

**ENVIRONMENTAL AND SOCIAL IMPACT STATEMENT****FOR****PROPOSED CONSTRUCTION OF ONE-STOREY LABORATORY  
BUILDING ON PLOT NUMBER 1829 OF St. BENEDICT'S NDANDA  
HOSPITAL IN MASASI DISTRICT, MTWARA REGION, TANZANIA**

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# EXECUTIVE SUMMARY

## Introduction

The St. Benedict's Ndanda referral hospital of the Registered Trustees of the Benedictine Fathers of Abbey- Ndanda of P.O. Box 25 Masasi, Mtwara, intends to construct a one-storey laboratory building capable of diagnosis and surveillance of Tuberculosis and other communicable diseases from the region and other neighboring countries such as Mozambique.

Established in 1908 soon after the Maji Maji Uprising in 1905, The St. Benedict's Ndanda referral hospital operates on a Not-for-Profit basis and has 300 beds and 350 staff (including professional and non-professional staff). Following recognition of the One Hundred years of unparalleled excellence in provision of health care services in the country's Southern region, and for the neighboring countries, particularly, Mozambique, the St. Benedict's Ndanda hospital was, on 12th November 2010, up-graded to Regional Referral Hospital through Government Notice No: 828, and published on the Government Gazette.

Moving with provision of excellent health care and laboratory services, St. Benedict's Ndanda hospital in 2014 was awarded the WHO Certificate of Best Overall Laboratory-Satellite Laboratory Category under the East African Public Health Laboratory Network Project involving 33 laboratories from all East African Countries (*Appendices 8,9,10*). In addition, St. Benedict's Ndanda hospital has for the past 3 consecutive years maintained a **Four-star status** of the WHO assessment, meaning that it been missing just few points to attain the **Five-star status** which is the highest 'gold' status for best provision of health care and laboratory services. According to WHO, the missing points are attributed to laboratory services that are limited by current structure of the laboratory building in terms of space, facilities and staff.

It is on this basis and the growing emergency of communicable diseases outbreaks (e.g. the case of Ebola), that the hospital with support from the government and the World Bank under the East Africa Public Health Laboratory Network intends to construct the new laboratory building to strengthen capacities for diagnosis and surveillance of Tuberculosis and other communicable diseases in the region. The laboratory to be constructed falls under **level 4** according to the levels and categories of health laboratories in Tanzania. **Level 4** laboratories according to this clarification refers to laboratories that has an automated high-throughput equipment run by laboratory personnel (technicians, technologists, and scientists) with at least an advanced diploma level of training.

The investment cost for the proposed project is estimated at US \$ 700,000.

## Policy and Legal Framework

A study has been conducted in respect of national and international policies and legal frameworks abiding ESIA and Resettlement Action Plan (RAP), which include National Environmental Policy (1997), National Health Policy (2003), National Public Health Act (2009), National Water Policy (2000), Water Resource Management Act (2009), National Land Policy (1995), Environmental Management Act (2004), and Environmental Impact Assessment Audit Regulations (2005) and World Bank OP 4.12. With the above mentioned guidelines, ESIA team is aware that such project

intervention should provide maximum benefit to the communities and that there should be mitigation strategies for every negative effects emanating from the intervention.

## **Environmental and Social Impact Assessment (ESIA)**

The area to be used for construction of the laboratory belongs to the developer (the Benedictine Fathers of Abbey-Ndanda) and is surveyed with title deed No. 1829 and a total area of 288 acres. Part of this area is currently already occupied by other building including the Ndanda referral hospital, Ndanda Nurses and Midwifery Training School, Chaplaincy (Ndanda mission), Ndanda Vocational Training College, as well as residential houses for staff and other assistants.

The proposed development is located within the hospital area where other hospital buildings such as theatre (on the North), X-ray department (on the West), TB/Ultra Sound department (on the South) and ward for admitted patients (on the East) are located. As such, other facilities such as electricity, water and waste management systems are already in place.

### **Assessment of Impacts and Mitigation Measures**

An integrated evaluation of the impacts of the construction of the new laboratory building on physical, biological and socio-economic spheres indicated some impacts if no mitigation measures are implemented. The impacts vary between construction and operation phases.

The construction activities of the proposed building would result in an impact on soil and water quality and a number of socio-economic impacts with significance in relation to a positive impact on employment (job creation) and negative impacts on human health and safety. Some of the impacts on health such as HIV infections would be irreversible and long-term suggesting that implementation of recommended mitigation measures is of utmost importance.

