LVWATSAN – Mwanza
Environmental and Social Impact Assessment Report for Construction and Operation of a Faecal Sludge Treatment Plant in Lamadi Town, Busega District, Simiyu Region – Tanzania

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MOTT MACDONALD

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Mwanza Urban Water Supply and Sanitation Authority (MWAUWASA)

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Issue and revision record

Revision	Date	Originator	Checker	Approver	Description
01	10 February 2016	MMD / UWP Salim			Draft ESMP for internal review.
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03	1 August 2016	MMD / UWP Salim	Benthem		Initial draft ESIA for internal review.
04	19 August 2016	MMD / UWP Salim	Benthem	Waterkeyn	ESIA for submission to NEMC for review and approval.
05	29 March 2017	MMD / UWP Benthem Nshange	Nshange	Waterkeyn	Final Report, incorporating NEMC's Review Committee's comments received on 10/3/2017.

Signed on behalf of the ESIA Study Team:

Wandert Benthem, E&S Lead Consultant, Project Management Consultant, LVWATSAN – Mwanza Project

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List of Abbreviations

AFD	French Development Agency
DED	Detailed Engineering Design
DoE	Department of Environment
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)
MCC	Mwanza City Council
MDG	Millennium Development Goals
MoWI	Ministry of Water and Irrigation
MSF	Multi-Stakeholder Forum
MWAUWASA	Mwanza Urban Water 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)
STP	Sexually Transmitted Diseases
STIP	Short-term Investment Plan (for LVWATSAN)
USD	United States Dollar
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 proposed faecal sludge treatment plant for Lamadi town in Busega district in Simiyu region.

Special thanks are expressed to the Busega District Executive Director and MWAUWASA's technical managers, Environmental experts who carried this study and NEMC's Lake Zone staff for their vital contributions and their assistance during various project's consultations.

The team of experts that carried out the Environmental and Social Impact Assessment Study is presented below.

Name	Title	Qualification & Experiences
Ally Salim	Registered EIA Expert and Lead Consultant (Team Leader)	Bsc. Env. Mgt, Msc. NARAM Cert. in Sustainability Economics & Mgt
Salvatory S. John	Registered EIA Expert	Bsc. Geog & and Env/Sociologist
Naomi Kiwia	EIA Assistant	Environmental Science
Wandert Benthem	Registered EIA Expert	MSc Biology, Free University, Amsterdam

Note 1: As Mott MacDonald, the lead consultancy firm contracted by the EIB as the Project Management Consultant, is not a registered firm in Tanzania, it subcontracted the ESIA study to Mr Ally Salim, who is a NEMC-registered EIA expert. As Mr Salim was not available for further inputs to the study since August 2016, incorporation of the comments of the NEMC Review Committee and finalization of the present report was done and signed-off by Mott MacDonald's employee Mr Wandert Benthem, who is a NEMC-registered EIA expert as well.

Note 2: Simultaneously to this ESIA study, an Abbreviated Resettlement Action Plan (ARAP, March 2017) has been produced by the project promoter which provides further detail on land ownership of the key project locations (raw water intake area, water storage reservoirs, faecal sludge treatment plant) as well as on the Project Affected People (PAP) that have been identified thus far. The ARAP is considered as being an integral but separate part of the present ESIA report.

Executive Summary

Title of the Project

Environmental and Social Impact Assessment (ESIA) study for construction and operation of a Faecal Sludge Treatment Plant for Lamadi town.

Name of the proponent and contact

Developer: Mwanza Urban Water Supply and Sanitation Authority (MWAUWASA)
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Brief description of the Proposed Project

The proposed works for Lamadi town are part of the ongoing LVWATSAN – Mwanza Project (2014-2020) which 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 of plans for the rehabilitation and expansion of existing water supply infrastructure and the construction of a faecal sludge treatment plant in three satellite towns of Mwanza City, i.e. in Misungwi, Magu and Lamadi, and the implementation of these plans. The present ESIA is for the construction and operation of a faecal sludge treatment plant for Lamadi town only. A separate ESIA deals with the water supply component.

At present in Lamadi town there is no treatment of faecal sludge being generated in septic tanks and pit latrines. The local administration organizes private operators with suction trucks to empty septic tanks and latrines and when a minimum number of users are willing to pay, the private operator is called to service several sites at the same time. As there is no appropriate site for disposal of the faecal sludge, the waste is dumped in fields nearby where the private operator has an agreement with the landowner.

The objective of the proposed works is to develop a system that provides simple cost-efficient latrine/cesspit emptying, removal and treatment capacity for the town. The main challenge is the long-term sustainability with respect to adequate cost-recovery to finance future O&M, where high fees from users are not feasible, hence the O&M costs must be designed to be low (affordable). Using appropriate technologies fit for the town's conditions will give a low capital investment compared to ordinary hi-tech solutions and also give lower O&M costs.

A proposed facility will be constructed for collection, disposal and treatment of faecal sludge generated within Lamadi since the township expands rapidly. Hence, MWAUWASA through the Lake Victoria Water and Sanitation Project, financed under the European Union (EU) Africa Infrastructure Trust Fund within the overall context of the EU and Africa Strategic Partnership proposed the construction of a faecal sludge plant to enhance sanitation.

The overall layout is designed for a total of four settling-thickening ponds with two drying beds for each pond. Only the first two units (Ponds A and B) will be constructed initially with space reserved for future expansion for additional capacity (Ponds C and D).

This first stage of the proposed development will involve mobilization of the construction human resource, construction equipment and plant and construction materials. Also, as required, the Contractor will hire labour and erect necessary temporary facilities to cater for offices and storage yards within the construction site. The mobilization phase will also involve the purchase and stockpiling of materials such as aggregates, sand, cement, timber and reinforcing steel. The construction phase will involve:

- Setting out to demarcate rights of way, work areas, clearing limits. Access roads, detours, bypasses and protective fences;
- Site preparation;
- Excavation of foundations;
- Trench sheeting and bracing to protect trench side walls – the site has a high water table, therefore dewatering during sewer construction is expected;
- Pouring concrete to bases of foundations;
- Backfilling, disposal of overburden and surface restoration to match the condition that existed prior to the sanitary sewer construction.

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

During operation of the facilities, trucks will be employed for the collection of sludge from households' and institutions' septic tanks and soakaway pits and offloaded at the facility. Effluent from the settling-thickening ponds will be drained into an on-site septic tank, from where the effluent spills into the ground. Faecal sludge must be three (3) years old before being applied for agricultural use as a soil conditioner, as to secure the elimination of Ascaris eggs (parasitic helminth).

There are two concerns for groundwater protection, these are the potential pathogen movement in the groundwater and the infiltration of soluble nutrients. Due to their size, the pathogens will adhere to the soil particles and not move very far. With a minimum safe distance of 100 m for ordinary soil, there will be no pathogens in the groundwater outside this distance. The soluble nutrients, such as nitrate from urine, will move with the groundwater, but will be diluted to a level where there is no health risk. It is assumed that most of the nitrate has already infiltrated at the site of origin, that is near the households from the infiltration of liquid waste the septic tanks and pit latrines.

Brief description of the project environment

Lamadi town sits amidst degraded savannah terrain, occupied by scattered plots of cultivation (rice, maize, beans), pockets of low shrub and isolated trees (fruit, utility). Fallow land is used for keeping livestock (cattle, sheep, goat). Due to this cultivation and land use, and despite its close proximity to Serengeti National Park (Ndabaka Gate is only 4 km north of the town) little remains in terms of undisturbed natural habitat and therefore the area is believed to have little biodiversity value, except for some isolated privately owned pockets (e.g. Speke Bay lodge). Nevertheless small groups or individuals were noted of heron, egret, stork and ibis species, mainly feeding along and in rice fields and other cultivated areas. The land assigned for the faecal sludge treatment land is currently communal grazing land.

Stakeholder consultation and public involvement

The design team, UN-Habitat and the ESIA team conducted public participation activities for the proposed works. Accordingly, issues arising from this process were incorporated in the report and were used in determining mitigation measures for the project. This included the identification of organizations, groups

and individuals considered to be regarded as "stakeholders". Comments or concerns drawn from public meetings and the corresponding response from the consultants have been presented in this report. Among others the stakeholders required the project to be implemented as early as possible. They also demanded the road to the project site and employment.

Expected positive impacts of the proposed works

- Improved quality of health from proper management of faecal matter that would otherwise be dumped haphazardly and drain into rivers where others may become in contact.
- Improved water quality in rivers and subsequent reservoir downstream.
- Increased agricultural products due to availability of manure.
- Employment and some business opportunities will be direct benefits to the neighbouring communities during the construction and operation phase of the project.
- This is likely to boost the household incomes and improve the living standards of the local community and other populations from the neighbouring and other areas.
- Government coffers will equally benefit from statutory contributions made by the contractor for his employees.
- Sales from construction materials will have value added tax that goes to the government.
- It is also anticipated that properly treated sludge can be re-used as fertilizer to increase agricultural productivity through minimization of the chemical fertilizers, which are potential pollutants of Lake Victoria and the soil in general.
- Similarly, the properly treated supernatant overflow from sludge digestion process can be used for land irrigation.

Potential negative impacts of the proposed works

Pre-construction, Planning and Design Phase – This phase was at time of finalization of this ESIA report already completed.

Construction Phase

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

Demobilization Phase

- Generation of waste.

Operation Phase

- Potential pollution to ground and surface waters;
- Bad smell and mosquito breeding;
- Safety concerns.

Explanation on why some impacts are not addressed

All potential impacts are believed to have been addressed in the present ESIA Report.

Environmental and Social Mitigation Measures

The core of the present report is the Environmental and Social Management Plan (ESMP) that outlines for the identified Project activities what the expected negative impacts may be, which mitigation measures are recommended, and who is responsible for the implementation of these measures. This has been done for three distinct phases: construction, operation of the facilities, and decommission (closure). Negative impacts are considered to be of a local nature and small-scale, and can be mitigated through proper management and at limited costs.

Alternatives considered

Alternative Project Location – The targeted site for the facility had been selected during the early stages of project design in accordance with a list of criteria that were to be met. The selected location is in accordance with the District Council's Land Use Plan. One of the advantages of the site is that the land is already government-owned, and that no people reside or farm at or near the location. Therefore, no other locations were considered or proposed by the ESIA Study Team.

Do-Nothing – Under this alternative, the sludge treatment plant would not be constructed and operated and the unsanitary conditions associated with the removal and dispersion of raw faecal sludge around the town would continue. Given the rapidly expanding population of the town this option would imply the increased and continued pollution (nutrient and pathogen) loading of lands, streams, and ultimately of Lake Victoria. As this would not be in line with the regional LVWATSAN Initiative, this is not a desired option.

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

Technology Alternatives – The concept design was guided by the requirement to select a low-cost option for faecal sludge treatment. This ruled out the construction of a conventional but costly underground sewerage system. No other technical alternatives have been considered by the ESIA study team.

Environmental and Social Management Plan

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

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

Environmental and Social Monitoring Plan

Monitoring of the faecal sludge treatment plant is a long-term process that begins at construction and continues throughout the life of the project. 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 project life. Based on the monitoring plan presented in this report, the project contractor will prepare their Environmental and Social Monitoring Plan covering the mobilization, construction, commissioning and demobilization phases of the project.

During operation of the project, MWAUWASA and engineers of the Busega District Council (there is no Urban Water Supply and Sanitation Authority in Lamadi yet) will be responsible for monitoring the environmental and social impacts. The Environmental Specialist at Busega District Office as well as from MWAUWASA will be in-charge of the environmental and social monitoring of issues related with the proposed if it is meeting all the statutory requirements.

Summary and Conclusion

The main impacts of the proposed works are overall positive: a substantial and low-cost improvement is expected in dealing with faecal sludge, and final dispersal of the processed (dried and decomposed) produce that may safely be used as manure in agriculture activities around the town. Both the construction and operation of the plant may potentially have some negative impacts, but all of these are of a low to moderate significance and all can be mitigated to acceptable levels at limited cost.

During construction of the facility moderate negative impacts are or may be expected from the required clear-felling of on-site eucalyptus trees and the potential spread of (e.g. HIV/AIDS) disease of workers, while general safety and vandalism may cause issues of some concern. Once in operation, the facility might produce foul smell and be a breeding ground for mosquito's. The potential risk of overflow can be reduced by timely increasing the capacity of the facility for which there is already space available. With regard to groundwater protection, potential pathogen movement in the groundwater and the infiltration of soluble nutrients does not give reasons for concern: due to their size, the pathogens will adhere to soil particles and not move very far. With a minimum safe distance of 100 m for ordinary soil, there will be no pathogens in the groundwater outside this distance. The soluble nutrients, such as nitrate from urine, will move with the groundwater, but will be diluted to a level where there is no health risk. It is assumed that most of the nitrate has already infiltrated at the site of origin, that is near the households from the infiltration of liquid waste the septic tanks and pit latrines.

An ESMP was prepared for the works in early-2016, and based on a preliminary review NEMC concluded that the proposed works will not have serious environmental impacts that cannot be mitigated. As the present ESIA report comes to the same conclusion, the ESIA study team is of the opinion that the project be allowed to go ahead 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. Part 6 of the PFR deals with the proposed project interventions in the three satellite 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 5 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 aims 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. In 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 Water Sector Development Programme (WDSP) 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 finally, 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.

The proposed works for Lamadi town categorize as belonging to Category C receiving government subsidies.

1.2 Rationale of the Project in the Area

Poor sanitation has long been regarded as a constraint to the national social - economic growth in any nation or any community.

In Lamadi, the local administration organizes private operators with suction trucks to empty septic tanks and latrines and when a minimum number of users are willing to pay, the private operator is called to service several sites at the same time. As there is no appropriate site for disposal of the faecal sludge waste, the waste is dumped in the fields nearby where the private operator has an agreement with the

landowner. As the organization of privately operated vacuum trucks is done by the local administration and pits and septic tanks are being emptied, the main focus will be on developing a disposal facility near Lamadi to reduce transportation costs and provide hygienic treatment of the faecal sludge in sustainable manner.

The construction and operation of proposed development will help Lamadi town manage its wastewater flows and therewith reduce the spread of diseases and pollution of ground and surface waters and increase hygiene which will bring both social and economic advantage in the area concerned.

1.3 Project Benefits

The project will enhance proper management of faecal sludge in Lamadi town. In addition, the project will create some jobs during construction and operation of the facility for local workers.

1.4 Rationale of the ESIA Study

The ESIA process helps an organization or developer identify critical environmental and social issues associated with a project, and ensure that positive impacts are optimized while negative impacts are mitigated or minimized. An effective ESIA process can improve local community understanding of a project, thereby increasing the sustainability of the project. It is most 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. Environmental assessments are also useful for the operational phase to identify areas for improvement and thus avoid site closure as a result of non-compliance. The purpose of conducting this ESIA study was to facilitate an evaluation of potential impacts and its mitigation associated with the proposed works, and in harmony with relevant stakeholders.

The Environmental Management Act (EMA), Act No. 20 of 2004 provides direction for environmental management in the country bringing together stakeholders across different sectors. The Act through its EIA and Audit Regulations of 2005 outlines the procedures to be followed in undertaking the ESIA study for a development project. Part VI and the Third Schedule of the EMA provide information on EIA and projects that require EIA. The First Schedule of the EIA and Audit Regulations lists 'projects requiring EIA' but although not mentioning the construction or operation of a faecal sludge treatment plant it is understood that the works trigger Clause 20 (*waste treatment and disposal*), sub-Clause (c) (*municipal waste*), Item (iii) (*night soil collection and transport and treatment*).

EIB's Environmental and Social Handbook (ESHB, 2013) provides lists of developments that require EIA (in its Volume II, Annex 3: Annex I of the EIA Directive 92/2011/EC), however none of these include the construction or operation of sludge treatment plants or sewerage works. Volume II of the ESHB, Paragraph 113, states projects only requiring a limited form of ESA for, among others, "*renewal of water and sewerage works*".

Annex II of the EIA Directive lists projects that either are "screened in (full ESIA) or screened out (ESA)" and these include under its Paragraph 11 – "Other Projects" item (d) *"sludge-deposition sites*". Given the limited and local scale of the sludge deposition site for Lamadi town, it seems reasonable that only a limited ESA would be required.

1.5 Objectives of the ESIA Study

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 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.

1.6 Scope of the ESIA Study

The scope of the ESIA study as outlined in the Terms of Reference (ToR) submitted to NEMC (Appendix 1) can be summarized as follows:

- Describe and evaluate the present baseline data and the relevant environmental characteristics of the area proposed for the works development;
- Outline the national policies, legislation and administrative framework within which the environmental management of the proposed works will be carried out;
- Identify, analyse and assess potential environmental and social impacts that will result from the proposed works, based on the proposed design;
- Propose costs-effective mitigation measures for minimizing or eliminating adverse social and environmental impacts of the proposed works, including recommendations on design changes if deemed necessary;
- Propose modalities and arrangements for collection of stakeholders views ensuring participation of key public and civil society representatives;
- Prepare an environmental and social management plan for implementing the mitigation measures and recommend institutional administrative and management framework. It should include the identification of the necessary measured which should be inbuilt in the current mechanisms.

1.7 Methodology of the ESIA Study

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

- Undertaking the activities initiated during the scoping phase including involvement of key stakeholders and collecting of the baseline information on both natural and built environment including socio-economic conditions surrounding the project area and the municipality at large;

- Analysis of data for identification, prediction and evaluation of the impacts both beneficial and adverse ones from the proposed project development and operation. This was achieved through use of checklists, simple matrices and use of engineering judgment, standards and guidelines;
- Identifying and proposing mitigation measures aimed at minimizing and where possible eliminating the potential negative impacts and enhancing positive ones using expert judgment;
- Preparing environmental and social management and monitoring plans for follow up and follow up during project operation;
- Presenting the information in the ESIA Report (the present report).

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

Other methodologies used in this assessment include literature reviews, consultative meetings with respective offices including the Regional Commissioner's Office, district officials and ward and village members and their respective leaders and visual observations through familiarization visits in the project area.

2. Project Description

This chapter provides a description of the proposed Faecal Sludge Treatment Plant (FSTP) that assists in determining the significance of impacts that may arise. The proposed works for Lamadi town are described in the Design Consultant's (COWI) Study Report (March 2016), Tender Documents (July 2016), and Design Report (October 2016).

2.1 Location and Accessibility of Lamadi

Lamadi town lies in Busega District which is one of the five districts of Simiyu Region of Tanzania. The district's administrative centre is the town of Nyashimo. The district is bordered to the north by Lake Victoria and Bunda District, to the east by Bariadi District, and to the South by Magu District.

Lamadi town is connected by two well-maintained and paved national trunk roads. The Mwanza-Musoma highway (trunk road T4) runs through the district from south to north. The highway that connects Shinyanga Region and Mara Region (trunk road T36) branches of the Musoma-Mwanza road in Lamadi town and passes through the regional capital. Lamadi town is located about 130 km northeast of Mwanza City (Figure 2-1).

Figure 2-1. Location of Lamadi town

Source: Study Report for Lamadi town (COWI, March 2016)

Figure 2-2. Location of the FSTP, south-east of Lamadi town
Source: Tender Document (COWI, July 2016)

2.2 Land Ownership

The land required for the construction of the faecal sludge treatment plant belongs to the village government who willingly agreed to provide the area for the proposed works. A village meeting conducted in June 2016 agreed to use the designated land for the project purpose (Figure 2-2).

