effluent	$L_{e,m2}$	34	mg BOD/l
	$k_{N(T)}$	3.7	days^{-1}
E coli in effluent	$N_{e,m2}$	1,410	counts per 100 ml
Design surface	$A_{m2,d}$	50,000	m²
Design volume	$V_{m2,d}$	60,000	m³
Maturation Pond 3			
BOD in inlet	$L_{i,m3}$	34	mg BOD/l
E coli in inlet	$N_{i,m3}$	1,410	counts per 100 ml
Depth	D_{m3}	1.2	m
Surface BOD loading	λ_s	84	g BOD/(ha*day)
Hydr. retention time	θ_{m3}	4.8	days
	k_b	0.11	days^{-1}
BOD in effluent	$L_{e,m3}$	22	mg BOD/l
	$k_{N(T)}$	3.7	days^{-1}
E coli in effluent	$N_{e,m3}$	75	counts per 100 ml
Design surface	$A_{m3,d}$	50,000	m²
Design volume	$V_{m3,d}$	60,000	m³

Maturation Pond 2			
BOD in inlet	L_{inM2}	51	mg BOD/l
E coli in inlet	N_{inM2}	26,320	counts per 100 ml
Depth	D_{M2}	1.2	m
Surface BOD loading	λ_s	129	kg BOD/(ha*day)
Hydr. retention time	θ_{M2}	4.8	days
	k_b	0.11	days^{-1}
BOD in effluent	L_{eM2}	34	mg BOD/l
	$k_{E(T)}$	3.7	days^{-1}
E coli in effluent	N_{eM2}	1,410	counts per 100 ml
Design surface	$A_{M2,d}$	50,000	m^2
Design volume	$V_{M2,d}$	60,000	m^3
Maturation Pond 3			
BOD in inlet	L_{inM3}	34	mg BOD/l
E coli in inlet	N_{inM3}	1,410	counts per 100 ml
Depth	D_{M3}	1.2	m
Surface BOD loading	λ_s	84	g BOD/(ha*day)
Hydr. retention time	θ_{M3}	4.8	days
	k_b	0.11	days^{-1}
BOD in effluent	L_{eM3}	22	mg BOD/l
	$k_{E(T)}$	3.7	days^{-1}
E coli in effluent	N_{eM3}	75	counts per 100 ml
Design surface	$A_{M3,d}$	50,000	m^2
Design volume	$V_{M3,d}$	60,000	m^3

Source: COWI, January 2017. Master Plan, including STIP and LTIP

Appendix 8. Public Consultations

Appendix 8-1. Consultation Meeting held in Mwanza City Council on 10 March 2018

S/No.	Issues & Comments from the Community/Institutions	Remark/Action by the E&S Study Team
1.	How Nyamagana Municipality will 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 land owners 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 Mkuyuni area was not considered 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 the gravity and it will connect large wastewater scheme. However, new Mkuyuni WWTP will be covered under Long-Term Investment Plan (LTIP) as per new 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 new 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 servicing 40,000 (2015) to 850,000 inhabitants (2040).

Appendix 8-2. 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 on 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 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 minimal buffer of 100m to avoid encroachment by the nearby community, livestock grazing and agricultural activities within the vicinity of the proposed location.

Appendix 8-3. 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 perimeter 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 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 pipe works from their premises to the manhole or inspection chamber of the wastewater scheme.

Appendix 8-4. 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 the alternative site for the proposed Igoma WWTP was 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 the peri-urban areas like Nyamadoke not extensively covered under STIPs compared to the proposed areas which have already 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 Water Supply project at Nyamadoke area connected to the proposed project under STIP?	The on-going construction of 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.

S/No.	Issues & Comments from the Community/Institutions	Remark/Action by the E&S Study Team
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).
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 odour and nuisance from the untreated sewage channelled to the ponds.
7.	Why the project proposed the construction of Igoma Mid-Level Reservoir while there is the existing Igoma High-Level Reservoir?	The project aims to increase the required hydraulic heads in the distribution networks since these two tanks will be interconnected during the operation phase.
8.	Why Nyamhongolo ward is proposed for the construction of Igoma WWTP and not water supply project?	STIP is covering 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 8-5. 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 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	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.

S/No.	Issues &Comments from the Community/Institutions	Remark/Action by the E&S Study Team
	constraints, what would be the fate of the project/	
3.	Does the cost of water tariffs will 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 Buswelu Storage Reservoir?	The selected tank location for Buswelu Reservoir was Buswelu hill which is at a high point enough to command the hydraulic flows to the targeted areas.
5.	Many projects get failed 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 to 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 servicing 40,000 (2015) to 850,000 inhabitants (2040).