2.3 Design

2.3.1 Rationale and Objective

At present, there is no established faecal sludge treatment for the waste being generated in septic tanks and pit latrines. The objective of the proposed works is to develop a system that provides simple cost-efficient latrine/cesspit emptying, removal and treatment capability for the town. The main challenge is the long-term sustainability with respect to adequate cost-recovery to finance future O&M, where high fees from users are not feasible, hence the O&M costs must be designed to be low (affordable). Using appropriate technologies fit for the town's conditions will give a low capital investment compared to ordinary hi-tech solutions and also give lower O&M costs.

2.3.2 Existing Situation for Faecal Sludge Management

The local administration organises private operators with suction trucks to empty septic tanks and latrines and when a minimum number of users are willing to pay, a private operator is called to service several sites at the same time. As there is no appropriate site for disposal of the faecal sludge waste, the waste is dumped in the fields nearby where the private operator has an agreement with the landowner. As the organisation of privately operated vacuum trucks is done by the local administration and pits and septic tanks are being emptied, the main focus is on developing a disposal facility near the town to reduce transportation costs and provide hygienic treatment of the faecal sludge.

2.3.3 Preconditions for Concept Design

Operational conditions – Electrical power is likely to be unstable (not 24/7) and expensive, thus pumping should be at a minimum (and not needed 24/7 for operation), mainly applying gravity flow through the system. Manpower for operation is likely to be low skilled, thus operations must be simplified and require only basic management skills/input to function.

Potential reuse of end products – The main part of nitrogen and phosphorus which is valuable as a fertiliser is excreted with urine, and part of the nitrogen is lost due to the biological decomposition during storage in a septic tank or pit. Faecal sludge (fresh or treated) should not be seen as a fertiliser, but rather as a product for soil conditioning to improve the moisture retention and to add some micro-nutrients. Only for ecological type sanitation, with urine separation and collection, this resource can be used as a very efficient fertiliser for home gardening or agriculture.

Sludge from septic tanks – This sludge is high in solids, low in water, but can still be pumped using vacuum trucks if it is not more than two years old. Older sludge tends to settle and becomes too viscous to pump. With intervals of more than two years between emptying a septic tank, there is a risk that the bottom layer of viscous sludge will not be removed and the effective volume will be reduced over time. Sludge from a septic tank will mainly be digested sludge, apart from the last month's input. Thus biogas production is not feasible. Treatment should consist of separation of solids and liquids using "settling-thickening pond", from where each fraction is treated and disposed of separately.

Sludge from pit latrines (single pit system) – Sludge from pit latrines will be high in solids, vary viscous and cannot be pumped, thus it will have to be dug out. Various mechanical methods exist to empty pits, but most have some drawbacks and limitations. All sludge from single pit systems will mix new and old faeces and be highly contagious. Only lined pit latrines or unlined pits in very stable soil can be dug out and reused without the risk of collapse. Emptying the liquid part at the top of unlined pits using vacuum

pumping or alternative mechanical tools or emptying by hand may give some additional life span to the pit, but will not be able to recover the initial design volume without the risk of collapse.

Sludge from dual pit latrines (intermittent use, for one to two years intervals) – Sludge from dual pit systems will, after resting for one to two years, resemble a thick clay soil, be inoffensive in smell and appearance and can be dug out by hand tools with minimal protection, mainly boots and gloves to protect from sharps and helminth eggs. Soil-transmitted Ascaris eggs have one to three years survival in moist soil after excretion from infected persons. Pits designed for intermitted use are fit for digging out and reuse, and can be lined or part-lined. Sludge from dual pit latrines can be deposited as it is or reused as a soil conditioner mixed with topsoil in home-gardening or agriculture after appropriate storage (to eliminate Ascaris risk) or, alternatively, can be used without storage for support for tree growing in custom made pits (mixed with other organics and soil to make improved conditions for moisture retention and access to micro-nutrients) where the contagious material is buried thus eliminating contamination risk after the immediate handling.

Design considerations – For faecal sludge treatment, a system is recommended with several small settling-thickening ponds with a minimum operational cycle of 8 weeks (4 weeks for loading, followed by 4 weeks for desludging) combined with sludge drying beds for maturation for up to 3 years for elimination of the contamination risk from Ascaris. To construct several small ponds with individual drying beds will facilitate the manual desludging (reduced distance to drying bed) and facilitate expansion of the plant in phases according to future needs. The design is to fulfil the desire for "efficient cost", as this design will use very little concrete, pipes and coarse sand / small gravel. For the same reason earthworks are to be rather limited compared with alternative designs. There will be no membrane under the facility, as infiltration of liquid is allowed as a pragmatic measure, provided the siting does not cause serious problems for the water quality in the surrounding area (groundwater, river, lake). Therefore, a 100 m buffer zone to habitation and dug wells / bore holes / rivers should be sufficient to secure no risk of pathogens in any of these. The nitrogen load from urine in the faecal sludge is minimal, as most has already left with the effluent from the septic tanks and pit latrines.

2.3.4 Final Design

The faecal sludge treatment will consist of two stages. The first is the settling-thickening pond to reduce the water content to a level where the sludge can be removed manually to the second treatment stage, the sludge drying bed. A drying bed is placed on each side of the settling-thickening pond. The bed on one side is to be use for even numbered years and the other side to be used for odd numbered years to secure proper management of storage for maturation to eliminate the risk of Ascaris eggs.

Geographical position of the FSTP – The site selection has been optimized according to the following criteria:

- Near the town, within about 5 km, to reduce transportation costs;
- Near the main road, to reduce transportation time and reduce the investment in an all-weather road from the main road to the site;
- Minimum distance to households and the main road of say 100 m to reduce problems of smell;
- Minimum safe distance of 100 m to the nearest water source, such as a borehole or shallow well, that is used for human consumption; and
- Locations downstream from the town, which may be suitable for gravity conveyance to a wastewater treatment plant, in case a community sewage network be constructed in the future.

Overall layout of faecal sludge treatment plant – The overall layout of the faecal sludge treatment plant in indicated in Figure 2-3.

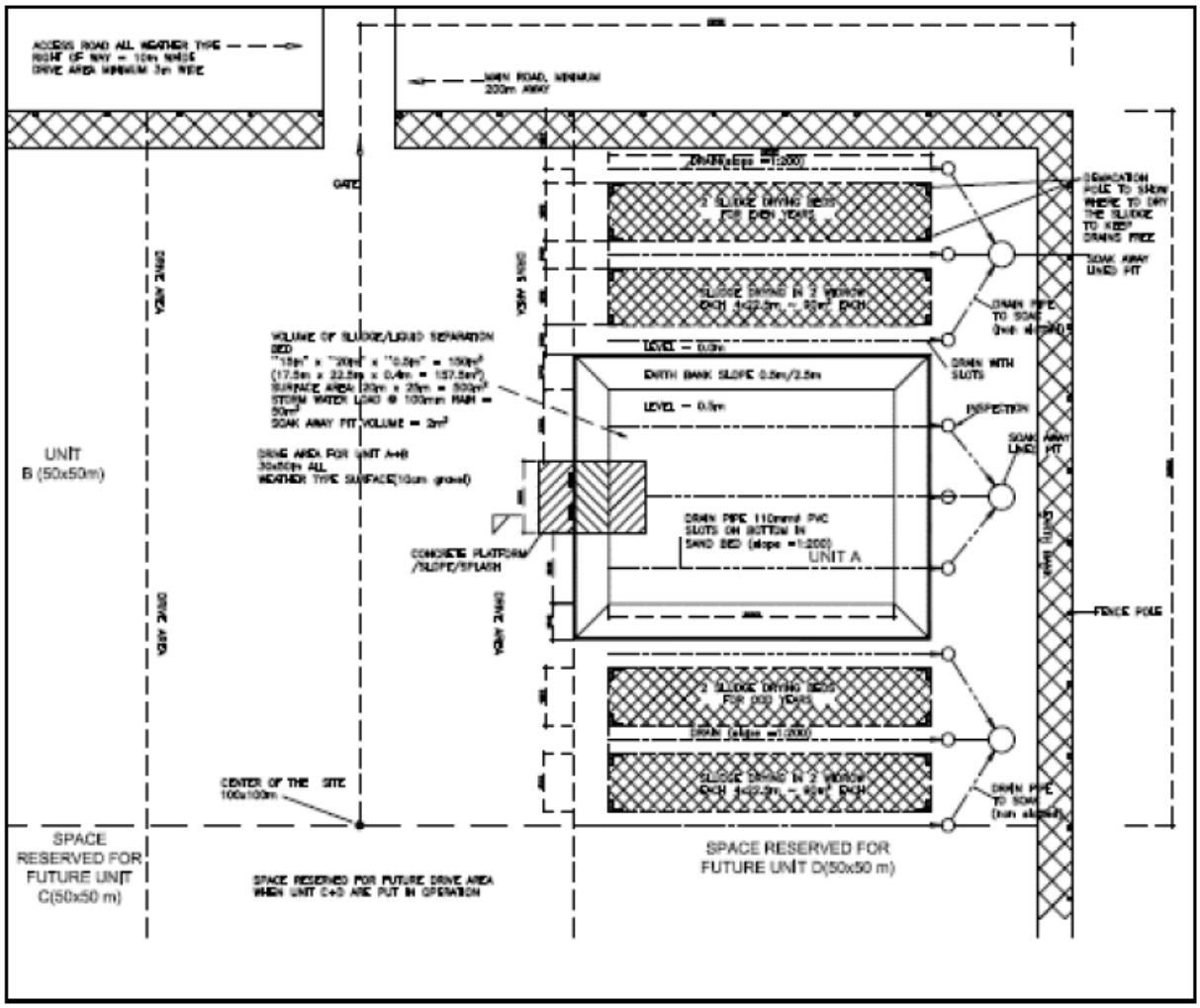

Figure 2-3. Overall layout of faecal sludge treatment plant

Source: Design Consultant (COWI) – better quality drawings have been requested but have not been provided

Note to Figure 2-3: the middle section is the settling-thickening pond; above and below it are the drying beds, each consisting of two beds: one set for even years, the other for uneven years. In total two units will be built initially (Phase I).

The total area required for the faecal sludge treatment plant is 100 m x 100 m, with an access road of minimum 100 m from the main road. The selected area should be relatively flat. A shallow earth bank will be constructed along the perimeter of the total area to protect from the plant storm water. The earth bank is to be planted with grass and small trees to demarcate the area. The soil for construction of the earth bank comes from excavation of the ponds. A simple fence with two lines of barbed wire to keep out large livestock is recommended. The overall layout is designed for a total of four settling-thickening ponds with two drying beds for each pond. An all-weather drive area will be provided in the middle of the treatment plant to service all four ponds and eight drying beds. Only the first two units (Ponds A and B) will be constructed initially with space reserved for future expansion for additional capacity. Alternatively, the

Ponds B and D near the gate can be constructed at the first stage to save the initial cost of 50% of the all-weather drive area. The drive area will be 30 m wide between Pond B and Pond D near the gate, for optimum operation of large trucks. However, it may make sense to elevate (by 200 to 300 mm) part of the area into wide "roads" needed and leave the rest at ground level to act as receiving areas for storm water with local infiltration without a soak away dedicated to storm water.

Design of the settling-thickening ponds – The layout of a typical settling-thickening pond is shown in Figure 2-4.

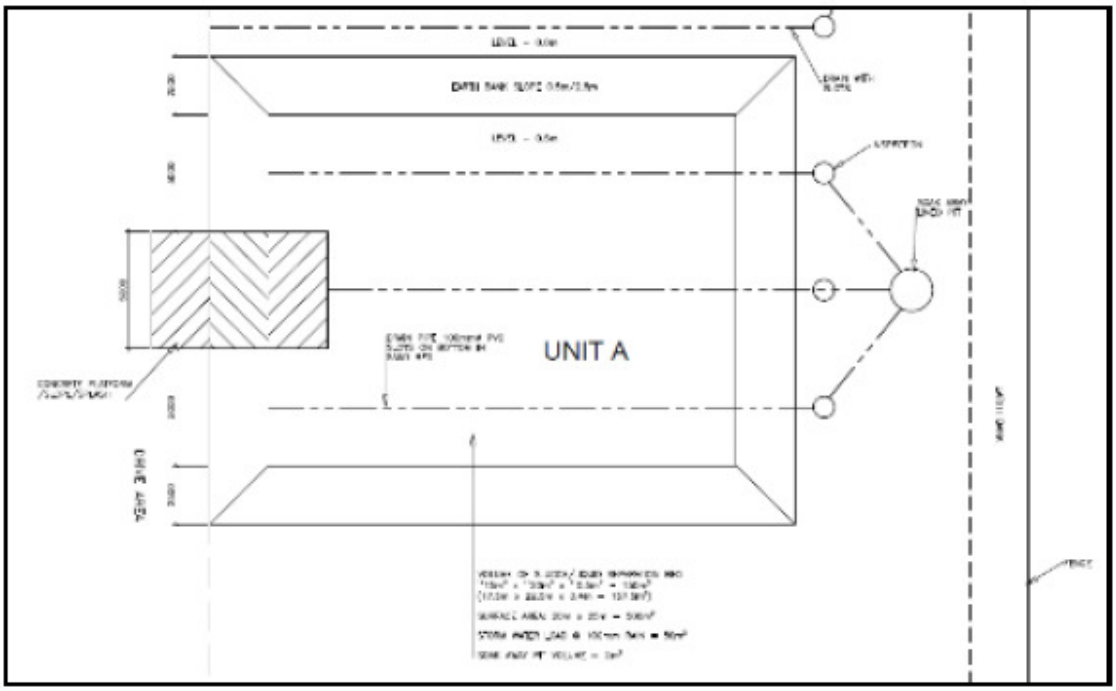

Figure 2-4. Settling-thickening pond layout
Source: Design Consultant (COWI) – better quality drawings have been requested but have not been provided

The settling-thickening ponds are constructed from soil with sloping sides, a drainage system to a soak-away pit and a concrete protected area for emptying the vacuum trucks. The bottom of the pond is 500 mm below ground level with a sloping edge around (no concrete, soil banks only, as inclination is 0.5 m : 2.5 m). The bottom area is 15 m x 20 m and 0.5 m deep. With inclusion of the sloping sides, the total effective volume is about 150 m³ equivalent to 25 to 30 full truck loads with the privately operated vacuum trucks (5 and 6 m³ capacity).

There should be a sand layer at the bottom of the pond, initially a minimum of 200 mm thick. It is expected that only 5 to 10 mm thickness of sand will disappear each year while moving the sludge from the settling-thickening ponds to the sludge drying beds. The lost sand should be replaced when the depth of sand removed reaches 100 mm. The measuring point will be the top of the concrete splash guard at the entrance to the bed.

The drainage system is made from three perforated pipes buried at the two sides and the centre, leading to three inspection wells and a large lined soakaway pit with large infiltration capacity. The underdrain

should be placed in a 500 wide x 1000 mm deep ditch with coarse sand /small gravel (2 to 10 mm), where the pipe should have a slope towards the outlet. The pipe is 100 mm PVC with 1 mm slots on the underside every 200 mm of pipe for slow infiltration from the sand bed into drain pipe without sand inflow.

Each pipe of the underdrain goes first to an inspection hole (for occasional cleaning if blocked), then into a soakaway constructed like a lined pit (using same technology as the pit latrine lining, that is using trapezoidal blocks, dry masonry, cone design) for a large area of infiltration and a small diameter at the top for a small slab (1.20 m diameter) with an inspection hole (700 mm diameter conical concrete slab, 70 mm thick).

The soakaway can be constructed as a standard pit for trapezoidal blocks, that is digging 1.80 m diameter and 1.80 m deep, for conical lining giving an effective volume of 2,000 litres (the effective volume starting from 500 mm below the slab). However, when the drain pipes inlet are around 1.00 m below surface, the effective volume becomes about 300 litres less, some 1,700 litres having a large infiltration area in the 1.50 m diameter lined pit bottom. If necessary, the pit can be extended downwards by another 500 m to increase the effective volume by 850 litres, but for infiltration purposes, it should be more advantageous to make an extra pit 10 m away near the corner of the bed/fence.

To protect the sand at the bottom from splash and erosion from the wastewater stream from the vacuum trucks when being emptied, a small section of the floor is protected with concrete. This concrete splash guard is leading up to the actual ramp for the rear wheels of the vacuum truck to be placed when in position to discharge the waste into the pond.

The concrete platform/slope/splash feature is for unloading the vacuum trucks. The first part (5 m x 2.5 m) is with a very small slope towards the bed for spill to go into the bed, with a kerb to stop the truck. Then the slope is going 500 mm down (5 m x 2.5 m) to the splash plate (5 m x 2.5 m) for distribution of the sludge without disturbing the sand bed. All the concrete must be designed for heavy truck loads, as the total area should also be used for vehicle access in case it is decided to empty the bed using a front loader. The kerb should be designed to stop the vacuum truck when reversing, but letting a front loader (tractor) pass.

Design of the drying beds – A layout of the sludge drying bed is shown in Figure 2-5 below.
The drying beds on each side of the pond are designed as two long windrows with drainage to a soak-away pit. The sludge drying bed is at ground level with demarcation for where to build two windrows of drying sludge. As this is to be loaded with a truck or front loader, there is no sand bed, but virgin soil (hard compacted) for bottom. The three drainage pipes are placed on the outside of the windrows, dug down in ditches of 1.00 m deep by 0.50 m wide (for protection of the slotted PVC pipes) and covered with coarse sand / small gravel. Each pond is to have two drying beds, for use in alternating years.

Environmental protection: rain – If, for example, a large rain storm drops 100 mm rain in the sludge/liquid separation bed (surface area 500 m^2), it will collect some 50 m^3 of water mixed with sludge. The soakaway only has a capacity to store 2 m^3 until it infiltrates, so the storm water mixed with sludge must stay in the bed while the soakaway slowly removes or infiltrates the large volume over some days or weeks. Eventually, it will be dry again. However, it means that during operation of the sludge/liquid separation bed there must always be a margin up to the top of the earth bank to prevent overflow after a large rain storm.

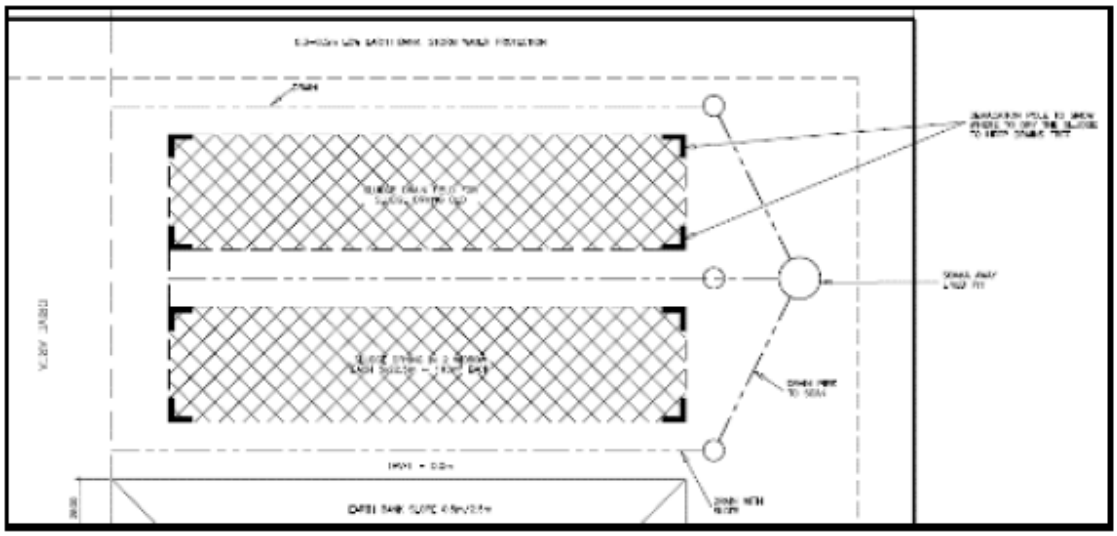

Figure 2-5. Sludge drying bed next to the settling-thickening pond

Source: Design Consultant (COWI) – better quality drawings have been requested but have not been provided

In case there is some kind of overflow due to extreme rain (continuous for several days), the perimeter earth bank at the fence will prevent overflow to the surroundings.

Environmental protection: groundwater – There are two concerns for ground water protection, these are the potential pathogen movement in the groundwater and the infiltration of soluble nutrients.
Due to their size, the pathogens will adhere to the soil particles and not move very far. With a minimum safe distance of 100 m for ordinary soil, there will be no pathogens in the groundwater outside this distance. The soluble nutrients, such as nitrate from urine, will move with the groundwater, but will be diluted to a level where there is no health risk. It is assumed that most of the nitrate has already infiltrated at the site of origin, that is near the households from the infiltration of liquid waste the septic tanks and pit latrines.

2.4 Operation of the FSTP

Initially the operation should be simple and related to the volume of faecal sludge transported to the site per year. If the total volume is low, Pond A can be used many times as the sludge will dewater and allow more sludge to be deposited. When reaching the design level of say 100 mm from the top of pond, the alternative pond should be used. The sludge in Pond A is then left to dry more while the other pond is filling up. When the second pond is about to be full, the first pond is dug out (during the dry season) and the sludge put on the one assigned drying bed for further drying and maturation. The other drying bed on the other side of the pond is not to be used yet, as it is important to keep separate the sludge from different time periods. The sludge from the ponds is moved manually using shovels and wheel barrows. The gentle slope on the banks (0.5 m in 2.5 m) will provide access to the drying bed over the whole length of the pond. Thus sections of say 5 m x 15 m can be moved to the beginning of the windrows, before the next section is moved to be placed further down the windrow. This continues until the pond is empty.

2.5 Increasing the Capacity of the FSTP using the Same Facility

Capacity of the proposed facility can be increased by shortening the time of each cycle for removal of semi-dried faecal sludge from the ponds to the drying beds, while still providing the secure storage time for a safe Ascaris egg-free waste product. For example, the proposed cycle of one year for moving semi-dry sludge to the drying bed can be cut down to a half year, thus increasing the capacity of the sludge/liquid separation bed by 100%, that is 200% of the original capacity. Alternatively, cycles of three months can be used, increasing the capacity to 400%. The fastest cycle time for this design is eight weeks (four weeks for filling and four for drying, that is a continual process of sludge/liquid separation, ending with moving the semi-dry sludge to the drying beds, or disposal at landfill). It is however necessary to take into account the seasons with dry periods and rain periods, where the latter may prolong the drying period. Thus the planning of the operation of the faecal sludge treatment facility should be take the weather into account when estimating the reasonable maximum capacity with regards to the number of cycles per year for emptying the sludge/liquid separation bed. It is noted that during field visits it was observed that private vacuum trucks for desludging will typically be operated during the rainy seasons when there will be problems of infiltration resulting in malfunctioning or overflow from the septic tanks. Hence, planning of the operation of faecal sludge treatment facilities using the present design may look into two cycles per year as the best option, that is filling during rainy seasons.

The twice yearly rainy seasons are the long rains (typically March to June) and the short rains (typically from November to December). The emptying should then be completed by the end of the two dry seasons; the cold period (typical July to October) and the hot period (typically January to February). In recent years it has been observed that the typical times for seasons is unpredictable, probably attributed to by the global climate change provoking extreme weather. Thus this has to be taking into account in the planning as well, but will still suit the twice annual cycle with emptying of the sludge/liquid separation bed twice a year during dry weather, for example in October and February.

2.6 Disposal of Treated Waste Products Options

The liquid part of the faecal sludge waste will be infiltrated in a number of local soak away pits without prior treatment. The rationale is that the quantity is limited thus infiltration is a feasible method of disposal. At the same time the small volumes to be infiltrated does not justify a treatment facility as the soil will act as a filter to prevent hazardous organism in the faecal waste to move very far from the infiltration points. Only the soluble parts of the waste, e.g. nitrate from break down of urine will move with the water stream. It is however evaluated that the amount of decomposed urine in the faecal sludge is limited, as most of the soluble parts will have been infiltrated in the soak away system in the local septic tanks before transport to the faecal sludge treatment site. With a Safe Minimum Distance (SMD) of 100 m to water sources (wells, boreholes) using the same aquifer, the dilution of soluble parts from the sludge waste will eliminate potential negative effects.

2.6.1 Dried Faecal Sludge Disposal at Landfill

The dried faecal sludge can be disposed in a landfill or reused for agriculture. In the first case, the dried sludge waste can be moved to a landfill relative short time after it is being produced, thus reducing the need for storage space at the treatment facility. The alternative of reusing the dried sludge waste for agriculture is discussed below.

2.6.2 Dried Faecal Sludge Reuse for Agriculture

Faecal sludge must be three (3) years old before being applied for agricultural use as a soil conditioner, as to secure the elimination of Ascaris eggs (parasitic helminth). Ascaris is the roundworm of humans,

growing to a length of up to 35 cm. The transmission route is from eggs in the faeces to the soil and the through the skin (normally the skin of bare feed) into the body of a new host. Ascariasis is prevalent worldwide, especially in tropical and subtropical countries. For reuse of the dried faecal sludge from the faecal sludge treatment facility, the operation must secure elimination of Ascaris eggs, for example by using a one year cycle for moving sludge from pond to the two drying beds (for odd and even year) giving a total three years retention time before final removal of the dry faecal material. After three years the infection risk of Ascariasis is minimal. While manually handling the sludge the workers should wear rubber boots and not touch the material with their hands. The tools (shovels, wheelbarrows and rubber boots) should be washed after use.

2.7 Collection of Faecal Sludge

As noted above, the local administration is already organising the collection of faecal sludge in using private operators with trucks. When, for example, 10 households are in need of emptying service, the private operator is called. This reduces the transportation costs per household. Apparently, this organisation functions well with user-payment and should just continue in the same way with the only difference that the disposal of the faecal sludge waste should now be at the new faecal sludge treatment facility instead of a local field. A small surcharge for operation of the faecal sludge treatment facility will be needed on top of the normal fee for emptying the septic tank or pit latrine. The easiest administrative way is to let the private operator pay a fee per volume of waste disposed at the treatment plant. The private operator will then charge the extra costs directly to the clients. The actual fee for using the treatment site depends on the cost of operation, that is the manual work for moving the sludge from the ponds to the drying beds and subsequent removal to waste dump or reuse for agriculture.

2.8 Project Activities

Construction and operation of the works follow normal routines whereby there are pre-construction activities, construction activities and finally operations and maintenance activities.

2.8.1 Mobilization

Mobilization was scheduled (in December 2016) to take place in February-March 2017. This stage involves mobilization of the construction crews, and transport and storage of equipment and plant and construction materials. Also, as required, the Contractor will hire labour and erect necessary temporary facilities to cater for offices and storage yards within the construction site or outside the site as it may be agreed and permitted by the district authorities. At this stage, wastes (solid, liquid and gaseous) will be generated from storage yards and temporary workers camps and offices. The staff camps like any other domestic place will generate garbage such as packaging, sacks, papers, cardboard boxes, plastic, wood crates, bottles, glass, metal cans and the like. Such wastes will need to be segregated for recycling or incinerating at designated project sites. The mobilization phase will also involve purchase and stockpiling of the materials such as aggregates, sand, cement, timber and reinforcing steel.

2.8.2 Construction

The construction works were (in December 2016) expected to start in March 2017 and be completed in 24 months; then follows a defects period of 12 months (ending in March 2020. Upon completion of preliminary activities involving erection of the site office, storage facilities and services (water, temporary wastewater facilities and electricity) as required, the actual construction work of the sludge treatment facility will start which will involve:

- Setting out to demarcate rights of way, work areas, clearing limits. Access roads, detours, bypasses and protective fences or barricades should all be in place before construction begins;

- Site preparation – clearing and grubbing to remove unsuitable soils, construction of bypasses and possible modification of existing drainage structures;
- Concreting bases of foundations – as required;
- Construction of access road to the site;
- Backfilling, disposal of overburden and surface restoration to at least match the condition that existed prior to the construction – as required.

Construction activities were planned in December 2016 to start in March 2017 and to end in March 2019, after which there will be a defects period of 12 months (Figure 2-6).

Figure 2-6. Implementation of the proposed works

4 #02: (ICB) IIP Satellite Towns	1076 da	Fri 26/02/16	Thu 26/03/20	
4.1 #02 Draft Tender Docs frm COWI	70 days	Fri 26/02/16	Thu 26/05/16	
4.2 #02 PMU Document Review	10 days	Fri 27/05/16	Thu 09/06/16	
4.3 #02 COWI Final Edits to T Docs	25 days	Mon 13/06/16	Fri 15/07/16	
4.4 #02 Tender Period	47 days	Fri 22/07/16	Fri 23/09/16	
4.5 #02 Tender Evaluation	53 days	Fri 23/09/16	Wed 07/12/16	
4.6 #02 Negotiations and Mobilisation	50 days	Wed 04/01/17	Thu 09/03/17	
4.6.1 Contract Negotiatiations	0 days	Wed 04/01/17	Wed 04/01/17	NCB Contractor
4.6.2 Attorney General Approval	0 days	Wed 04/01/17	Wed 04/01/17	AGoT
4.6.3 Contract Signing	0 days	Fri 27/01/17	Fri 27/01/17	NCB Contractor
4.6.4 Contracts Awarded & Announced	0 days	Fri 27/01/17	Fri 27/01/17	MWAUWASA
4.6.5 Prepare Plan of Works	2 wks	Fri 27/01/17	Wed 08/02/17	NCB Contractor
4.6.6 #02 Construction Programme Agreed	0 days	Wed 08/02/17	Wed 08/02/17	NCB Contractor
4.6.7 Contractor Mobilisation	1 mon	Thu 09/02/17	Thu 09/03/17	NCB Contractor
4.7 #02 IIP Satellites RAP & Valuation	67 days	Fri 27/01/17	Thu 27/04/17	
4.7.1 Pipe route marking	7 days	Fri 27/01/17	Sat 04/02/17	PMC
4.7.2 PAPs identification	14 days	Mon 06/02/17	Wed 22/02/17	PMC
4.7.3 Draft A/RAP preparation	10 days	Thu 23/02/17	Wed 08/03/17	PMC
4.7.4 PAPs Census & Valuataion of affected assest by LGAs	14 days	Thu 23/02/17	Tue 14/03/17	LGAs
4.7.5 A/RAP Revew & Approval by MoWI	12 days	Wed 15/03/17	Thu 30/03/17	MoWI
4.7.6 Release of fund and compensation process	7 days	Fri 31/03/17	Mon 10/04/17	MoWI
4.7.7 Monitoring & reporting of the A/RAP implementation	13 days	Tue 11/04/17	Thu 27/04/17	PMC/SC
4.8 #02 IIP Satellites ESIA	595 day	Thu 15/12/16	Fri 22/03/19	
4.8.1 Review of ESIA by NEMC and revision by PMC	24 days	Thu 15/12/16	Mon 16/01/17	NEMC/PMC
4.8.2 Approval of Final ESIA by NEMC	7 days	Tue 17/01/17	Wed 25/01/17	NEMC
4.8.3 Monitoring of & reporting on ESMP implementation	24 mon	Wed 15/03/17	Fri 22/03/19	PMU/PMC
4.9 #02: (ICB) 24m Construction & 12m Defects	792 day	Wed 15/03/17	Thu 26/03/20	
4.9.1 Construction Period (24m)	528 day	Wed 15/03/17	Fri 22/03/19	
4.9.1.1 Non PAP affected areas (duration assumed)	18 mon	Wed 15/03/17	Wed 19/09/18	ICB Contractor
4.9.1.2 PAP affected areas (duration assumed)	6 mons	Thu 20/09/18	Fri 22/03/19	ICB Contractor
4.9.2 Defects period (12m)	12 mon	Mon 25/03/19	Thu 26/03/20	ICB Contractor

Source: Joint Implementation Plan (PMC, December 2016)

2.8.3 Demobilization

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

Various wastes will be generated during this stage for which the same methods will be used to manage waste as during previous phases. Along with this, upgrading for damaged areas will be carried out before commissioning the project. On the other hand wastewater will also be generated from work camps, and runoffs crossing hydrocarbon contaminated areas. As this wastewater can cause detrimental effects to the surrounding environment, conventional wastewater treatment systems such as septic tank and soak away pit will be employed to ensure safe and proper onsite disposal of wastewater. Upon completion of contractor's obligations, the structures will be handed over to the Project Proponent MWAUWASA for the operation phase.

2.8.4 Operation

Once construction of the sludge treatment plant is completed, the actual purpose of the plant for collection, treatment and disposal of sludge will start. Trucks will be employed for the collection of sludge from households or from institution's septic tanks and offloaded at the treatment plant. Dried sludge will be used as manure.

2.9 Project Requirements

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

2.9.1 Mobilization Phase Materials

Site Preparation - Preparation of the site and the access road will result in the removal of existing vegetation around the site, this may include shrub and some trees. These activities will result into generation of some waste like tree debris and other solid wastes like plastics all of which will be collected and disposed of in designated district waste disposal sites. Decomposable materials may be buried; plastics and other recyclable materials will be collected and sent out for recycling.

2.9.2 Construction Phase Materials and Equipment

The proposed development will involve earth works and plain or reinforced concrete structures, the latter require materials such as aggregates, cement, sand, reinforcing steel and water. Other requirements such as timber, formwork, scaffolding, etc. will also be required. Borrow materials to be used for construction will be collected from the identified borrow areas such as those used for road construction or new ones opened as agreed with the district authorities. Once these borrow pits are no longer in use, they will be backfilled with the spoil or these pits may be turned into water storage points for livestock as agreed with the local community. Steep edges of these pits will be smoothened to avoid posing risks to children and livestock, also the site will be surrounded with the iron wire to avoid unauthorized persons or livestock to inter within the project site.

2.10 Waste Generation and Disposal Methods

Biodegradable wastes such as food leftovers, cardboards, papers will be collected and disposed of along with other district solid wastes. Other materials such as plastics, metal straps, reinforcing bars, unusable timber crates, steel cable pieces, pipes, etc., will be collected and transported to recycling centres in the town or be taken by waste recyclers located at Mwanza.

2.10.1 Wastewater Drainage and Treatment

There is currently no central sewer system running along the streets in the town. Therefore any wastewater generated as the result of the proposed works will be collected at a temporary wastewater

septic tank. Therefore the contractor will construct a temporary facility for the collection of wastewater to be used by workers and visitors, and will be demolished, emptied and will finally be refilled accordingly.

2.10.2 Demobilization Material Wastes

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

2.11 Project Costs

The estimated costs of all LVWATSAN – Mwanza Project interventions in Lamadi town are summarized in Table 2-1 below, i.e. for the water supply works (being subjected to a separate ESIA study), and the construction of the FSTP (Item 9, green highlighted). The costs are shown in Tanzanian Shillings (TZS) and Euro (EUR) using an exchange rate of EUR 1.00 = TZS 2,400. Costs of the FSTP amounts to only 2.7% of the total project investment in Lamadi town.

Table 2-1. Summary of investment costs

No.	Description	Cost in Tzsh	Cost (EUR)
1	Raw water intake	306, 750,000	127,813
2	Water treatment plant	1, 482, 596,000	617,748
3	High lift pumping station	389, 736,000	162,390
4	Transmission main	691, 600,000	288,167
5	Elevated storage tank	341, 250,000	142,188
6	Distribution network	1, 122,930, 900	467,888
7	House connections and customer meters	983, 448,000	409,770
8	Domestic points	20, 700,000	8,625
9	Faecal sludge treatment plant	184, 168,000	76,737
Subtotal of Investment costs		*5, 523, 178,900*	*2, 301,325*
10	Physical contingencies (10%)	552, 317,890	230,132
11	Price contingencies (10%)	552, 317,890	230,132
Total cost of investments		***6, 627, 814,680***	***2, 761,589***

Source: Lamadi Satellite Town Study Report (COWI, March 2016)

3. Policy, Legal Framework and Administration

This Chapter presents the policies, legal framework and institutions that are or may be relevant to the preparation of the ESIA as well as an outline of the applicable legal ESIA process.

3.1 Environmental Management in Tanzania

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

3.2 National Policies

Environmental awareness in the country has significantly increased in recent years. The government has been developing and reviewing national policies to address environmental management in various sectors. National environmental policies and regulations are based on the need to take an integrated approach to environmental management and the need to work towards the goals of sustainable development. The objectives of these policies are among others to regulate development so that this is not undertaken at the expense of the environment. National policies that address environmental management relevant to this project include the following.

3.2.1 National Environmental Policy (NEP) of 1997

Chapter 4 of the National Environmental Policy elaborates on the importance of EIA in the implementation of the 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 policy issues in urban water supply and sewerage, the policy has a goal of having wastewater treatment systems which are environmentally friendly. To ensure that domestic and industrial wastewater is not haphazardly discharged to contaminate water sources, the project in each town entails:

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

3.2.3 National Land Policy of 1995, revised in 1997

This policy advocates the equitable distribution and access to land by all citizens. It aims to ensure that existing rights in land especially customary 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 among other objectives and secured by the law. The National Land Policy recognizes the need of protecting environmentally sensitive areas. The policy 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. Finally, the policy identifies the need for conservation and preservation of prehistoric/historic sites and buildings. The proposed development shall ensure all requirements of this policy.

3.2.4 Community Development Policy of 1996

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

3.2.5 Women and Gender Development Policy of 2000

This policy's overall objective is to promote gender equality and equal participation of men and women in economic, cultural and political matters. It also focuses on fairer opportunities for women and men and access to education, child care, employment and decision-making. During project implementation the proponent is to give fair opportunities for both women and men.

3.2.6 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 quality 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 respond to the policy by ensuring equal employment opportunities during the project cycle. The proponent is to adopt the policy through the provision of gender balanced employment opportunities in construction and related activities.

3.2.7 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 is to link its effort with other stakeholders in HIV/AIDS sensitization during different project phases.

3.2.8 National Employment Policy of 1997

In view of the Government efforts in development of this policy, the contractor in collaboration with the District Council intends to supplement these efforts by providing employment to local residents during project implementation. Transfer of skills and technology can be attained among those who will be employed and after their contract terms they can engage in self-employment activities in the informal sector. It is envisaged that some people will be engaged by the project proponent in during operation of the works.