Appendix 8-6. Meeting with Buhongwa ward community in Mwanza City 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 incidences of vandalism from the communities.	All pipes will be laid at the required trench depths as per designs.

S/No.	Issues &Comments from the Community/Institutions	Remark/Action by the E&S Study Team
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.
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 healthy 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 need 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 decrease the concentration of residual chlorine in relation with the time of travel which is long.	Post chlorination will be done at the tank before water flowing to the end-users.

Appendix 8-7. Meeting with Butimba ward community in Mwanza City 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 heads.	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 reservoirs location was based on the areas with highest points to enable free hydraulic flows to the nodes as per design.
2.	Does the cost of water tariffs will 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

S/No.	Issues &Comments from the Community/Institutions	Remark/Action by the E&S Study Team
		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 properties, e.g., land, etc by considering the possible design 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 community for ownership purposes.
9.	Bad experience from previous projects there 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.	Does 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 by poor coverage of water supply scheme, thus necessitate these customers to share the costs of the water supply extension works.

Appendix 8-8. Meeting with Igoma ward community in Mwanza City Council
Venue: Igoma ward office
Date: 3 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 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.

S/No.	Issues &Comments from the Community/Institutions	Remark/Action by the E&S Study team
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 takes for pipeline routes when traverse the farms or plots are less than 10% of the total areas, thus considered as a minor impact and temporal.
5.	The operation of 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 Mwanza City Council 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 8-9. 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 ground water 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 contents which interfere the biological treatment of these ponds.	Thoroughly 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 compliance with the permissible/allowable standards according to Tanzania Standards.

Appendix 8-10. 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.

S/No.	Issues & Comments from the Community/Institutions	Remark/Action by the E&S Study Team
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 8-11. 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 until the household gets a water connection inside
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.

S/No.	Questions/Issues	Responses Given
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 educative 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 monthly water bills which are already very high?	Customers can take simple measures such as closing the tap when no water is really required, repairing leaking pipes, etc. Adults should also educate / instruct their children to avoid misuse of water
17.	Customers face 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-level 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 haphazard location of the houses?	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 addition, the household must be connected to water supply.

S/No.	Questions/Issues	Responses Given
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 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 un-skilled or semi-skilled labour. Contractors are expected to provide these opportunities.

Appendix 8-12. 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 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 roadways 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

S/No	Questions/Issues	Responses Given
		connections will be received and processed as per current procedures.
8.	When the valuation of affected properties will 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 of 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 and are being constructed in different places for distribution and small distribution pipes will be laid to supply 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 works, or complain of low payment and run away. They should be prepared, and the hard workers will get opportunities.	Good observation and well noted.