3.2.9 Cultural Policy of 1997

This policy covers a wide range of topics relating to both living cultural heritage and historical and archaeological remains (“cultural property”). The policy requires that “all land development shall be preceded by Cultural Resource Impact Studies”. The District Council and the contractor are to follow the requirements of this policy and in case such historical or cultural sites are discovered, appropriate measures are to be taken to involve local and national authorities in their conservation. However, this far no cultural or historical sites of relevance are known to be present in any of the proposed project intervention sites.

3.2.10 Other Policies

Other policies relevant to the project works include:

- **Tanzania Development Vision of 2005**, which aims to attain high quality of life.
- **Forestry Policy of 1998.**
- **National Health Policy of 2003** – Public Healthy Act. No. 1 of 2009 stipulated on Pg. 20.

3.3 Legal Framework

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.

3.3.2 Land Act No. 4 of 1999

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

3.3.3 Village Land Act, Cap 114 – No. 5 of 1999

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

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

To pay full, fair and prompt compensation to any person whose right of occupancy or recognized long-standing occupation or customary use of land is revoked or otherwise interfered with to their detriment by the State under this Act or is acquired under the Land Acquisition Act, Cap 118 of 2002.

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

This act requires the minister responsible for land to pay compensation as may be agreed upon or determined in accordance with the provisions of the act. The act stipulates that no compensation shall be awarded in respect of land, which is vacant ground, or to be limited to the value of the un-exhausted improvement of the land, in case the development of the land is deemed inadequate. The act defines the circumstances in which public interest could be invoked, e.g., for exclusive government use, public use, for or in connection with sanitary improvement of any kind or in connection with laying out any new city, municipality, township or minor settlement or extension or improvement of any existing city. Other purposes are in connection with development of any airfield, port or harbour; mining for minerals or oils; for use by the community or corporation within community; for use by any person or group of persons as the President may decide to grant them such land. The acquisition of the land for public use as well as for the resettlement sites is within the provision of this act. Furthermore the act specifies other requirements prior to the acquisition of the land such as investigation for the land to be taken, issuing notice of intention to take land and mode in which notices will be served. It further defines the requirements for and restrictions on compensation.

3.3.5 Land Use Planning Act – No. 6 of 2007

This act repeals the National Land Use Planning Commission Act No. 3 of 1948 that established a National Land Use Commission (NLUC) as the principal advisory organ of the government on all matters

related to land use. Among others, it recommends measures to ensure that government policies, including those for development and conservation of land, take adequate account of their effects on land use, seek the advancement of scientific knowledge of changes in land use and encourage development of technology to prevent, or minimize adverse effects that endanger human's health and welfare. The act also specifies standards, norms and criteria for the protection of beneficial uses and the maintenance of the quality of the land.

3.3.6 Water Supply and Sanitation Act No. 12 of 2009

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

3.3.7 Urban Planning Act No. 8 of 2007

This act provides procedures for the preparation, administration and enforcement of land use plans. One of the fundamental principles of land use includes protection of the environment, human settlement and ecosystems from pollution, degradation and destruction in order to attain sustainable development. The act also seeks to improve level of the provision of infrastructure and social services for sustainable human settlement development. The act furthermore provides for the protection of buildings or groups of buildings of special architectural or historic interest.

3.3.8 Occupational Health and Safety Act No. 5 of 2003

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

3.3.9 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.

3.3.10 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 developer is to ensure that the project does not negatively impact the environment and that wastes produced during different project phases are properly managed.

3.3.11 Employment and Labour Relations Act No. 6 of 2004

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

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

These acts regulate the engineering practice in Tanzania by registering engineers and monitoring their conduct. It establishes the Engineering Registration Board (ERB). Laws require any foreigners engineer to register with ERB before practicing in the country. Engineers both local and foreign engineers that will be engaged in this project shall abide to the requirements of the law.

3.3.13 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 developer is to comply with the law requirement during the recruitment of contractors for project implementation by ensuring engaging registered contractors.

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

This act requires architects and quantity surveyors (QS) to be registered with the board before practicing. Foreign architects and Quantity Surveyors should abide with the law. The construction work is to be contracted to registered Architects and Quantity Surveyors.

3.3.15 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. This is deduced from Section 111 of the act, which promotes social welfare and economic well-being of all residents within its area of jurisdiction. Protection and management of the environment is further provided for under Section 118 of Act number 7 of 1982. District Councils are required to take the necessary measures to control soil erosion and desertification; to regulate the use of poisonous and noxious plants, drugs or poison; regulate and control the number of livestock; maintain forests; manage wildlife; ensure public health; provide effective solid and liquid waste management protect open spaces and parks etc. The Act also has provisions for a scheduled timetable and management of the environment. Since the project will be touching the areas where the local government authorities have roles to play, the village will work hand in hand with District Council and other local government structures for the success of the project.

3.3.16 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, natural gas and water sectors. Role and functions are further specified in various regulator tools, e.g. legislation, regulations, rules, licenses, contracts etc. In addition to technical and economic regulation, powers include promoting/monitoring competition in the sectors.

3.3.17 Water Resources Management Act No.11 of 2011

This act provides for sustainable management and development of water resources; outlines principles for water resources management; provides for the prevention and control of water pollution; provides for

participation of stakeholders and the general public in implementation of the National Water Policy, repeal of the Water Utilization (Control and Regulation) Act and provides for related matters.

3.3.18 Forest Act – No. 14 of 2002

This act deals with the protection of forests and forest products in forest reserves and the restrictions and prohibitions in forest reserves. Any contravention of the restrictions and prohibition is considered an offence under this ordinance and subject to enforcement. The law was repealed in 2002 to meet the new requirements under the Forest Policy. The act requires that for any development including mining development, construction of dams, power stations, electrical or telecommunication and construction of building within a Forest Reserve, Private Forest or Sensitive Forest, the proponent must prepare an Environmental Impact Assessment for submission to the Director of Forestry. The law also requires licenses or permits for certain activities undertaken within the national or local forest reserves, such as, among others, felling or removing trees, harvesting forest produce, entering a forest reserve for the purpose of tourism or camping, mining activities, occupation or residence within the reserve, cultivation, erecting any structures.

3.4 Relevant Regulations and Guidelines

3.4.1 Tanzania 2025 Development Vision

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

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

The proposed project works support achieving the Development Vision objectives.

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

The Regulations encompass all matters pertaining to the environment and set standards, procedures, duties and limits with obligations for all stakeholders to benefit human needs and govern sustainable resources. They provide composition and responsibilities of environmental authorities that 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 information 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 Regulations also require registration of EIA experts. In addition to the Act, the Regulations provide the corner stone for any EIA for projects in Tanzania. The Regulations apply to all projects, undertakings and activities referred to in Part VI and the Third Schedule to the Act and the First Schedule to the Regulations. The First Schedule to the Regulations contains a list of projects for which EIA is mandatory and projects for which EIA may or may not be required. Any project in the water sector cannot be undertaken without an EIA. In short, the Regulations encompass the whole process of EIA and the prescribed forms under the law.

3.4.3 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.

3.4.4 NEMC and TBS National Environmental Standards

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

- National Environmental Standards Compendium - Tanzania Bureau of Standards
- 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
- Other Air Quality related TBS standards include: TZS 845: 2005 – Air Quality Specification (Environmental Quality Standard
- TZS 837: 2004 Air quality: Sampling and test methods - Guidelines for planning the sampling of atmospheric and location of monitoring stations
- TZS 845: 2006 Air Quality Specification

3.4.5 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). Some land acquisition such as land for the waste stabilization ponds was done by the municipality (government) hence no any kind of compensation will be required, but in case there are areas that belong the private people, appropriate measures of land acquisition and corresponding compensation will be undertaken as provided for in the said regulations.

3.5 Institutional Framework for Management of the Environment

3.5.1 Central Government Agencies

At the national level, the institutional and legal framework for sustainable management and development of water resources and sludge treatment falls under the Ministry of Water and Irrigation. The ministry issues policy guidance and provides legal frameworks, water licenses, certificate of compliance and project monitoring. Under the legal framework, the Water Resources Management Act No. 11 of 2009, assigns the following mandates:

- The Minister is responsible for management of water resources through national policy and strategy formulation and ensuring the execution of the functions connected with the implementation of the Water Resources Act No. 11 of 2009
- The Minister is assisted in the discharge of his duties by the Director of Water Resources.
  - The overall structure of Water Resources Management includes:
  - Minister of Water
  - Director of Water Resources
  - National Water Board
  - Basin Water Boards
  - Catchment and Sub-catchment Water Committees

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

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

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

3.5.2 Regional and District Administrative Structures

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.

3.6 European Investment Bank

Environmental protection and improvement, and benefits to people's welfare form key operational priorities for the European Investment Bank, the European Union's long-term lending institution. The EIB's environmental and social safeguard policies are based on the EU approach to environmental sustainability. The principles, practices and standards derived from these policies are highlighted in the Declaration on the European Principles for the Environment (EPE), agreed to by the EIB and four other European multilateral financing institutions in May 2006. The general approach of the Bank is described in a number of public documents (Table 3-1).

Table 3-1. EIB documents presenting the general approach to environmental and social safeguards

Document	Date
Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment	2014
Environmental and Social Handbook	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

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. 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 also screened according to their potential impacts on sites of nature conservation. Where the impacts are expected to be significant, a special biodiversity assessment is carried out, according to the principles and practices of the EU Habitats Directive (ref. Art. 6 of the Directive).

The main responsibility for scrutinizing the environmental aspects of projects lies with the Bank's Projects Directorate, which has about 80 engineers and economists, all with adequate environmental skills, who undertake the environmental assessment of projects at the EIB. The project teams, made up of engineers, economists, financial experts and lawyers, have front-line responsibility for managing environmental issues. They bring together significant cross-sectoral and cross-regional resources, experience and professional knowledge. 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 (in its Chapter 6), stakeholder engagement (in its Chapter 10 and Annex 6), and objectives and structure of an Environmental and Social Management Plan (ESMP) in its Annex 11. It states that the latter "can follow a decision on scoping or after a full EIA".

4. Baseline / Existing Conditions

This Chapter provides some baseline information on environmental characteristics of the project area including on the physical, biological, socio-economic and cultural environment. The compilation is based on a literature review supplemented by filed observations of the ESIA team.

4.1 Physical Environment

4.1.1 Climate

The average annual rainfall of Busega district is about 950 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.

4.1.2 Soil and Topography

Lamadi town and Busega district in general are on slightly sloping 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 very much higher agricultural potential but tend to be found in areas of low rainfall. The proposed area for the faecal sludge treatment plant is located in a remote rural area some distance out of town.

4.1.3 Hydrology and Hydrogeology

Groundwater in Mwanza Region is generally found at varying level beneath the surface, depending on local topography and time of the year (dry/wet season). The geo-technical survey conducted at the proposed FSTP site for Lamadi did not find groundwater within drill depth (4 m). Lake Victoria is the main nearby surface water body for Lamadi town and Busega district in general, 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.

4.1.4 Air Quality

Until now air quality measurements in Lamadi won have not been conducted, nevertheless taking into consideration that this area includes commercial and residential facilities, and considering traffic on the Mwanza-Musoma highway that runs through the town, it is concluded that the air in this area can be polluted, mainly due to dust and gaseous emission. It is not expected that air quality is exceeding TBS and WHO air quality standards.

Figure 4-1. Area location where the proposed sludge treatment plant will be located
Source: Photos taken during site visit by the ESIA team, June 2016

4.1.5 Noise Emission

Noise in this area is mainly resulting from traffic and commercial and residential areas. The Mwanza-Musoma road produces noise but traffic is generally not intense and it is therefore it is not expected that noise levels in and around the town exceed permissible standards.

4.2 Biological Environment

Lamadi town sits located amidst degraded savannah terrain, occupied by scattered plots of cultivation (rice, maize, beans, sweet potato, etc.), pockets of low shrub and isolated trees (fruit, utility). Land is used for keeping livestock (cattle, sheep, and goat). 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 and in rice fields and other cultivated areas. The project area is not covered with heavy vegetation there are few acacia plant species.

4.3 Socio-economic Environment

4.3.1 Demographic Profile

According to the 2012 population Census, the district has a population of 203,597. Average household size of 6.1 and sex ratio of 94. The population of Lamadi ward where the proposed development shall be located is about 22,062; average household size of 5.1 and sex ratio of 5.1. This population will benefit from the proposed development.

4.3.2 Energy and Power Supply

Major sources of commercial energy in Busega district are petroleum, hydropower and about 90% of population use traditional solid fuels in residential sector. Power cuts are common due to low water levels in the hydro-electric dams since the region still depend on the power supply from the National Grid. All districts in Mwanza including Lamadi town are connected to National Grid Power. The major towns and minor towns and settlements where electricity line passes are connected. Although electricity line passes near many communities but the level of connection to the power is minimal due to poverty

4.3.3 Employment and Economic Activities

It is estimated that most residents in Busega district are employed in private, public sectors and self-employed. Most are being employed in the private sector, then followed by self-employed while the rest are employed in the public sector. The majority of the residents are street vendors, service and shop sales workers, craftsmen fisheries, livestock keepers and farmers. Only about 5% of the working force is estimated to be engaged in subsistence agriculture in the peri-urban areas. There are no large farms but small plots ranging from 2.5 to 6 acres. Others make small gardens around their houses in which various vegetables and root crops are grown for family food and the surplus for income generating.

4.3.4 Waste Management

Principally, waste management in Tanzania is liable directly to the local authority's responsibility. The local Government (Urban authorities) Act 1982 imposes under urban authorities the responsibility "to remove refuse and filth from any public or private place" (sect. 55 g) and to provide and maintain public refuse containers for the temporary deposit and collection of rubbish. The Busega District Council plays an important role in the financing, planning and providing waste collection and disposal services. Under the District Council, waste management belongs to the structure of the Waste management Department, but other departments such as Works, Health and urban planning carry out part of its operation.

5. Stakeholder Consultation and Public Participation

5.1 Introduction

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

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

The consultant conducted public meetings which involved key Interested and Affected Parties (I&APs) – see Appendix 7 and 8. 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 consultants identified organization, groups and individuals considered to be regarded as "stakeholders". This identification was based on each ones roles and their relevance in the proposed construction of the faecal sludge treatment plant for Lamadi town. Some of the stakeholders such as government authorities, municipality/district level, wards and sub-ward level that might be impacted by or have interest in the project or exercise some influence on the project were predetermined as shown under each level in form of tables.

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

Table 5-1. Stakeholders for this proposed development and their roles and responsibilities

Level	Institutions	Roles and responsibilities
National Level	Prime Minister´s Office Regional Administration and Local Government	- Issuing policies - Providing legal frameworks - Issuing licenses, provision of compliance certificates - Enforcement of laws and regulations - Setting operational standards for effluents including wastewater - Project monitoring
	Vice President's Office Division of Environment and NEMC	- Coordination of the EMP, Act and guidelines - Environmental Monitoring and Auditing - Advise to the government on all environmental matters
	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 planning sector - Setting operational standards - Activities monitoring in planning - Providing legal frameworks in energy
	Ministry of Lands and Human Settlement Development (Sector Environmental Section)	- Authority over the national land including the project area - Authority over national wildlife resources - Enforce law and regulations in the area of influence of the project
	Occupational Safety and Health Authority (OSHA)	Issuing certificates of compliance and Designated Authority for occupational safety issues
Regional Level	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
	Regional Land Advisory Committee	- Overall supervision of all activities pertaining to land use in the respective in the region
District Level	District Director's Office	- Chief executive officer for development activities in municipality level - Land use approval - Oversee/advice implementation of national policies at District level -Oversee enforcement of laws and regulations
	MWAUWASA	- Project implementation - Consultation with stakeholders - Project monitoring and internal auditing
	MWAUWASA	-Project recipient – operator of the facility
	District Natural Resources Department (forest and Wildlife Divisions	-Plan and coordination of community based natural resources -Enforcement of laws and regulations -Overseer of rights to utilize resources in the municipality
	Land and Environment	- Land use planning at municipality level - Environmental management
	District Planning / Health / Community Development Departments	-Baseline data on social and economic conditions - Extension services
	District Engineer	-Overseer of engineering activities in the district
	District Environmental Management Officer	Coordination of environmental matters at the district level

Level	Institutions	Roles and responsibilities
Ward Level	Ward Development Committees Ward Environmental Committee	-Oversee general development plans for ward level - Provide information on local conditions and extension services -Project monitoring in their area of jurisdiction
Village level	'Environmental Committee	-Oversee general development plans at village level - Provide information on local conditions and extension services in the village -Project monitoring in their area of jurisdiction

Table 5-2. Developer

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

Table 5-3. Affected Parties (Directly and indirectly affected)

Level	Institution	Course of action
Community	Residents	- Residents at Nyanga village
Level (neighbouring facility site)		- Road side users in the project area- Project Monitoring - Project beneficiaries

Table 5-4. Interested Parties

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

5.3 Consultation Outcome

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

A Multi-Stakeholder Forum has been established in Lamadi town (Appendix 6). This forum has been involved in development and planning of the proposed works. Intensive consultations on the sludge treatment plant were held between the involved communities and the local government (Appendix 8). Community members consulted on the treatment plant in June 2016 are listed in Appendix 7. Issues pertaining to construction of the faecal sludge treatment plant and its environmental and social consequences were first presented and later discussed with the representative of the key stakeholders, interested institutions, and residents particularly those around working or residing within the areas earmarked for project activities.

In general the stakeholders were happy with the proposed development; general consensus was reached among the stakeholders with the proposed development because of the social and economic benefits the proposed development will bring in Lamadi town.

They pointed out some of the positive impacts to be associated with the proposed development, which include the following.

The proposed development will provide a special area for the deposition of faecal sludge to be collected from Lamadi, and therefore this will enhance the hygiene of the area.

Also the establishment of a faecal sludge treatment plant in Lamadi town will enhance the environment around Lake Victoria. The stakeholders advised that the proposed development is to follow all legal requirements. They also view that the District officers to come and discuss with the ward and village officers the issues regarding the implementation of the proposed development in the Lamadi area.

6. Identification and Assessment of Impacts and Alternatives

6.1 Introduction

ESIA involves the investigation into positive and 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. The faecal sludge treatment plant, like any other development project on a village land, may have impacts that may occur ranging from site clearance to transportation of building materials, construction and operation of the works.

6.2 Methodology

The standard approach for undertaking ESIA was employed for the study. Main techniques applied were the collection and analysis of the project and design documents, relevant legislation, field visits to the proposed location, and consultations. Key impacts and their significance were identified and assessed based on experience gained in other but similar developments in Tanzania and abroad. Impacts, their magnitude and receptor sensitivity were assessed and the overall significance was determined (see Appendix 9).

6.3 Pre-construction, Planning and Design Phase

This phase involved topographical surveys and plant 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. At time of finalizing this ESIA report the planning and design phase had already been completed. Positive and negative impacts of this phase, if any, have been limited and are no longer being considered.

6.4 Construction Phase

6.4.1 Positive Impacts

The construction works will require skilled and unskilled labourers, the latter should preferably contracted from Lamadi town or nearby villages. Wages will temporarily increase family income and boost the local economy. Some labourers will learns from the construction works and improve their skills.

6.4.2 Negative Impacts

Main negative impacts during construction may include the following.

- **Vegetation clearance –** Presently the proposed site for the construction of sludge treatment plant has no shrub or any tree, and there is no agriculture (farming, crop production going on); and therefore vegetation clearing is limited to the need remove grass turf.

- **Cultural, historical or archaeological artefacts –** Field investigation on-site suggests that it is unlikely that the site has any cultural, historical or archaeological significance.
- **Land use, scenic and visual quality –** Establishment of the FSTP will permanently alter the local scenery, i.e. from an open, primarily rural agricultural setting to a fenced built-up enclosure.
- **Resettlement and disturbance to residents –** There are no people living or farming on the designated FSTP site; only occasional grazing by herded livestock occurs, however the wider surroundings provide ample alternative grazing grounds (i.e. road sides, fallow fields, etc.). Therefore, for the planned works resettlement and/or compensation is not required.

Abbreviated Resettlement Action Plan (Final Draft – 8 March 2017)

Simultaneously to the present ESIA study, and in accordance with the project's Resettlement Planning Framework (RPF, January 2016) the Project Proponent prepared an Abbreviated Resettlement Action Plan (ARAP) for all planned project works in each town. All project components in Lamadi were screened on possible Project Affected People (PAP) that may result from the works. The conclusion was that no people or any assets will be affected by the FSTP works for Lamadi town. Although the site is used for occasional grazing by herded livestock (like almost any other plot of land in the region), there is ample alternative grazing opportunity in the surroundings, reason why there is no need for compensation. Moreover, during consultations with local communities it was agreed that no-one will claim any user rights for the required land plot.

Due to absence of any building or infrastructure on or near the site is not expected that accidental damage may occur during construction works, but if this happens this 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.

At time of finalizing of the present ESIA report, the ARAP report was still under review by the District Council and the MoWI and MoLHS.

- **Land scarring at borrow sites –** Borrow materials to be used for construction of the FSTP (for example sand, aggregates, stones) will to the extent possible be collected locally. This may result in excavation pits that, if not filled or landscaped after borrow activities have stopped, in erosion gullies, or depressions that accumulate stagnant water forming breeding ground for water-borne disease and mosquito's.
- **Noise and vibration during construction –** Noise may pose a nuisance to people living or working close to construction sites and along transportation routes due to the use of heavy equipment and vehicles. The intensity of this impact will vary depending on the location.
- **Soil erosion –** Soil excavation may trigger erosion. The removal of trees and other vegetation will accelerate soil erosion, which if not abated it will result into gully erosion. This could also be observed at quarry sites if quarrying activities will not be conducted properly. Excavated soil from construction sites may also be washed away as runoff if the construction activities will be carried out during the rainy season.

- **Increased traffic levels –** Movement of heavy duty vehicles may cause damage to (rural) roads, road blockage, and pose risks of accidents.

- **Leakage of fuel and lubricants –** Ground- and surface water contamination could occur if the Contractor does not follow pollution control measures. Groundwater can be contaminated through leaking of spilt fuels and lubricants.

- **Air quality –** Dust and engine emission fumes may be formed in areas subject to excavation for trenches, pits or ponds, along transportation routes and at the construction site. This is likely to happen during dry periods.

- **Solid and liquid wastes –** The construction works may encounter poor quality excavated soil or rock which needs to be deposited somewhere. Construction work will generate organic and non-organic solid and liquid waste which is to be disposed of in accordance with government regulations at designated sites. Non-compliance will lead to littering and pollution of the environment.

- **Spread of disease (HIV/AIDs, STIs or STDs) –** The construction site will be a place of work where job seekers and other service providers such as food vendors commonly known as “Mama Lishe” will gather for work and services. Such gatherings may result in spreading the incidence of disease.

- **Safety –** Construction of the FSTP and the road leading to it, like any other construction site, is inherently a potentially dangerous place. Once the construction site is active, there are chances that people may come as a matter of interest or look for employment. Free roaming at the construction site can be dangerous and may lead to accidents such as falling into open trenches.

- **Vandalism and/or damage to the works.**

6.5 Demobilization of Construction Activities

Demobilization after completion of the construction may include the following activities:

- Removal/demolition of temporary infrastructures that were installed to support the construction phase, removal of installations and equipment from the workshop and campsite.

- Dismantling and transporting of equipment such as bulldozers, front wheel loaders, excavators etc.

- Rehabilitation of the campsite, workshop, stockpile yard, to match the surrounding conditions of the project site.

- Clearing and disposal of various waste including used fuels and lubricants, sewage, solid waste (plastics, wood, metal and plastic crates, packaging materials, papers).

- Disposal of waste at an authorized dumping place.

All these activities may pose pollution threats to the environment if not properly handled.

6.6 Operation Phase

6.6.1 Positive Impacts

Main positive impacts of the intervention are:

- Improved quality of health from proper management of faecal matter that would otherwise be dumped haphazardly and ultimately drained into streams rivers where others may become in contact.
- Improved water quality in stagnant water bodies, streams and rivers and ultimately Lake Victoria.
- Some employment opportunities benefitting neighbouring communities. This will boost household income and improve living standards of those concerned.
- Government coffers will benefit from statutory contributions made by the contractor for his employees. Sales from construction materials will have value added tax that goes to government.
- Properly treated and matured sludge can be re-used as fertilizer to increase agricultural productivity. The use of decomposed sludge (compost) can reduce the use of chemical fertilizers, residues of which are potential Lake Victoria pollutants.

6.6.2 Negative Impacts

- **Pollution to the nearby water sources / channels –** If the proposed sludge treatment plant does not function as planned (see Chapter 2), there may be pollution of soil and groundwater sources. Failure of properly working may also cause significant impact to Lake Victoria which is the receptor of treated water from different sources and thus endangering the aquatic life and the ecosystem as a whole.
- **Foul smell –** The frequent dumping of truckloads for faecal sludge may cause bad smell in and around the FSTP. However, as the FSTP is located east of the town amidst a forest reserve, and because winds are predominantly coming from the west, foul smell is expected to be of minor significance.
- **Mosquito breeding –** The settling-thickening pond and the drying beds may form a suitable breeding ground for mosquitos and disease.
- **Overflowing of sludge into the surrounding farms or road –** Poor management of proposed development may result to sludge treatment overflowing of untreated sludge which may find its way to agricultural fields, water sources or roads. This may lead to the spreading of waterborne diseases such as cholera or impact fauna and flora.

6.7 Project Alternatives

6.7.1 Do-Nothing Option

Under the No-Nothing Alternative, no FSTP will be built and operated, and the insanitary conditions associated with the dispersal of raw untreated faecal sludge on lands surround the town will continue. The do-nothing alternative would mean that land and water and ultimately Lake Victoria will continue to be polluted and loaded with untreated faecal matter and potential disease vectors.

6.7.2 Alternative FSTP Location

Selection of the FSTP location has been done by applying the criteria listed in Section 2.3.4, above. Various options have been considered. The fact that the selected location is located on land that did not require acquisition because it was already government land, and the fact that it is located downwind from the town for most of the year, and still is easily accessible, indicates that few other options would offer a better choice. By the time that the ESIA study started the site had been selected already, and there were no reasons to propose or select another site.

6.7.3 Alternative Sources for Construction Materials

Gravel, hard core stones, aggregates and sand for construction activities will be extracted from existing sites currently used as borrow sites. No other borrow areas will be opened unless the existing ones are depleted and there is an agreement with the regional and the responsible district authorities.
Water for the works mainly for preparation of concrete may be drawn from groundwater or nearby streams unless it is determined that this is unsuitable for construction works.

6.7.4 Technology Alternatives

As outlined in Chapter 2, the concept design was guided by the requirement to select a low-cost option for faecal sludge treatment. This ruled out the construction of a conventional but costly underground sewerage system. No other technical alternatives have been considered by the ESIA study team.

7. Environmental and Social Mitigation Measures

7.1 Introduction

Construction activities the world over, may cause alteration to the biophysical and social environment. The proposed construction and operation of the faecal sludge treatment plant is not an exception. Mitigation measures for the impacts likely to be caused by the proposed project will focus on key potential impacts identified in Chapter 6 during different phases of the project development.

7.2 Pre-Construction

As the pre-construction phase has already been completed at time of finalizing the present ESIA report, no mitigation measures are felt necessary any longer.

7.3 Construction

Table 7-1. Impacts and Mitigation measures during mobilization and Construction phase

Nr	Impact	Mitigation measures
1	Vegetation loss through clearance	• There is no vegetation on the site other than grass turf (no trees or shrub is present). • Vegetation clearance shall be limited to the area necessary for permanent works. • Clearance of vegetation around the sites shall be replaced with the natural vegetation on completion of the works.
2	Disturbance to historical and archaeological finds during site clearance	• No historical or archaeological finds expected on site, however if encountered any the Contractor / Supervising Consultant is to inform the local authority for further action. • 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.
3	Disturbance to scenic and visual quality	• Operations house / buildings for facilitates the project will be designed to blend well with the surrounding buildings. • Landscaping and/or tree planting will be carried out to match the existing surroundings.
4	Disturbance to residents and/or land users (need for resettlement and/or compensation)	• No residents or land use on site, apart from occasional grazing by herded livestock; ample alternative grazing opportunities around. No need for mitigation.
5	Land scarring at borrow sites or sources of construction materials	• All borrow sites, and approved by the local authority, will be landscaped and revegetated with indigenous herbs, shrub and/or tree species after borrowing has been completed.

Nr	Impact	Mitigation measures
6	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.
7	Soil erosion	• Protection of steep slope with reinforcement. • Provision of silt trap to prevent sedimentation. • Construction activities especially land excavation should be carried out during dry seasons. • Avoid excessive clearance of trees and enhance tree planting and landscaping.
8	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.
9	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.
10	Poor air quality from dust and emissions around the construction site and material hauling routes	• Water sprinkling to reduce the dust at the construction sites. • Use of dust masks to operators and those working in the dusty areas. • Use of goggles for all operators. • Construction machines/equipment will be well maintained to ensure total fuel combustion. All vehicles involved in construction works will be frequently checked and well serviced during the whole construction period so that the level of exhaust emissions is reduced. • Speed of vehicles hauling construction materials shall be reduced and the construction materials will be covered with tarpaulins.
11	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.

Nr	Impact	Mitigation measures
		• 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.
12	Spread of diseases (HIV/AIDs, STIs or STDs)	• Sensitization and health awareness campaigns to all involved in the project including service providers. • Construction workers to undergo health screening according to the National HIV/AIDs Policy. • Project will assist the nearby health facility in sensitization of those involved in the project.
13	Safety during construction	• 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.
14	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 7-2. Impacts and Mitigation Measures during operation phase

Nr	Impact	Mitigation measures
1	Pollution to ground and surface waters in the surroundings	• Close monitoring of the facility to ensure it functions as planned, this involves monitoring of ground and surface waters in the surroundings of the FSTP, and ensuring that the facility’s effluent complies with the national effluent standards.
2	Air pollution / obnoxious smell from the treatment plant area	• Proper maintenance of the facility, including avoidance of pools of dirty stagnant waters and spills.

Nr	Impact	Mitigation measures
		• Covering swampy parts of the settlement and drying beds with a layer of earth or sand.
3	Mosquito nuisance	• Proper maintenance of the facility, including avoidance of pools of dirty stagnant waters and spills. • Covering swampy parts of the settlement and drying beds with a layer of earth or sand.
4	Overflowing sludge from the facility into the surroundings	• Provision of adequate and appropriate Personal Protective Equipment (PPE) to workers. • Regular checking of the adequacy of the facility, particularly when beds are (nearly) full and during the rainy season. • Timely heightening of the bund surrounding the facility and / or increasing the bed capacity.

8. Environmental and Social Management Plan

8.1 Introduction

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

The objectives of this ESMP are to:

- Provide a systematic overview of the required measures to manage the mitigation of impacts that will or may result from the FSTP works in Lamadi town;
- 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 (MoF) is the 'borrower' of the loan, the Ministry of Water and Irrigation (MoWI) is the 'Promoter' and will have the ultimate ownership of this project. Execution at local level rests with the Mwanza Urban Water Supply and Sanitation Authority (MWAUWASA). MWAUWASA effectively acts as the implementing agencies on the ground, charged with the responsibility of delivering upon the commitments within the territorial jurisdictions, including the responsibility for execution at the three satellite towns of Magu, Lamadi and Misungwi. MWAUWASA may delegate part of its implementation responsibility to the District Council and/or the town's water utility company. 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.

Daily oversight of this project at the operational level will be provided by the Project Implementation Unit (PIU). A Lenders' Supervisor is an additional part of the institutional structure, his role being to act as "a third party contracted by and acting on behalf of the Lenders [EIB] 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 sit alongside the PIU to review all implementation tasks. Independent monitors appointed by the EIB would not be full-time but are likely to go on short missions to check compliance of the programme.

MWAUWASA as the project proponent of the proposed works will be assisted by the project management and supervision consultants. These two bodies will ensure that the contractor and sub-contractors who will win the tender 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. Table 8-1 outlines the components of the ESMP, as well as the main actors and their responsibilities. The organizational framework for the ESMP is designed to evolve as the project progresses through detailed engineering design, construction, commissioning and operation phases.

8.3 Reporting Arrangements

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

8.4 Cost estimates for ESMP

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

Table 8-1. Environmental and Social Management Plan

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Reporting to	Estimated cost (EUR)	Remarks
Pre-Construction Phase							
	No longer relevant as construction is about to start						
Construction Phase							
1 - Vegetation loss through clearance	• As the FSTP will be built within the Forest Reserve, (mostly eucalyptus) trees will need to be clear-felled on the designated area. To limit clear-felling the FSTP may in part be built on the site that has been opened up recently for another (but unknown) development on site. • Vegetation clearance shall be limited to the area necessary for permanent works. • Clearance of vegetation around the sites shall be replaced with the natural vegetation on completion of the works.	Contractor	Start and end of the works	Site revegetated	District Natural Resources Officer	--	Included in Contractor 's contract
2 - Disturbance to historical and archaeological finds during site clearance	• No historical or archaeological finds expected on site, however if encountered any the Contractor / Supervising Consultant is to inform the local authority for further action. • 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.	Contractor	During extraction of construction materials	No historical / archaeological sites damaged or destroyed, alternative sites found and used	Mining License Holder	--	Included in Contractor 's contract
3 - Deterioration scenic and visual quality	• Operations house / buildings for facilitates the project will be designed to blend well with the surrounding buildings. • Landscaping and/or tree planting will be carried out to match the existing surroundings.	Contractor	During construction of the project	Ensure design and construction blends well with surroundings	District and Project Architect	--	Included in Contractor 's contract
4 - Resettlement and compensation to affected residents and land users	• No residents or land use on site, apart from occasional grazing by herded livestock; ample alternative grazing opportunities around. No need for mitigation.	Project Proponent	Before the project starts	All affected persons compensated in accordance with	Land Officer	N/A	

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Reporting to	Estimated cost (EUR)	Remarks
				RPF prior to construction start			
5 - Land scarring at borrow sites	• All borrow sites, and approved by the local authority, will be landscaped and revegetated with indigenous herbs, shrub and/or tree species after borrowing has been completed.	Contractor	Throughout construction	Disturbance minimized	District Planner	--	Included in Contractor 's contract
6 - 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.	Contractor	Weekly	Noise within set limits	District Health Officer	--	Included in Contractor 's contract
7 - Soil erosion	• Protection of steep slope with reinforcement. • Provision of silt trap to prevent sedimentation. • Construction activities especially land excavation should be carried out during dry seasons. • Avoid excessive clearance of trees and enhance tree planting and landscaping.	Contractor	Weekly	Loose soils and bare soils protected from erosion	District Natural Resources Officer	--	Included in Contractor 's contract
8 – Increased 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	Weekly	No complaints		--	Included in Contractor 's contract

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Reporting to	Estimated cost (EUR)	Remarks
9 - 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	Daily	No spillage of lubricants	District Environmental Management Officer	--	Included in Contractor 's contract
10 - Poor air quality from dust and emissions around the construction site and material hauling routes	• Water sprinkling to reduce the dust at the construction sites. • Use of dust masks to operators and those working in the dusty areas. • Use of goggles for all operators. • Construction machines/equipment will be well maintained to ensure total fuel combustion. All vehicles involved in construction works will be frequently checked and well serviced during the whole construction period so that the level of exhaust emissions is reduced. • Speed of vehicles hauling construction materials shall be reduced and the construction materials will be covered with tarpaulins.	Contractor	Monthly	Within limits	District Environmental Management Officer	--	Included in Contractor 's contract
11- 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.	Contractor	Daily	Good house keeping	District Health Officer	--	Included in Contractor 's contract

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Reporting to	Estimated cost (EUR)	Remarks
	• 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.						
12 - Spread of diseases (HIV/AIDs, STIs or STDs)	• Sensitization and health awareness campaigns to all involved in the project including service providers. • Construction workers to undergo health screening according to the National HIV/AIDs Policy. • Project will assist the nearby health facility in sensitization of those involved in the project.	Contractor	Weekly	Employees sensitized and examined	District Medical Officer	--	Part of HIV/AIDS sensitization program
13 – Safety (e.g. injuries from falling into trenches and open pits for inspection chambers)	• 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.	Supervising Engineer/ Contractor	Daily	Zero injuries	District Health Officer /OSHA	--	Included in Contractor 's contract

Impact	Management Measures	Responsible for mitigation	Time Frame	Target Level / standard	Reporting to	Estimated cost (EUR)	Remarks
	• Constant surveillance from security to make sure that there are no "uninvited guests" in the project area.						
14 – Vandalism	• 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.	Contractor	Daily	No damage		--	Included in Contractor 's contract
	Total					**--**	
Operational Phase							
1 - Pollution to the nearby water sources	• Close monitoring of the facility to ensure it functions as planned, this involves monitoring of ground and surface waters in the surroundings of the FSTP, and ensuring that the facility's effluent complies with the national effluent standards.	Project Operator (MWAWASA)	Quarterly	No pollution outside 100 m buffer zone	District Environmental Officer	2000	
2 - Air pollution / obnoxious smell	• Proper maintenance of the facility, including avoidance of pools of dirty stagnant waters and spills. • Covering swampy parts of the settlement and drying beds with a layer of earth or sand.	Project Operator (MWAWASA)	Daily	No complaints	District Environmental Officer	2000	
3 - Mosquito breeding	• Proper maintenance of the facility, including avoidance of pools of dirty stagnant waters and spills. • Covering swampy parts of the settlement and drying beds with a layer of earth or sand.	Project Operator (MWAWASA)	Monthly	No mosquito nuisance	District Environmental Officer	500	
4 - Poor safety of employees and neighbours from overflowing of the plant	• Provision of adequate and appropriate Personal Protective Equipment (PPE) to workers. • Regular checking of the adequacy of the facility, particularly when beds are (nearly) full and during the rainy season. • Timely heightening of the bund surrounding the facility and / or increasing the bed capacity.	Project Operator (MWAWASA)	Monthly	No overflow	District Environmental Officer	500	
	Total (annual recurrent)					**5000**	

9. Environmental and Social Monitoring Plan

9.1 Introduction

Monitoring will be performed during construction and operation of the faecal sludge treatment plant. The purpose of the monitoring is to assess the extent to which the plant performs as anticipated to adapt the management of the plant in case this is 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 may be carried 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.