Appendix 9. Water Analysis Report for Butimba Site, 2010-14

Year	Month	PH	Turbidity (NTU)	TDS (mg/L)	Fluoride (mg/L)	Iron (mg/L)	Manganese (mg/L)	Nitrate (mg/L)	E.coli (CFU/100 mL)
2010	August	7,0	6,5	50,4	0,27	0,06	0,15	0,03	1300
2010	September	7,1	7,2	49,7	0,22	0,15	0,11	0,03	150
2010	October	7,1	6,0	50,2	0,22	0,02	0,13	0,01	0
2010	November	7,2	11,2	46,9	0,19	0,06	0,12	0,02	170
2010	December	7,2	5,9	48,5	0,23	0,11	0,11	0,03	100
2011	January	6,9	6,2	47,0	0,13	0,10	0,12	0,05	200
2011	February	7,0	6,3	45,0	0,26	0,04	0,02	0,01	100
2011	March	7,3	6,2	50,0	0,17	0,07	0,09	0,03	500
2011	April	7,1	7,1	45,5	0,14	0,07	0,08	0,02	1800
2011	May	7,1	7,7	46,6	0,17	0,05	0,06	0,03	2000
2011	June	7,4	6,8	47,1	0,21	0,08	0,05	0,04	1500
2011	July	7,6	7,2	47,2	0,24	0,06	0,05	0,02	100
2011	August	7,4	6,3	46,9	0,22	0,07	0,07	0,04	1000
2011	September	7,2	6,9	47,3	0,23	0,17	0,06	0,04	1500
2011	October	7,2	7,0	46,9	0,22	0,09	0,05	0,05	2000
2011	November	7,3	8,6	47,7	0,23	0,11	0,06	0,04	1500
2011	December	7,3	9,6	47,4	0,22	0,17	0,04	0,04	2000
2012	January	7,5	9,2	47,9	0,22	0,10	0,05	0,08	800
2012	February	7,9	7,4	47,1	0,26	0,04	0,02	0,05	1000
2012	March	7,7	7,9	46,7	0,25	0,05	0,03	0,05	800
2012	April	7,8	8,1	44,7	0,15	0,10	0,06	0,04	1500
2012	May	7,9	6,9	46,6	0,20	0,15	0,04	0,04	800
2012	June	7,8	7,5	46,6	0,15	0,20	0,05	0,05	1500
2012	July	8,1	7,3	47,3	0,20	0,12	0,11	0,05	1000
2012	August	7,4	6,3	47,9	0,22	0,15	0,07	0,05	900
2012	September	7,6	5,0	48,1	0,23	0,21	0,05	0,04	1020
2012	October	7,7	7,9	49,5	0,20	0,18	0,05	0,05	100
2012	November	7,9	6,7	47,6	0,25	0,15	0,08	0,01	2800
2012	December	7,7	5,8	47,7	0,21	0,17	0,08	0,07	1050
2013	January	7,8	6,9	48,1	0,22	0,18	0,09	0,07	850
2013	February	7,4	5,3	47,5	0,21	0,46	0,09	0,02	300
2013	March	7,4	4,9	47,6	0,00	0,38	0,07	0,02	300
2013	April	7,4	5,0	47,9	0,20	0,40	0,08	0,05	2540
2013	May	7,2	4,7	47,3	0,31	0,34	0,60	0,05	850
2013	June		4,6	46,9	0,29	0,35	0,70	0,05	110
2013	July		5,1	46,8	0,53	0,35	0,83	0,05	0
2013	August		5,2	46,5	0,76	0,33	0,75	0,05	1500
2013	September		5,8	47,0	0,40	0,35	0,87	0,05	1700
2013	October		5,2	47,1	0,25	0,45	0,67	0,05	1900
2013	November		5,9	52,6	0,20	0,18	0,09	0,04	2000
2013	December		5,9	52,6	0,20	0,18	0,09	0,04	2000
2014	Jan		5,8	46,7	0,77	0,07	0,16	0,04	5000
2014	February		5,3	46,9	0,63	0,10	0,20	0,04	3000
2014	April	8,1	3,5	47,1	0,40	0,05	2,66	0,05	2800
2014	May	8,1	2,9	46,9	0,56	0,05	2,57	0,03	800
2014	June	8,2	3,6	47,0	0,29	0,04	2,70	0,03	600
2014	July	8,4	3,4	47,1	0,23	0,01	0,60	0,04	100
2014	August	8,4	3,6	46,8	1,01	0,02	2,45	0,04	100

Source: COWI, January 2017. Master Plan, including STIP and LTIP

Appendix 10. Environmental and Social Impact Tables

The overall impact of the proposed interventions is positive but some impacts will or may negatively affect the communities in the study area. Table A8-1 provides a key to the significance of the identified impact criteria.

Table A8-2 presents a preliminary listing of potential interventions that may be undertaken as part of the Mwanza Water Supply and Wastewater works under STIP with their expected environmental and social impacts, positive and negative.

Table A8-1. Significance of impact criteria

Magnitude of potential impact	**Sensitivity of receptors**			
	Very severe	Severe	Mild	Low / negligible
Major	Critical	High	Moderate	Negligible
Medium	High	High	Moderate	Negligible
Minor	Moderate	Moderate	Low	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

Table A8-2. Potential interventions and expected adverse environmental and social impacts

Intervention	Potential impact	Impact duration	Spatial extent	Reversible (Y/N)	Likelihood	Magnitude	Sensitivity	Significance prior to mitigation	Significance after mitigation	Mitigation measure
No-project scenario										
None	Continued lack of piped treated water, poor water quality	Long term	Local	Yes	Certain	Major	Severe	High negative	--	--
With-project scenario										
All interventions	Availability of treated piped water	Long term	Local	Yes	Certain	Major		High positive		
Impacts related to pre-construction, planning and design										
Surveys	Employment generation	Temporary	Local	Yes	Possible	Minor	Low	Positive	--	--
Surveys	Vegetation loss through clearance	Temporary	Local	Yes	Possible	Minor	Low	Low negative	Negligible	Limit vegetation clearance as much as possible
Surveys	Temporary obstruction of access roads	Temporary	Local	Yes	Possible	Minor	Low	Low negative	Negligible	Signage & community sensitization
Surveys	Soil erosion	Temporary	Local	Yes	Possible	Minor	Low	Low negative	Negligible	Conduct during dry season; erosion control
Surveys	Traffic increase	Temporary	Local	Yes	Possible	Minor	Low	Low negative	Negligible	Speed limits
Surveys	Noise from geotechnical surveys	Temporary	Local	Yes	Possible	Minor	Low	Low negative	Negligible	Noise silencers
Surveys	Noise from transport	Temporary	Local	Yes	Possible	Minor	Low	Low negative	Negligible	Sound mufflers
Surveys	Accidents	Temporary	Local	Yes	Possible	Minor	Low	Low negative	Negligible	Sensitize & instruct drivers
Construction										
Site clearing	Vegetation clearance	Temporary	Local	Yes	Likely	Minor	Low	Low negative	Negligible	Limit as much as possible
Site clearing	Disturbance to cultural, historical & archaeological art.	Permanent	Local	No	Unlikely	Negligible	Low	Low negative	Negligible	Provide fair per compensation timely

Intervention	Potential impact	Impact duration	Spatial extent	Reversible (Y/N)	Likelihood	Magnitude	Sensitivity	Significance prior to mitigation	Significance after mitigation	Mitigation measure
All works	Disturbance to land use, scenic & visual quality	Temporary	Local	Yes/No	Possible	Minor	Mild	Low negative	Negligible	Blend-in & provide landscaping afterwards
All works	Disturbance to residents & resettlement	Temporary	Local	No	None identified	Negligible	Mild	Low negative	Negligible	Provide fair compensation timely
All works	Land scarring at borrow pits	Temporary	Local	Yes	Likely	Minor	Low	Low negative	Negligible	Landscaping afterwards
All works	Noise & vibration	Temporary	Local	Yes	Likely	Minor	Low	Low negative	Negligible	Silencers to be used
All works	Soil erosion	Temporary	Local	Yes	Possible	Minor	Low	Low negative	Negligible	Slope protection, silt trap, dry season timing, etc
All works	Traffic intensity increase	Temporary	Local	Yes	Likely	Minor	Low	Low negative	Negligible	Driver sensitization, control plan, signage
All works	Water contamination from fuel &lubricant leakage	Temporary	Local	Yes	Possible	Minor	Low	Low negative	Negligible	Dripping pans, re-fuelling on designated areas, contaminated soil collection & disposal
All works	Poor air quality, dust & emissions	Temporary	Local	Yes	Likely	Minor	Low	Low negative	Negligible	Water sprinkling, use dust masks and goggles, speed limits and load covers
All works	Spread of disease (e.g. AIDS/HIV)	Temporary	Local	Yes	Possible	Medium	Mild	Moderate negative	Low negative	Sensitization & health awareness; worker's screening
All works	Safety	Temporary	Local	Yes	Likely	Medium	Mild	Moderate negative	Low negative	Appropriate warning & control
All works	Solid & liquid waste generation	Temporary	Local	Yes	Likely	Minor	Low	Low negative	Negligible	Site housekeeping, garbage bins, officer-in-charge, trash & waste collection & disposal
All works	Vandalism & damage of pipes	Temporary	Local	Yes	Possible	Medium	Mild	Moderate negative	Low negative	Fencing off, regular control, offence & penalty

Intervention	Potential impact	Impact duration	Spatial extent	Reversible (Y/N)	Likelihood	Magnitude	Sensitivity	Significance prior to mitigation	Significance after mitigation	Mitigation measure
Operation and Maintenance										
O&M	Disturbance from pumps & engines	Regular	Local	Yes	Possible	Minor	Low	Low negative	Negligible	Noise silencing equipment
O&M	Pollution of soil & surface/ground waters by effluents from PS & WTP	Regular	Local	Yes	Possible	Minor	Low	Low negative	Negligible	Regular testing followed by repair or additional treatment
O&M	Health risk to laboratory attendant	During water treatment & testing	Local	Yes	Possible	Minor	Mild	Moderate negative	Negligible	Proper training and equipment
O&M	Vandalism to WS system	Regular	Local	Yes	Likely	Minor	Mild	Moderate negative	Negligible	Regular control, offence & penalty

Appendix 11. Comments Received on the Draft ESIA

This Appendix presents the comments received from members of the TAC meeting held on 14th May 2018, and the responses of the ESIA Team explaining how these comments have been addressed in the final ESIA report.