9.2 Monitoring per Phase

9.2.1 Pre-Construction

This phase has already been completed.

9.2.2 Construction Phase

During the construction phase the monitoring will focus on:

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

9.2.3 Commissioning Phase

During the commissioning phase the monitoring will focus on:

- Plant is performing as designed and constructed in term of water quality and smell around the plant is within limits.
- Solid and liquid wastes generated are taken care in the manner specified in the environmental management plan.
- Mitigation measures are effectively mitigating the impacts identified before the project start.

9.2.4 Demobilization Phase

During the demobilization phase the monitoring will focus on:

- Resulting debris is managed in planned order.

9.2.5 Operation Phase

MWAUWASA will be responsible for monitoring the environmental and social impacts after construction and handing over of the proposed sludge treatment by the contractor. The Environmental Specialist at the Busega District Office together with the district Land Officer can be in-charge of the environmental and social monitoring of issues related with the Busega district if it is meeting all the statutory requirements. Among other things, the appointed District Environmental Management Officer should deal with:

- Monitoring water quality from various pollutants from the proposed sludge treatment plant.
- Monitoring air pollution from the obnoxious smell at various.
- Environmental degradation control measures such as soil erosion.
- Changes in socio-economic status.

Table 9-1. Environmental and Social Monitoring Plan

Nr	Impact	Project Phase	Monitoring location	Frequency	Parameters	Responsibility	Monitoring cost (EUR)
1	Excavation and soil removal	Construction	Project site	Monthly	Soil erosion	Supervising Consultant	(incl. contract sum)
		Operation	N.a.	N.a.	N.a.	N.a.	
		Closure	Project site	Monthly	Soil erosion	MWAUWASA & District Council	1000
2	Air and noise pollution	Construction	Project site	Monthly	Dust (PM10) Noise (dB)	Supervising Consultant	(incl. contract sum)
		Operation	Project site & surroundings	Monthly (initial) Quarterly	No complaints	MWAUWASA & District Council	500
		Closure	Project site / area	During demolition	Dust (PM10) Noise (dB)	MWAUWASA & District Council	500
3	Soil and groundwater pollution	Construction	Project site	Monthly	Oil and fuel leakage (visual)	Supervising Consultant	(incl. contract sum)
		Operation	Project site & surroundings	Monthly Bi-annually	Sewage leaks (visual) Groundwater quality (testing)	MWAUWASA & District Council	500 2000
		Closure	Project site	During demolition	Oil and fuel leaks Groundwater quality (visual)	MWAUWASA & District Council	500
4	Solid and liquid waste	Construction	Project site	Monthly	No waste littering	Supervising Consultant	(incl. contract sum)
		Operation	Project site & surroundings	Monthly (initial) Quarterly	Facility's waste collection	MWAUWASA & District Council	500
		Closure	Project site	Monthly	No waste littering	MWAUWASA & District Council	500
5	Disposal / spreading of processed sludge & improvement in hygiene and health in served communities	Construction	N.a.	N.a.	N.a.	N.a.	
		Operation	Project site & surroundings	Monthly (initial) Quarterly	Incidence of FSTP-related disease	District Council & MWAUWASA	500
		Closure	N.a.	N.a.	N.a.	N.a.	
6	Injury to workers and the public due to	Construction	Project site	During construction	Immediate backfilling; fencing or safety tape	Supervising Consultant	(incl. contract sum)

Nr	Impact	Project Phase	Monitoring location	Frequency	Parameters	Responsibility	Monitoring cost (EUR)
	falling into pits and trenches	Operation	N.a.	N.a.	N.a.	N.a.	
		Closure	Project site	During demolition	Immediate backfilling; fencing or safety tape	District Council & MWAUWASA	500
7	Injuries from work related activities	Construction	Project site	During construction	PPE to workers	Supervising Consultant	(incl. contract sum)
		Operation	N.a.	N.a.	N.a.	N.a.	
		Closure	Project site	During demolition	PPE to workers	District Council & MWAUWASA	500
8	Employment creation	Construction	Project area	During construction	Number of people employed as labourer	District Council	--
		Operation	Project site	Yearly	Number of people employed as labourer	District Council	--
		Construction	Project area	During construction	Number of local people employed as labourer	District Council	--
	Total (annual, recurrent)	**Construction**					**--**
		Operation					**4000**
		Closure					**3500**

10. Decommissioning

10.1 Introduction

Decommissioning is the final phase in the life cycle of the project. Usually this involves dismantling and demolition of the used structures, landscaping, and recycling and/or disposal of re-usable or discarded materials. The activities are to take into account all necessary environmental, health and safety requirements for the operating personnel and the general public.

The lifespan of the FSTP is 25 years. Decommissioning of the facility before the end of the expected lifespan is not expected.

10.2 Reinstatement

The decommissioning plan considered here will be removal of above-, on- and underground structures and levelling / landscaping to such an extent that the site does not differ from its immediate soundings. Debris and waste materials will need to be handled through collection, loading and transportation to the final disposal site. Wastes must be disposed of according to the procedure drawn up during the detailed decommission plan becoming due about two years before actual decommission.

NEMC approves decommissioning plans of projects when their lifespan expires or premature closure of the projects. In this regard, the proponent / developer shall approach NEMC in due time with a proposal for decommissioning stating details and methodology. Disposal of all waste must be in accordance with the “Duty of Care” and the conditions of the environmental performance bond.

11. Summary and Conclusions

Summary

This ESIA report on the construction and operation of a faecal sludge treatment plant for Lamadi town intends to provide an objective assessment of the concerns raised during the scoping phase of the study as well as those noticed by the assessment team in the project area and during consultations. The purpose of this report is to identify and assess the potentially significant environmental and social issues and impacts of the works and to propose mitigation measures to avoid or minimize these impacts.

Alternatives to the proposed project were considered as well, including the “Do-Nothing Option”. The latter can justifiably be dismissed due to the need and desirability of improved disposal of faecal sludge from septic tanks and soakaway pits in Lamadi town.

Conclusion

The findings of environmental impact assessment of the proposed works are overall positive in the sense that a substantial and low-cost improvement is expected in dealing with faecal sludge and its final dispersal of the processed (dried and largely decomposed) produce that may safely be used as manure in agriculture activities around the town. Both the construction and operation of the plant will have some (potential) negative impacts, but all of these are of a low to moderate significance and all can be mitigated to acceptable levels at limited cost.

During construction of the facility the required clear-felling of on-site eucalyptus trees, potential spread of (e.g. HIV/AIDS) disease of workers, general safety and vandalism have or may have a moderately negative but temporary impact on works. Once in operation the facility might produce foul smell, be a breeding ground for mosquito’s and could pose some risk of overflow. With regard to groundwater protection, potential pathogen movement in the groundwater and the infiltration of soluble nutrients may give rise to concern. However, due to their size, the pathogens will adhere to the soil particles and not move very far. With a minimum safe distance of 100 m for ordinary soil, there will be no pathogens in the groundwater outside this distance. The soluble nutrients, such as nitrate from urine, will move with the groundwater, but will be diluted to a level where there is no health risk. It is assumed that most of the nitrate has already infiltrated at the site of origin, that is near the households from the infiltration of liquid waste the septic tanks and pit latrines.

An ESMP was prepared for the works in early-2016, and based on a preliminary review NEMC concluded that the proposed works will not have serious environmental impacts that cannot be mitigated. As the present ESIA report comes to the same conclusion, the ESIA study team is of the opinion that the project be allowed to go ahead 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

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COWI, 11 March 2016
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Tender Documents, Volume V – Drawings, Part 2: Drawings for Lamadi

EIB, February 2013
Environmental and Social Datasheet for LVWATSAN

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EIB, 2014
EIA 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

EIB/Halcrow, December 2015
Resettlement Planning Framework for LVWATSAN

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

EIB, 2014
EIA 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

Glasson, J. Therivel, R. and Chadwick, A., 1994
Introduction to Environmental impact Assessment. UCL Press Ltd London. 342pp

Glasson, John; Riki Therivel and Andrew Chadwick (URT), 1999

Introduction to Environmental impact Assessment, 2nd Edition. London: UCL Press.

Mott MacDonald, February 2016
Environmental and Social Management Plan for construction of water supply and faecal sludge treatment plant in Lamadi town

Mott MacDonald, March 2017
Abbreviated Resettlement Action Plan for Contract 2: Extension and rehabilitation of water supply systems and construction of a faecal sludge treatment plant in Misungwi, Magu and Lamadi

United Republic of Tanzania (URT), 2004
Environmental Management Act (EMA). Government Printers, Dar es Salaam

United Republic of Tanzania (URT), 2005
Environmental Impact Assessment and Audit Regulations G. N. No 339. Government Printers, Dar es Salaam

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

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

Appendix 1. Terms of Reference for the ESIA Study

The Terms of Reference for the Environmental and Social Impact Assessment Study for the construction of a faecal sludge treatment plant for Lamadi town in Busega District, Simiyu Region 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 Terms of Reference (TOR) is to provide formal guidance to the proponent and ESIA Consultants the 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 and long term interventions works for water supply and Sanitation in Lamadi. 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.

The project is one of several interventions under the Lake Victoria Water and Sanitation (LVWATSAN) Programme for improving and attaining the strategic goal of sustainable, efficient and economic water services provision in Lamadi. The proposed interventions to improve sanitation and waste management include:
Improving on-site household and community sanitation

OBJECTIVES

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

› To ensure that environmental considerations are explicitly addressed and incorporated into the development during 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

In order to undertake a comprehensive assessment of all key issues related to the project, the core area has been determined to be the area identified within the Busega district.

ENVIRONMENTAL IMPACT ASSESSMENT SCOPE OF WORK

Task 1: Description of the Proposed Project

The Consultant shall give details of:

Location of all project - related development and operation sites

General layout of facilities - diagrams of facilities, design basis, size, and sources of utilities

Pre-construction activities and construction activities

The current water sources and supply systems

Organizational relationships, mandates and interactions among the different parties to be involved in the project

Task 2: Description of the Environment

The Consultant shall:

Provide general description of the project environment and sources of information for anyone requiring a more extensive description (Especially the EIA reviewers);

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;

Identify areas that may require special attention during project implementation.

The EIA 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:

Identify issues and concerns in order to find suitable remedies

Identify linkages among project components and the issues

Identify where project activities or elements interact with social and biophysical environment (direct impacts)

Identify indirect impacts of the project on the environment

Identify cumulative impacts that may be anticipated

Identify residual impacts if any

Predict probability, magnitude, distribution and timing of expected impacts and

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:

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

List issues raised by the public and classify them according the level and frequency of concern whenever possible

List regulatory standards, guidelines etc. that need to be met; and

Rank predicted impacts in order of priority for avoidance, mitigation, compensation and monitoring.

Task 6: Development of Management Plan to Mitigate Negative Impacts and develop a monitoring plan

The Consultant shall:

Determine appropriate measures to avoid or mitigate undesirable impacts
Assess and describe the anticipated effectiveness of proposed measures
Ascertain regulatory requirements and expected performance standards
Determine and assess methods to monitor impacts for prediction accuracy, and remedial measures for effectiveness
Determine and assess methods to monitor for early warning of unexpected effects
Re-assess project plans, design and the project management structure
Describe follow-up scheme and post-project action plan for achieving EIA objectives; and
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:
Highlight key concerns and considerations associated with the acceptance and implementation of recommended actions
Determine resource requirements for implementing recommendations
Determine capacity and resourcefulness of the client to meeting such commitment
Explain rationale for proposed development and benefits and costs vis-à-vis the no-project option;
Ascertain degree of public acceptance of /or reaction to recommendations.

Task 9: 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.
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

Additional experts will be consulted when needed.

REPORT STRUCTURE

Prepare EIA 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 Environmental Impact Statement 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 EIS 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.

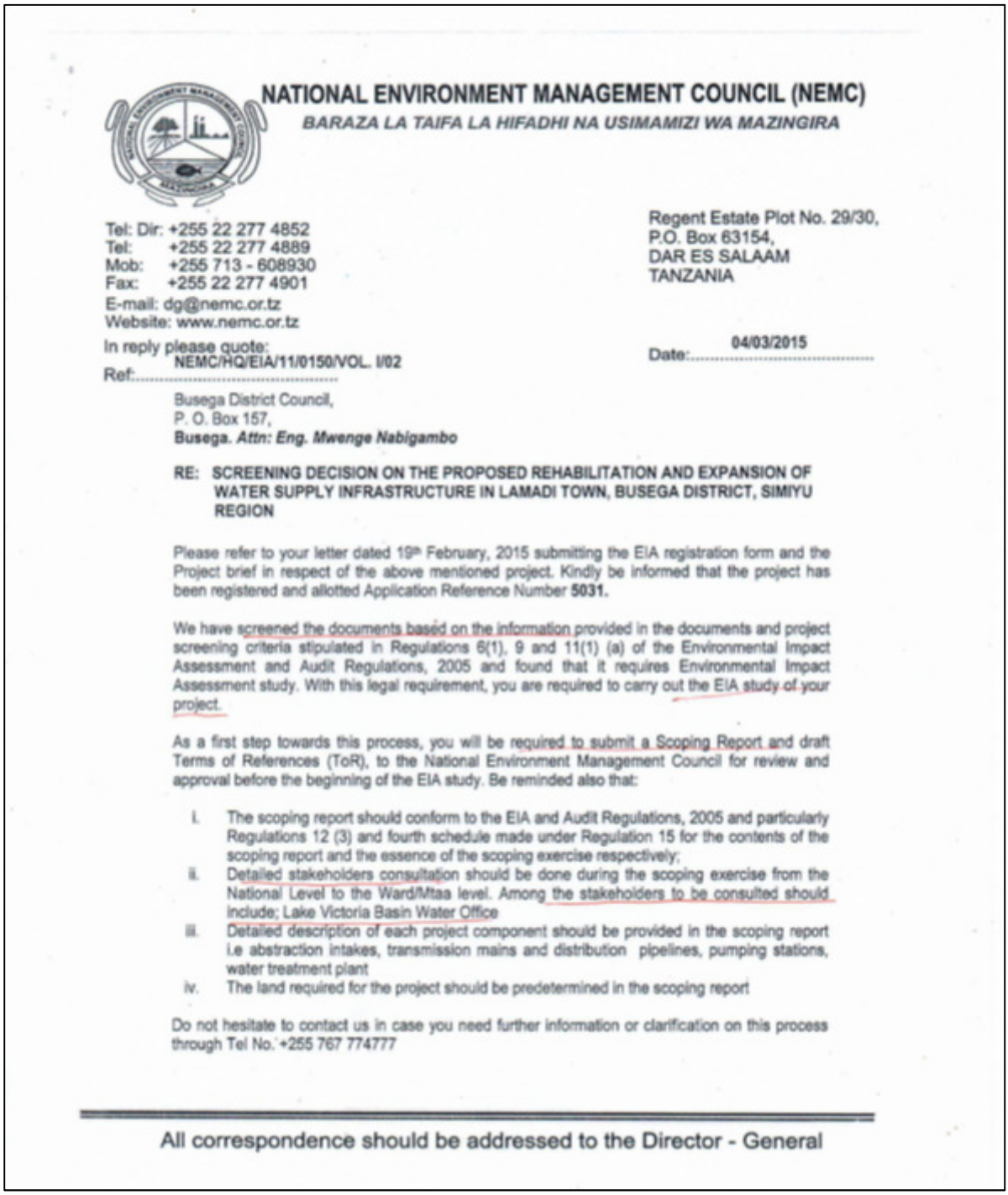
OUTPUT

The Consultant shall submit to NEMC, five bound hard copies of the Scoping Report accompanied with Terms of reference which shall quid the EIA study. The Consultant shall then undertake the detailed EIS, and shall also make 15 copies of the EIS for the review process, finally shall submit five copy of final ESIA 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, Authorities, 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 EIS.

Appendix 2. NEMC's Screening Decision



NATIONAL ENVIRONMENT MANAGEMENT COUNCIL (NEMC)
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TANZANIA

In reply please quote:
Ref: NEMC/HQ/EIA/11/0150/VOL. I/02

Date: 04/03/2015

Busega District Council,
P. O. Box 157,
Busega. *Attn: Eng. Mwenge Nabigambo*

RE: SCREENING DECISION ON THE PROPOSED REHABILITATION AND EXPANSION OF WATER SUPPLY INFRASTRUCTURE IN LAMADI TOWN, BUSEGA DISTRICT, SIMIYU REGION

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 **5031.**

We have screened the documents based on the information provided in the documents and project screening criteria stipulated in Regulations 6(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 EIA and Audit Regulations, 2005 and particularly Regulations 12 (3) and fourth schedule made under Regulation 15 for the contents of the scoping report and the essence of the scoping exercise respectively;
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

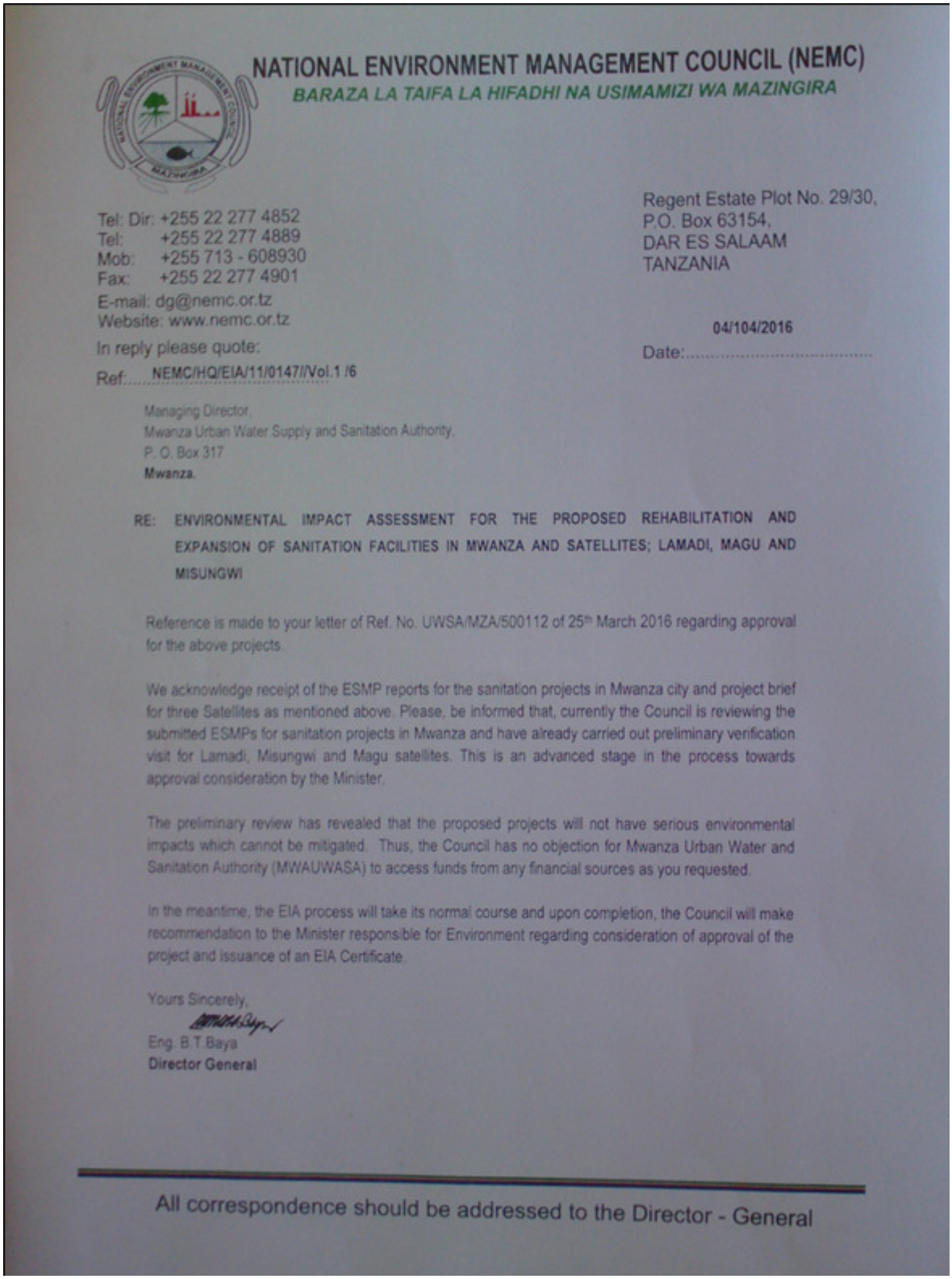
All correspondence should be addressed to the Director - General

Yours Sincerely,

Dr. M.H. Makene
For Director General

CC COWI TANZANIA LTD,
P.O. Box 1007,
Dar es Salaam.