General

S.N.	Comment	EIS Team Response/Action
1.	Although some of the structures will be constructed in land owned by the Government Institutions, there is formal agreement regarding the acquisition of such land. It is expected in the final EIS the agreements will be annexed in the report.	Consultations are continuing regarding this issue. Letter from Ministry of Home Affairs relating to acquisition of land for Raw Water Intake and Treatment Plant in Butimba area is given in Appendix 6.
2.	Has the consultation with TARURA/TANROADS been conducted on the use of road reserves?	Consultations have been held with TARURA/TANROADS. This has been done. The official request letters are included in Appendix
3.	Detailed designing parameters for the Waste Water Stabilization Ponds are needed to ensure that water will be treated to the levels that meet National Effluent Standards. Inclusion of constructed wetland in the design must be included.	The WWTP Design parameters are given in Appendix 7. Proponent will make necessary technical and financial arrangements to enable inclusion of constructed wetland in a future phase as advised.
4.	There should be prior arrangement in the design particularly for industrial waste water to ensure there is pre-treatment before being discharged into the system.	Industrial effluents will be discharged into the Sewerage System only after meeting minimum standards especially regarding the chemical parameters.
5.	Are there any plans for the use of sludge from the Waste Water Stabilization Ponds? Will it be socially accepted e.g. in the use as fertilizers?	There are currently no plans to utilize the sludge from the WWTP. The experience from the similar Ilemela WWTP is that there is ample space to store the sludge on site until beneficial

		us is identified e.g. as fill for borrow sites.
6.	Is there any kind of study that has been conducted to estimate amount of waste water that can potentially being generated from the targeted areas?	Study was carried out by COWI in 2016. The design parameters are based on this study and are available in the design report i.e. COWI (2017)
7.	They should apply for water use permit from Lake Victoria Basin Water Board according to Water Resources Management act No. 11 of 2009 section 43(1) and also should apply for Discharge permit if discharge of waste water to environment will be necessary. And this according to Water Resources Management Act No. 11 of 2009 section 63(1)	Consultations have been held with LVBWB who have indicated that applications for water use permits and wastewater discharge permits will be considered on completion of the construction to enable checking of the systems.
8.	The project must be registered with OSHA during construction and operation phases.	Note taken. This will be done after award of contracts for construction of the works
9.	As we know the nature of Mwanza Region is rock, there is possibility of meeting rock area during the excavation for trenches. Therefore proponent should mention the method is going to use when he meet with this situation.	This is detailed in the Tender Specification documents. Contractors may have to use blasting, for which mitigation measures are indicated in the ESMPs

Review Area 1
Description of the Development Local Environment and Baseline conditions:

S.N.	Comments	EIS Team Response/Action
1.	Front Page; in the Final EIS indicate the exact date for which the EIS was submitted to the Council.	
2.	Miscellaneous typographical errors	Corrections have been made throughout the document
3.	Page vii, section 6; provide a description of the WWTP in terms of number of anaerobic ponds, facultative ponds and maturation	Description of the WWTP has been provided in detail in Section 2.4.8. The process of acquisition of the land from individual owners is underway

	ponds. What will be the footprint of the WWTP in terms of total size? o Is the 36.5 ha land already acquired?	and shall be completed before start of construction.
5.	Page 9, section 2.3 can be moved to chapter 4 i.e. baseline conditions.	Some of the information has been moved to Chapter 4
6.	In page 9, Item 2.3.1 Existing Water Supply Conditions. I think it will be good if the proponent mention the current daily water demand of Mwanza City. Capacity of existing Wastewater Treatment Plant and The amount of wastewater produced by the community of Mwanza city	The information has been provided in sections 2.3.1 and 2.3.2
7.	Page 14, section 2.5.3; bullet 3; it is not clear how the routine collection, transfer and safe disposal of solid wastes is linked to the project. Also in last paragraph where is the landfill information coming from?	This has been elaborated in section 2.5.3.
8.	Page 14 section, sub section 2.6.1 (Waste during construction), where (place) these spoiled soil, liquid wastes and metal scraps be damped?	This has been elaborated in section 2.6.1
9.	Page 14, section 2.6; with regard to the waste to be generated, describe how the wastes will be managed.	This has been described in Section 2.6
10.	Page 15, provide estimates of materials to be used during construction and their sources.	This is explained in Section 2.6
11.	Page 16, this chapter should have been Policy, Legal and Administrative Framework. o Make sure that for policies and legislation, there is a commitment statement in the implementation of the provisions by the proponent (how the proponent is committed to the implementation of the provisions.	Description of all the relevant Policies and legislation has been reworded accordingly and commitment shown in Chapter 3.

12.	Page 18, section 3.2.10; provide a brief description of the Tanzania Development Vision, Forestry Policy and National Health Policy provisions that are relevance to the project.	This is addressed in Section 3.1 and 3.2.10
13.	Page 24 section 3.6, sub section 3.6.1 (Central Government Agencies), line 3, written as water licenses. It should be written as Water Use Permit	This has been corrected
14.	Page 27, section 4.2.3; can you provide information on the ground water level at the project site.	
15.	Page 28 table 4-1 water quality measurement in Lake Victoria at Mwanza (Capri point intake area). Is it Capri point intake area or Butimba intake area?	The measurements are for Butimba raw water intake site
17.	Page 44, Item of Picture of public consultation meeting at Mtaa level. The proponent should write the title of each picture by mention the name of Mtaa and Ward which conducting the meeting	Picture captions have been given to indicate the Mitaa.

Review Area 2: Identification and Evaluation of key impacts:

S.N.	Comments	EIS Team Response/Action
1.	Page 50, bullet viii; contamination could also result from the mismanagement of used oil and used oil filters.	This has been noted and incorporated in section 6.4.2 (viii). More explanation on proper sludge management is given in section 2.4.8
2.	Page 54, section 6.5.2; consider impacts associated with mismanagement of the sludge from the WWTP. Also impacts associated with flood hazards in the WWTP.	These impacts have been incorporated in section 6.5.2, Table 7.3 and in the ESMP (Table 8-3)

3.	Include impacts associated with the decommissioning phase.	
4.	Page 55, section 6.6.4; the explanation in this section does not reflect the heading.	The alternative WWTP under consideration is described in section 6.6.4

Review Area 3: Alternatives, mitigations, EMP, and commitment

S.N.	Comment	**EIS Team Response/Action**
1.	Page 59, under generation of construction solid and liquid waste; there is sanitary landfill in Mwanza.	This has been corrected.
2.	Table 7.3; under Odour nuisance; how adequate is the buffer zone. Can you provide specific size of the buffer zone?	The buffer zone is 100 metres wide. Details of the buffer zone are given in Section 2.4.8
3.	Under influx of birds; who is supposed to ensure that design is efficient enough to facilitate removal of all nutrients? Right from the beginning the design must ensure the parameters are met.	Design is the responsibility of the Project Proponent (MWAUWASA). The approved design observed followed all the standard criteria set by MOWI as shown in the Final Design Report, COWI (2017).
4.	Page 60, under pollution of soil and surface and ground water, inclusion of artificial wetland must be part of the design to improve efficiency of the system.	Construction of artificial wetland is one of the mitigation measures proposed. A feasibility study will be carried out before it is constructed.
5.	Page 63, include mitigation measures that may result from the impacts associated with the mismanagement of the sludge.	This has been included in ESMP Table 8.3
6.	Page 85, section 9.2.4; is demobilization the same decommissioning? The term is normally used after construction	This section refers to demobilization. Decommissioning is discussed separately in Chapter 10.

	where some demobilization activities are conducted.	
7.	Page 86, table 9.1; include a column with standards/target for parameters to be monitored. Where the standards are known put the number for such standard.	This has been done in Table 9.1

Review Area 4: Stakeholder participation and communication of results

S.N.	Comment	EIS Team Response/Action
1.	Page 119, annex 7; where were these analyses is conducted?	The samples were taken at Butimba Raw Water Intake site. Note that this is now Appendix 9

Formatting/Printing:

S.N.	Comment	EIS Team Response/Action
1.	Page 7&8; figures 2.1&2.2 are not clear.	Note taken for printing
2.	Page 11 &12 print the figures in A3 papers	Note taken for printing
3.	Page 46, print table 6.1; in a landscape format.	Note taken for printing
4.	Page 102, annex 5 improve the Annex is not readable	Note taken for printing
5.	Page 122, Table A8-2; print this table in a landscape format.	Note taken for printing
6.	Improve the readability of the document by printing some of the tables in landscape and printing figures in A3 and in colour. The A3 can be put as annexes.	Note taken for printing