Appendix 3. NEMC's Comments on ESMP



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/11/0147//Vol.1 /6

Date: 04/104/2016

Managing Director,
Mwanza Urban Water Supply and Sanitation Authority,
P. O. Box 317
Mwanza.

RE: ENVIRONMENTAL IMPACT ASSESSMENT FOR THE PROPOSED REHABILITATION AND EXPANSION OF SANITATION FACILITIES IN MWANZA AND SATELLITES; LAMADI, MAGU AND MISUNGWI

Reference is made to your letter of Ref. No. UWSA/MZA/500112 of 25th March 2016 regarding approval for the above projects.

We acknowledge receipt of the ESMP reports for the sanitation projects in Mwanza city and project brief for three Satellites as mentioned above. Please, be informed that, currently the Council is reviewing the submitted ESMPs for sanitation projects in Mwanza and have already carried out preliminary verification visit for Lamadi, Misungwi and Magu satellites. This is an advanced stage in the process towards approval consideration by the Minister.

The preliminary review has revealed that the proposed projects will not have serious environmental impacts which cannot be mitigated. Thus, the Council has no objection for Mwanza Urban Water and Sanitation Authority (MWAUWASA) to access funds from any financial sources as you requested.

In the meantime, the EIA process will take its normal course and upon completion, the Council will make recommendation to the Minister responsible for Environment regarding consideration of approval of the project and issuance of an EIA Certificate.

Yours Sincerely,

Eng. B.T.Baya
Director General

All correspondence should be addressed to the Director - General

Appendix 4. NEMC's ESMP Rejection

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:
Ref. No.NEMC/EA/01/Vol.1/12

Date: 22/04/2016

MWAUWASA,
P.O.Box 317,
Mwanza.

RE: LVWATSAN MWANZA PROJECT
SUB: ENQUIRY OF THE (ENVIRONMENTAL AND SOCIAL MANAGEMENT PLANS) (ESMPs) FOR MAGU, MISUNGWI AND LAMADI

Kindly refer the subject above.

We acknowledge receipt of your letter dated 22nd April 2016 with Ref.No.UWASA/MZA/500/155 requesting comments on the submitted ESMPs for Magu, Misungwi and Lamadi projects.

Prior to submission of the ESMPs to NEMC Mwanza Zone Office, these projects were registered with NEMC Headquarters Office and they were screened. The screening decision was to undertake full EIA for these projects.

This decision must be adhered as it is mandatory requirement by Environmental Management Act (EMA) **2004** Regulation first schedule of EIA to conduct full EIA for projects of this nature.

With this letter you are informed that the ESMPs were rejected and you were directed to carry on scoping exercise and submit scoping report and draft of Terms of Reference (ToR) to the NEMC– Lake Zone Office for approval which will enable you to prepare EIS reports for review purposes.

Yours Sincerely,

Justin Kasoka,
For: Director General

Cc: Mott MacDonald in Association with UWP Consulting Ally Salim
P.O.Box 175, Sengerema, Mwanza

Appendix 5. NEMC's Response on Scoping Report

NATIONAL ENVIRONMENT MANAGEMENT COUNCIL (NEMC)
BARAZA LA TAIFA LA HIFADHI NA USIMAMIZI WA MAZINGIRA

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

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

In reply please quote:
Ref. No. NEMC/EA/01/Vol.1/22

Date: 09/06/2016

Managing Director,
Mwanza Urban Water Supply and Sanitation Authority,
P.O. Box 317,
Mwanza.

RE: SCOPING REPORT AND TERMS OF REFERENCE FOR THE PROPOSED CONSTRUCTION OF FAECAL SLUDGE TREATMENT PLANT IN LAMADI TOWN, BUSEGA DISTRICT, SIMIYU REGION

The above captioned subject refers.

We acknowledge receipt of your letter dated 25/05/2016 submitted with the scoping report and Terms of Reference [ToR] for undertaking an EIA of the above mentioned project with project registration number **5032.**

We have reviewed the scoping report and ToR and found that there are some areas that need to be worked on to improve the ToR so that they can in turn be used to guide the EIA. The EIA should take note of the following comments:

1. Fine tune the Terms of Reference to that it is focused and specific to the issues to addressed during the EIA study. Improve Task 1, Task 2, and 5 ad indicated below:
    a. In Task 1 include the description on: projective and rationale, designs, activities in each phase, components, boundaries, land use planning, land ownership, Wastes and waste management.
    b. In Task 2 include the description of the physical, biological and socio-economic and cultural environments. Also you are required to collect relevant baseline data of various parameters including; topography, air quality, hydrology and water quality specific to the project area.
    c. In the Task 6 include the management of wastes in all project implementation phases.
    d. Methods used for impact Identification, assessment and analysis should be described and where checklists are used, they should be appended.

2. Stakeholders' Consultations should be adequate and their concerns considered in the EIS: Among the stakeholders to be consulted should include Lake Victoria Basin Water Board.

3. The project alternatives should be analyzed and the reasons given for the preferred alternative:

4. The EIA report should address issues related to land acquisition, land use planning and suitability of the site for the project and Copies of Relevant permits should be appended.

You are advised to work on the comments provided above. In addition to observing the ToR we emphasize that you undertake the EIA study, prepare the EIA report and submit the EIS to the National Environment Management Council, according to the requirements of the EIA and Audit Regulations, 2005.

Upon submission of the EIA report, the Council will arrange for a technical review of the document by the Cross-sectoral Technical Advisory Committee (TAC). Prior to review, representatives of the TAC will visit the project area and surrounding environment to verify the adequacy of the EIA report.

You are also reminded that submitted ToR with these improved comments should be appended with this letter to the Environmental Impact Statement (EIS) that will be submitted to the Council for review.

In case you need further clarification on this matter, please do not hesitate to contact us on ***Tel: 0767 153 776***

Yours sincerely,

Jamali Baruti
ZONAL COORDINATOR

Cc: Ally Salim (Registered Environmental Expert)
P.O. Box 175,
Sengerema – Mwanza.

Appendix 6. Multi-Stakeholder Forum Lamadi Town

Name	Gender	Membership in MSF	Contact
John Bature	M	Chairperson	0767471508/0787572247
Yunifrida Kinasa	F	Deputy chairperson	0683143800
Salome Igenge	F	Secretary	0784477981/0767477982
Sahani Joel	M	Deputy secretary	0787922575
Mobilization Thematic Group			
Rose Anthony	F	Member	
Mathias Lukwala	M	Member	0685808246
Musa Masanyiwa	M	Member	0786804060
Ezekiel Machibya	M	Member	0755144682
Shola William	M	Member	
Mligwa Masolwa	M	Member	
Hamza Swedi	M	Member	
Musa Justine	M	Member	
NKwaya Lukona	M	Member	684629802
Mayala Komanya	M	Member	788655225
Chanila Lukandikija	M	Member	
Infrastructure Thematic Group			
Abubakari Selemani	M	Member	
Mektrida Nkiligi	F	Member	
Reuben Julius	M	Member	
Helena Mau	F	Member	
John Petro	M	Member	
Ngollo Nzega	M	Member	
Mihayo Kiyumbi	M	Member	
Kulwa Getema	M	Member	
Njunga Kingi	M	Member	
Grace Malima	F	Member	
Salome Musa	F		767362767
Rahel Philipo	F		755696459
Pius Chure	M	Member	
Capacity Building Thematic Group			
Aspololbunga	M	Member	
Happiness Ikumbo	F	Member	
Tumaini Madaraka	M	Member	0786399424

Name	Gender	Membership in MSF	Contact
Samson Yusufu	M	Member	
Mary Mazanza	F	Member	
Tito Dirasi	M	Member	
Suzana Lufuta	F	Member	769513581
Tory Humbi	M	Member	
Yongo Fulano	M	Member	
Paulo Magahinja	M	Member	
Sikujua Mabula	F	Member	
Tana Goleha	M	Member	682438632
Ng'wamba Kipunga	M	Member	686346416
Mambo Manhumbu	M	Member	682078287
Kazimoto Songoma	M	Member	789695856

Appendix 7. List of Consulted Stakeholders

STAKEHOLDERS CONSULTATION FORMS FOR CONDUCTING ENVIRONMENTAL IMPACT ASSESSMENT FOR THE FAECAL SLUDGE TREATMENTB PLANT PROJECT IN LAMADI TOWN, BUSEGA DISTRICT; SIMIYU REGION

NA	NAME	INSTITUTION	SIGNATURE & DATE
	BEATRICE J. ALLOYCE	VEO- MWABAYANDA	16/06/2016
	BIJA LAURENT BIJA	DIWANI-LAMADI	16/06/2016
	ZAWADI NELLS MABULA	VEO- KALAGO	16/06/2016

STAKEHOLDERS CONSULTATION FORMS FOR CONDUCTING ENVIRONMENTAL IMPACT ASSESSMENT FOR THE FAECAL SLUDGE TREATMENTB PLANT PROJECT IN LAMADI TOWN, BUSEGA DISTRICT; SIMIYU REGION

NA	NAME	INSTITUTION	SIGNATURE & DATE
1	CHARYA IBASO MAYALA	M/K/ KITONGOJI MWALUKONGE	[signature]
2	MALA NTILUTABUNI MALU	—″ —″ LAMADI	[signature]
3	MPUYA ABLA LUCAS	M/KITI KALO GO	[signature]
4.	JUMA M. MSEMA	VEO	[signature]
5.	TISORO MATUTU MWITA	M/KI YA ITONGO	[signature]
6.	NZALA HEZRON GUMADI	M/KITI - KIJIJI LAMADI	[signature] 16/6/2016
7	JULIUS G. WAMBURA	M/KITI MWABAYANDA	[signature] 16/6/2016
8	JOHN L. MGHANDI	VEO	[signature] 2016 JUNE 16

Appendix 8. Impact Tables

The overall impact of the proposed intervention is positive (improved health and sanitation due to better faecal sludge management) but some impacts will or may negatively affect the communities in the study area. Table A8-2 presents a preliminary listing of potential interventions that may be undertaken as part of the FSTP works in Lamadi together with their expected environmental and social impacts.

Table A8-1 provides a key to the significance of the identified impact criteria.

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 poor sanitation condition and associated health risks	Long term	Local	Yes	Certain	Major	Severe	High negative	--	--
With-project scenario										
All interventions	Improved sanitation and reduced health risks	Long term	Local	Yes	Certain	Major		High positive		
Construction										
Site clearing	Vegetation clearance	Temporary	Local	Yes	Certain	Medium	Low	Low negative	Negligible	Planting trees around the site
Site clearing	Disturbance to cultural, historical & archaeological art.	Permanent	Local	No	Unlikely	Negligible	Low	Negligible	Negligible	No features identified
All works	Disturbance to land use, scenic & visual quality	Temporary	Local	Yes/No	Possible	Minor	Mild	Low negative	Negligible	Replanting trees around the site
All works	Disturbance to residents & resettlement	Permanent	Local	No	None identified	Negligible	Negligible	Negligible	Negligible	No residents or land use on site
All works	Land scarring at borrow pits	Temporary	Local	Yes	Likely	Minor	Low	Low negative	Negligible	Landscaping, revegetation
All works	Noise & vibration	Temporary	Local	Yes	Likely	Minor	Low	Negligible	Negligible	No people on site
All works	Soil erosion	Temporary	Local	Yes	Possible	Minor	Low	Low negative	Negligible	Plan works during dry season
All works	Traffic intensity increase	Temporary	Local	Yes	Likely	Minor	Low	Low negative	Negligible	Community sensitization, traffic plan

Intervention	Potential impact	Impact duration	Spatial extent	Reversible (Y/N)	Likelihood	Magnitude	Sensitivity	Significance prior to mitigation	Significance after mitigation	Mitigation measure
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
Operation and Maintenance										
O&M	Pollution of soil & surface/ground waters by effluents from FSTP	Continuous	Local	Yes	Possible	Minor	Low	Low negative	Negligible	Regular testing followed by additional protection works (more / better septic/ soakaway pits)
O&M	Foul smell	Frequent	Local	Yes	Likely	Medium	Moderate	Moderate negative	Low	Cover swampy parts of drying bed with layer of earth / sand

Intervention	Potential impact	Impact duration	Spatial extent	Reversible (Y/N)	Likelihood	Magnitude	Sensitivity	Significance prior to mitigation	Significance after mitigation	Mitigation measure
O&M	Mosquito breeding	Wet season	Local	Yes	Possible	Minor	Mild	Moderate negative	Low	Cover swampy parts of drying bed with layer of earth / sand or spraying
O&M	Overflowing of sludge to surroundings	Exceptional	Local	Yes	Possible	Minor	Mild	Moderate negative	Negligible	Increase capacity or heightening of bund around site as needed

Appendix 9. Lenders' Supervisor's Comments on the ESMP

The following comments were received on 1 April 2016 from EIB's Lenders' Supervisor on the draft ESMP for Lamadi town of 18 February 2016.

Nr	*Lenders' Supervisor Comment*	ESIA Team's response
1	*The Consultant has made thorough reference to the EIB Guidelines and applied them appropriately. And given the fact that most of the negative impacts associated with the proposed interventions are generally site-specific, short-term, reversible in nature, low significance, and can be easily mitigated, the ESMPs (which could also be called PEAs) suffices.*	Noted.
2	*There is an ambiguity or contradiction regarding the application of national legislation. In the first and second paragraphs of Section 3.3, the reports says screening decision by NEMC HQ required full EIA studies (see 3 below), but in the same section the Consultant gives a justification to waive full EIA studies in favour of ESMPs without a written consent from NEMC HQ or NEMC Lake Zone Office. The Consultant seems to have taken for granted that based on his consultation with NEMC Lake Zone Office on ESMPs for IIP subprojects in Mwanza City (Appendix 1: Meeting Minutes between NEMC and PMC), the ESMPs also apply to the subprojects for the satellite towns. I hope this will be cleared by NEMC HQ (Director General) when responding to MWAUWASA's letter requesting for urgent approval of the ESMPs.*	Verbal (telephone) conversation with NEMC in January 2016 on the structure and contents of the E&S reports for the satellite works learned that the team was instructed to submit all six reports (3 ESMPs for IIP works and 3 reports for the satellites) in one go, and that then NEMC would do its review. It was therefore assumed that for the works for the satellites, similar in nature as the IIP works for Mwanza City but in less challenging terrain, ESMPs would do for the satellites as well. This was particularly convenient as at that time final Tender Documents for the works were already (late and) due in January 2016 and the E&S documentation was to be included in these. There was simply no time for any sort of full ESIA and the ESMPs were consequently prepared in a period of a few weeks. Works on the E&S documentation for the satellite could not start earlier either because of delayed delivery of the designs by COWI (in January 2016 as well).
3	*In the first paragraph of Section 3.3, (pg 11 for Lamadi and pg 12 for Magu and Misungwi ESMPs) says "NEMC's screening decisions on the proposed rehabilitation and expansion of water supply infrastructure and construction of a faecal sludge treatment plant for .... (of 4 March 2015) indicated that an EIA study is to be undertaken." In connection to 2 above, the decision to waive full EIA studies in favour of ESMPs or PEAs {you could also add environmental audits - based on EIA and Audit Regulation 46.-(2)(a)} should come from NEMC, based on arguments/ suggestions from the Consultant and/ or the Developer.*	As response (2) above.
4	*In connection to comment 2 above, the ESMPs for Satellite Towns (and those for IIP subprojects in Mwanza City) are by far Preliminary Environmental Assessment*	Meanwhile NEMC has been insisting on the full ESIA process for the satellite works, one for the water supply

Nr	***Lenders' Supervisor Comment***	**ESIA Team's response**
	5(PEA) as defined under Regulation 11-(1)b of Tanzanian EIA and Audit Regulations. In case NEMC recommends renaming the ESMPs as PEAs, the Consultant will be required to revise relevant paragraphs notably under Section 1.3; 3.3; and 10. Other changes will be as per the requirements of the Regulation 11-(1)b of Tanzanian EIA and Audit Regulations.	component, the other for the faecal sludge treatment plant.
5	*The Consultant has ardently used the project activity/ impact matrix, such that the main negative impacts associated with the interventions have been identified and appropriate and adequate mitigation measures have been proposed. However, some of the identified impacts and their proposed mitigation measures (e.g. permanent or temporary loss of land and assets; and intensification of HIV/AIDS and other STDs) are not included in the ESMP matrices in Chapter 7 of each ESMP. All identified impacts and their respective mitigation measures should appear in the ESMP matrices.*	Structure of impact assessment amended.
6	*NEMC approves decommissioning plans of projects when their life span expires or premature closure of the projects. In this regard, the proponent/ developer shall approach NEMC in due time with a proposal on decommissioning stating details and methodology of proper decommissioning. The Consultant may consider reflecting this in Section 9.*	Amended.

Appendix 10. Comments from LVBWB

The following comments were received on 19 August 2016 from Mrs Jane John, Head of Environmental Section of the Lake Victoria Basin Water Board (LVBWB; Box 1342, Mwanza) office on the proposed LVWATSAN Project works in the satellite towns.

Nr	***LVBWB Comments***	**ESIA Team's response**
1	*The proposed project should ensure proper treatment of the sewage before discharging to the environment.*	As outlined in the present report, the proposed works in each town include the construction and operation of a faecal sludge treatment plant. The guiding design principle of this plant is "to provide simple cost efficient latrine/cesspit emptying, removal and treatment capability in each town". This is an improvement of the existing situation where raw faecal sludge is periodically collected and dumped on land in the town surroundings. The project funds are not sufficient to install and operate a sewerage system and a wastewater treatment plant.
2	*Provide access to the effluent monitoring points.*	The Environmental and Social Monitoring Plan outlined in Chapter 9 of the present report includes the monitoring of air-, soil- and groundwater pollution associated with the construction and operation of the works. Precise monitoring locations will be selected during implementation of the works. All monitoring points will be easily accessible.
3	*Ensure the groundwater/soil will not be affected/contaminated by your project.*	Sludge treatment in the plant consists of separation of solids and liquids using settling-thickening ponds, from where each fraction is treated and disposed off separately. There are two concerns for groundwater protection; these are the potential pathogen movement in the groundwater and the infiltration of soluble nutrients. Due to their size, the pathogens will adhere to the soil particles and not move very far. With a minimum safe distance of 100 m for ordinary soil, there will be no pathogens in the groundwater outside this distance. The soluble nutrients, such as nitrate from urine, will move with the groundwater, but will be diluted to a level where there is no health risk. It is assumed that most of the nitrate has already infiltrated at the site of origin, that is near the households from the infiltration of liquid waste the septic tanks and pit latrines. For reuse of the dried faecal sludge from the facility, the operation will secure elimination of Ascaris eggs, for example by using a one year cycle for moving sludge from pond to the two drying beds (for odd and even year) giving a total three years retention time before final removal of the dry faecal material. After three years, the infection risk of Ascariasis is minimal.

Appendix 11. Comments Received on Draft ESIA of August 2016

The following comments were received through NEMC from the report reviewers on 11 March 2017.

Nr	***Busega District Council – J.L. Mang'ara***	**ESIA Team's response**
1	*Policy Framework add the following Policies* *(a) Tanzania Development Vision – 2005 which aim to attain high quality of life.* *(b) Forestry Policy of 1998* *(c) The National employment Policy of 1997 which reflects Act No. 5 of The Occupation Health and Safety Act No. 5 of 2003 and workers compensation Act of 2008 No. 120.* *(d) The National Health Policy (2003) – Public Healthy Act. No. 1 of 2009 stipulated on Pg. 20*	Amended.
2	*Legal Framework part add the following Acts.* *(a) The forest Act. No. 14 of 2002 aiming to protect Flora* *(b) The village Land Act No. 5 of 1999.*	Amended.
3	*On the page of Summary and Conclusions* *- Edit the whole page because paragraph two looks as if it's for Magu as well as paragraph three remove Bugabu and Nyashimba, all those villages are within Magu District.*	Amended.
4	*Stakeholders should sign and their comments should appear to each stakeholder.*	Numerous consultations have been conducted, i.e. by the design consultant (COWI), UN-Habitat and the PMU/PMC; minutes of most of these encounters have been made, presence lists filled and signed, but adding these in the present report would make it too voluminous. Meeting minutes and participant's lists are available at MWAUWASA/PMU.
5	*Consultants should consult with DEMO in every respective district to get their views.*	Noted.

Nr	***Energy and Water Utilities Regulatory Authority (EWURA) – N. Musira***	**ESIA Team's response**
	General comments	
1	*Generally the report has covered all key areas concerning health, safety and environment*	Noted.
2	*EWURA has no objection with the proposed construction of proposed rehabilitation and expansion of water supply infrastructures and construction of faecal sludge treatment facilities provided that the project proponent abides to Environmental and Social Management Plan as*	Noted.

Nr	***Energy and Water Utilities Regulatory Authority (EWURA) – N. Musira***	**ESIA Team's response**
	proposed in the document and adheres to the current technical standards, policies and bylaws	
	Specific comments	
3	*Page 9: Section 2.5.1 Mobilization: Dimensions and text of the drawing in Figure 2-3 which shows the layout of the proposed faecal sludge treatment plant at Lamadi town is not visible. Zoom out the drawing accordingly so that the dimensions and texts can be visible.*	Drawing stems from the Design Consultant's Study Report (SR) of February 2016; better quality copies have been requested from the DC but have not been provided. The Tender Documents of July 2016 provide contours of the FSTP superimposed on satellite imagery but in less detail than the SR.
4	*Page 14: Section 3.0 Policy, Legal Framework and Administration: The Energy and Water Utilities Regulatory Authority (EWURA) Act, Cap 414 (2006) has not been sighted in the ESIA report. Include EWURA Act, Cap 414 (2006) in tis report.*	Included.
5	*Page 42, Section 6.6.7: Ground water pollution: The report shall consider on how Busega District Council will control the disposal of the hazardous liquid wastes originated from the laboratory from the hospital.*	BDC is to ensure that hospital's waste disposal is in accordance with national and local regulations with respect to health and safety, which may require, for example, the use on incinerators, instead of disposal in the FSTP.

Nr	***National Environment Management Council (NEMC) – J. Baruti***	**ESIA Team's response**
	General	
1	*The attached documents are difficult to read, make sure that in the final report the documents attached are readable.*	Referred attachments are scanned versions of provided PDF letters.
2	*The proposed handling of final sludge and decant is through irrigation and use as manure, has the study explored the social acceptance of the communities around to use decant water and sludge as irrigation water and as manure? This has implication in the operations of the facility.*	Yes, local residents have accepted the proposed works. Meeting minutes and participant's lists are available at MWAUWASA/PMU.
3	*It is proposed that during the initial stage of the project only cell A & B will be constructed. What is the anticipated amount of sludge from Lamadi Town that will be brought to the facility?*	See Chapter 2. The Design Consultant's Study Report does not provide this information but states that each of the two settling/thickening ponds that will be built during Phase I (pond A&B) has a capacity of 150 $m^{3,}$ equivalent to 25 to 30 full truck loads.
4	*What is the indicative efficiency of the proposed design in terms of sludge treatment to the required effluent standards?*	See revised Chapter 2.
5	*Are there plans from the District Authorities to ensure that a buffer zone of 100 m is maintained?*	The fenced FSTP plot itself provides some buffer as the settling and drying beds do not take the entire space. Outside the FSTP the land is fallow land only used for occasional grazing.
6	*According to the EIA and Audit Regulations, 2005; EIS studies are conducted by the registered experts or firms of experts. It is understood that Mott MacDonald is not a registered firm and thus it has*	Note at Acknowledgement page added.

Nr	***National Environment Management Council (NEMC) – J. Baruti***	**ESIA Team's response**
	subcontracted the EIA study to Ally Salim, who is registered expert. It should be explained clearly in the report.	
7	*The report must clearly identify where the effluent will be discharged.*	See revised Chapter 2 – effluent from the settling and drying ponds is discharged in a septic/soakaway pit.
8	*Proofread the document to ensure the information presented reflects the respective project.*	Done.
9	*A separate bound copy of Non-Technical Executive Summary and CD should be submitted in the final submission. The English and Kiswahili versions of the Non-technical Executive summary must reflect the same information.*	Noted.
10	*Adhere to EIA and Audit Regulations, 2005 particularly Regulation 18(1) and(2)*	Noted.
	Review Area 1 ***Description of the Development Local Environment and Baseline conditions:***	
11	*Page v; the registered experts who conducted the study must sign against their names. For those who are not registered, they can be acknowledged.*	Achieved.
12	*Page vi; in the names and address of experts; Mott and MacDonalds and UWP Consultants are not Registered Firms of Experts as required by Law.*	Noted.
13	*Are Magu, Misungwi and Lamadi, Satellite Towns of Mwanza City?*	That is how they are referred to in project documentation.
14	*Page 1; last paragraph; how is the current project addressing the Sustainable Development Goals which has replaced the Millennium Development Goals?*	The project is directly addressing several of the 17 main SDGs, particularly (3) 'Good health and well-being' and (6) 'Clean water and sanitation'.
15	*Page 3, section 1.4; fourth and fifth paragraphs; the EIA process in Tanzania is guided by the Environmental Management Act and EIA and Audit Regulation and therefore classifications under the EIB's Environmental and Social Handbook cannot influence the decision made to undertake full EIA. Consider deleting these paragraphs.*	As the project is financed for 85% by non-GoT sources, by institutions that operate by their own environmental and social safeguards, it makes sense to mention their requirements as well – see Section 1.3 and Section 3.10.
16	*Page 5; under visual observations; are there sewer lines at Lamadi?*	Meant are here surface gutters, usually along roads.
17	*Page 7, section 2.1; provide detailed description of the project site, what borders the project site, how far is the project site from the residential houses.*	Amended.
18	*Page 8;Figure 2-1; put a better map that is readable.*	See response on EWURA's comment 3, above.
19	*Page 10, second paragraph; what is the capacity of ponds A and B; what are the design considerations that make sure that there is no seepage to the ground water?*	See Chapter 2.
20	*What is the depth to the ground water?*	The geotechnical study conducted found no ground water within drill depth (4 m).

Nr	***National Environment Management Council (NEMC) – J. Baruti***	**ESIA Team's response**
21	*Page 12; figure 2-3; the figure is completely not readable. Consider printing in an A3 paper.*	See response on EWURA's comment 3, above.
22	*Page 10, second paragraph; be specific on how the soak away pit will be constructed instead of giving some options.*	See Chapter 2.
23	*Page 11; sections 2.4.1 and 2.4.2; what will be the duration of mobilization and construction phases?*	See Chapter 2.
24	*Page 12, section 2.4.4; what is the life span of the project?*	The construction works will be implemented from March 2017 to March 2020, including a 12 months defects period.
25	*What is the average sludge production is anticipated at Magu?*	Not specified in the design, but see response on comment 3 above.
26	*Has the project determine social acceptance on the use of sludge as manure as water for irrigation?*	See response on comment 2, above.
27	*Section 2.6; give estimates of wastes to be generated.*	This cannot be estimated as this stage, and depends on the Contractor's approach and performance.
28	*Page 13, table 2-1; what is the data source for this table? What will be the source of stated materials?*	Study Report; materials will be sourced as much as possible locally.
29	*Page 14; make sure that the sections and provisions in the policies and legislations are relevant to the project and the proponent commits to implementing the provisions.*	Chapter 3 has been revised.
30	*Treat the Acts and Regulations separately.*	Amended.
31	*Page 20; section 3.4.5; if Land Use Planning Commission does not have any bearing why including it here?*	Section deleted.
32	*Page 24 and 25; what is the relevance of these other environmental protection endeavours to the current project?*	Deleted.
33	*Page 26, section 3.9; under administrative framework; show in the relevant institutions and the roles they play in the proposed project. This include the project proponent, you may wish to summarize the information in a matrix.*	Included and amended.
34	*Page 27, section 3.10.1; this section could have come under policies and legislations before describing the administrative framework.*	This section on EIB is dealt with separately from all previous sections as it is non-GoT.
35	*Page 4; narrow down the baseline data to the project site (e.g. soil, topography, hydrology, fauna and flora, air quality, water quality both surface and ground), this are the ones which will be affected by the project activities at a local scale.*	Site conditions are similar to those in the wider environment, therefore a general descriptions has been given, amended to the extent necessary.
	Review Area 2 ***Identification and Evaluation of key impacts:***	
36	*Under this section the logic requires that you first identify the impacts, analyse for their significance. How were the impacts identified and analysed for significance levels?*	Noted.
37	*The impacts are not described in in terms of magnitude, duration and significance.*	Added.

Nr	***National Environment Management Council (NEMC) – J. Baruti***	**ESIA Team's response**
38	*Page 40; section 6.5.1; confine yourself to positive impacts during the operation phase.*	Amended.
39	*Section 6.5.2; consider other impacts such as foul smell and mosquitoes breeding sites.*	Included.
40	*Page 43; section 6.6.9 is a repetition.*	Deleted.
	Review Area 3 ***Alternatives, mitigations, EMP, and commitment***	
41	*Page 40; Section 6.6; for project alternatives, you need to describe options for each alternatives and choose one which is optimal and also giving the reasons for the particular choice. For instance, what are the options for disposal of treated waste products?*	Alternatives have been considered during the long process of project preparation, starting in 2010, and the currently selected option has been selected; it is believed to be beyond the scope of the current report to revisit and present all these options here.
42	*Page 44; what is the level of significance that deserves the mitigation measures? Normally is it moderate to high significant impacts.*	Table amended.
43	*Make sure that impacts appearing here are all that have appeared in the chapter 6.*	Amended.
44	*Page 48, section 8.1; the paragraph which starts with Environmental Impact Assessment … is not clear.*	Amended.
45	*Page 50, table 9-1;make sure that the impacts and mitigation measures are the ones appearing in chapter 6 and 7.*	Amended.
46	*Remove the column reporting to. There will be a lot of reports which are practically impossible to produces. Also effectiveness of the mitigation measures is realised through the monitoring, you may wish to delete columns with targets and timeframe.*	Columns remain and may be deleted once actual implementation and monitoring concludes that these columns are not necessary.
47	*What is the total cost of the mitigation measures?*	Added.
48	*The responsibilities of implementing mitigation measures lies within the project proponent.*	Noted and amended.
49	*Page 59, table 9-1; where is the monitoring of water supply in a faecal treatment plant comes in?*	Amended.
50	*Put the targets or standards and where applicable put the numbers as per the national standards.*	It is the responsibility of the monitors to assure that the monitored parameters comply to or are within the national standards.
51	*It is important that the Monitoring plan include the monitoring of the observation wells downstream the plant to monitor quality of ground water.*	Included.
52	*What is the total cost of the monitoring plan?*	Included.
53	*The Cost Benefit Analysis of the Project is missing.*	This has been assessed during preparation of the project – see response on comment 41, above.
	Review Area 4 ***Stakeholder participation and communication of results***	
54	*Front page: Who is the project proponent? The EIA certificated will bear the Name of MAUWASA as the*	Project proponent is MWAUWASA

Nr	***National Environment Management Council (NEMC) – J. Baruti***	**ESIA Team's response**
	proponent unless it is clearly stated that the client is MWAUWASA/ EIB	
55	*There is a confusion on who prepared the ESIA (see the address), is Ally Salim on behalf of Mott MacDonald or both? Take note that Mott MacDonald is not a registered firm in Tanzania.*	See response on comment 6, above.
56	*The final EIS should show the exact date of submission of the report.*	Noted.
57	*Page 32; provide a summary of who said what during the stakeholders' consultations; what were the comments raised and how the report has taken the comments on board.*	Amended.
58	*In annex 7, some stakeholders were consulted but their views and concerns are not shown in the consultations.*	See Chapter 5.

Nr	***Attorney General's Chambers – J. Nyaki***	**ESIA Team's response**
1	*The Environmental Impact Statement (EIS) have tried to show the relevant law concerning the proposed project and how the proponent will abide with the said laws and policies. The EIS have tried to provide a commitment statement on how the developer will adhere to the law and policies of the country.* *There is no any construction in the project area.* *The EIS provides that projectwill be located at the area legally owned by local government authorities. However there is no any document to that effect.*	Noted.
2	*Chapter 3-Policy, Administration and Legal Framework* *The EIS should cite the laws and regulation in a manner acceptable by the law. The following areas should be reviewed and cited as follows:* • *Environmental Management Act No. 20 of 2004.* • *Land Act No. 4 of 1999.* • *Water Supply and Sanitation Act No. 12 of 2009.* • *Urban Planning Act No. 8 of 2007.* • *Occupational Health and Safety Act No. 5 of 2003.* • *Workers Compensation Act No. 20 of 2008.* • *Public Health Act No. 1 of 2009.* • *Employment and Labour Relations Act No. 6 of 2004.* • *Engineers Registration Act No. 24 of 2007.* • *Contractors Registration Act No. 17 of 1997.* • *Architects and Quantity Surveyors (Registration) Act No. 16 of 1997.* • *Local Government (Urban Authority Act No. 8 of 1982.*	Amended.

Nr	***Lake Victoria Basin Water Board (LVBWB) – A.B. Malima***	**ESIA Team's response**
1	*Pages V, VI, X at Acknowledgement and at Executive summary the Proposed construction sludge treatment facility is it in Misungwi Town?*	Amended.
2	*The attached layout of faecal sludge treatment plant at page 9 are not seen clearly, attach the clearly and wide layout plan to enable readers to see the location of each section of the proposed faecal sludge treatment plant*	See response on EWURA's comment 3, above. Better quality drawings are currently not available.
3	*Page 12, Table 2-1 it supposed to be under sub-section 2.5.2 and not under Section 2.6 also the table 2-1 it should have column for material source especially what will be the source of water?*	Noted and amended.
4	*Sub-section 3.5.4 page 21 at a second paragraph state the exactly section 63 of Water Resources Management Act No. 11 of 2009 also include the quotation mark*	Amended.
5	*Sub- section 3.5.6 page 22 reform the first sentence*	Amended.
6	*Sub-section 4.1.3 page 29 since it discussed about surface and ground water information the heading should be Hydrology and Hydrogeology*	Amended.
7	*Page 56 For the case of pollution to nearby water sources LVBWB should be among the reporting to organization*	Amended.
8	*Page 85 at appendix 9 is not Lake Victoria Basin Office (LVBO) , its Lake Victoria Basin Water Board (LVBWB*	Amended.

Nr	***Occupational Health and Safety Authority (OSHA) Lake Zone – M.M. Shenduli***	**ESIA Team's response**
	Comments concerning the report	
1	*The comments are similar to Magu and Misungwi, [i.e.* *MISUNGWI* *1. Page xi summary and conclusion, line 1, remove water supply works at misungwi, it should be feacal sludge treatment* *2. Page 3, remove supply works and replace feacal sludge treatment* *3. Page 7, section 2.1 no figure 3-1, it is figure 2-1.* *4. Page 8, section 2.2, line 2 from bottom no figure 3-2, it is figure 2-2.* *5. Page 12, the figure is not readable.* *6. Page 15, line 2, it is dispose off and not dispose of.* *7. Page 25, OSHA is not in the list of abbreviation.* *8. Page 31, section 4.1.1, line 1, the data for average rainfall (930mm- 1000mm) is not the same with the*	Amended.

Nr	***Occupational Health and Safety Authority (OSHA) Lake Zone – M.M. Shenduli***	**ESIA Team's response**
	data of average rainfall in section 2.1 (700mm-1000mm). *9. Page 33, liquid waste management, line 3, the word feacal is erroneously typed.* *10. Page 35, table 5-1, National level, it is President's office and not Prime Minister's office.* *11. Page 55 last row, column of reporting, it should be Misungwi and not Busega.* *MAGU* *1. Page 6, Source of the figure should be in the caption.* *2. Page 8, last but one paragraph, line 2 and 3, the unit must have consistency.* *3. Page 9, figure 2-3, not readable.* *4. Page 10 line 1, the word diameter should be fully, and not diam.* *5. Page 25, OSHA is not in the list of abbreviation.* *6. Page 33, table 5-1, National level, it is President's office and not Prime Minister's office]*	
	General comments for Misungwi, Magu and Busega documents	
2	*The word wastewater has no space between waste and water.*	Amended.
3	*Justify the whole documents.*	Left alignment is the consultant's house style
4	*The colours for all headings and sub headings should be set to automatic*	Colour setting of headers and sub-headers is as per the consultant's house style
	OHS recommendations	
5	*The projects must be registered with OSHA during construction and operation phases*	Noted, for LUWASA to follow up
6	*All workers must undergo fitness for work medical examinations*	Noted, for the Contractor and Supervising Consultant to follow up