The long-term operation of the laboratory would result in significant negative and positive environmental and socio-economic impacts. In particular, the health status of Mtwara and neighboring regions would be enhanced through improved capacity for diagnostic and surveillance of diseases outbreak. In turn this would translate into a healthy and productive society capable of driving their own lives for achieving their socio-economic development goals as desired by the National Strategy for Growth and Reduction of Poverty (NSGRP/ MKUKUTA) Vision 2015 and the current Big Results Now (BRN). In contrast the generation of both liquid and solid waste from laboratory operation is anticipated to create negative impacts, which may affect both human health and the environment if not appropriately mitigated. There are potential risks for both liquid and solid waste to pollute underground water and soils if the developer will not take precautionary measures during project design and mitigation measures in the operational phase. The details of potential impacts and mitigation measures for the project are summarized in table 1 below.

**Table 1: Summary of Impacts**

Component Activity	Potential Issues/Impacts/Risks	Potential Mitigation/Enhancement Measures
<b>Phase: Design</b>	Lack of appropriate facilities for people with disabilities	Ensure that building designs takes into consideration of the needs of people with disabilities including access point for wheel chairs (including upstairs rooms) as well as provision of special washrooms and ramps at the access points. This also includes provision of the most direct entry from main gates.
<b>Phase: Construction</b>	<b>Positive Impacts</b>	
Income to material/equipment suppliers and contractors	- Economic empowerment of quarry owners and material suppliers	- Ensure proper sale agreements with material suppliers. - Ensure fair/market prices are paid to suppliers commensurate to quality of goods/services rendered.
Employment	- Construction will avail skilled and unskilled job opportunities.	- Wherever feasible, local people should be considered for job opportunities commensurate with their level of skills. - Adequate occupational health and safety standards should be provided to ensure the work environment is conducive.
	<b>Negative Impacts</b>	
Generation of waste	<ul style="list-style-type: none"> <li>- Clearance of vegetation and excavations to obtain a levelled site exposing the land to agents of erosion such as wind and storm water.</li> <li>- Contaminations of soil due to leakage of fuels and other liquid from equipment in addition to inadequate storage of waste generated during construction activities.</li> </ul>	<ul style="list-style-type: none"> <li>- The wastes should be properly segregated and separated to encourage recycling of some useful waste materials.</li> <li>- Waste collection should be made at least once in 24 hours and it should be done in such a way to minimize nuisance of smell and dust during collection.</li> <li>- The contractor and hospital administration should work hand in hand to facilitate sound waste handling and disposal from the site.</li> </ul>
Temporary disruption of healthcare services	- Modifications of the laboratory will entail moving patients from the wards below it and equipment from one area or room to another. This may cause temporary disruption in delivery of services to	- Plan pre-construction activities early to identify suitable rooms or adjoining buildings into which patients or service areas can be relocated with minimal inconvenience, especially to patients in the children cancer ward.

Generation of noise	<p>- Noise will mainly result from construction equipment, workers and traffic.</p>	<ul style="list-style-type: none"> <li>- Contractor will be careful when selecting the working equipment to avoid use of old equipment or damaged equipment with high level of noise emissions that would have a negative impact in the environment.</li> <li>- Contractor will ensure that equipment is properly maintained and fully functional.</li> <li>- Construction workers should be aware of the sensitive nature of workplaces they are operating in and advised to limit verbal noise or other forms of noise. For example, metallic objects or tools can be passed on to a colleague rather than dropping or throwing them with loud bangs.</li> <li>- The contractor should ensure that noise levels emanating from machinery, vehicles and noisy construction activities are kept at a minimum for the safety, health and protection of people in the nearby buildings.</li> <li>- Noise and vibration can also be minimized at the project site and surrounding areas through sensitization of construction truck drivers to switch off vehicle engines while offloading materials.</li> </ul>
Traffic and fugitive emissions	<p>- There will be an increase in traffic associated with material and equipment haulage hence road dust and exhaust emissions especially through the hospital premises.</p>	<ul style="list-style-type: none"> <li>-The construction activities will be carried out during the day;</li> <li>-Control travel speeds of construction vehicles along the access road especially within the hospital;</li> <li>-Trucks should be covered during haulage of construction materials;</li> <li>-An alternative entry gate near the proposed site should be used to deliver materials;</li> <li>-Wherever dust suppression is necessary, water should be sprayed over dusty areas;</li> <li>-Keep all construction equipment in good operating condition to reduce exhaust emissions;</li> <li>-All dust should be quickly swept away to avoid migration to other non-construction areas;</li> <li>-Ensure that all equipment leaving the site, clean up their tires in case they are dirty; and</li> <li>-Construction work should be undertaken by an experienced and duly registered contractor with a verifiable sense of environmental awareness and responsibility.</li> <li>-Workers will be provided with PPE and the use of PPE shall be enforced.</li> </ul>

Temporary scenic blight	<ul style="list-style-type: none"> <li>- Construction activities will require material, equipment and cordons at the hospital. Since the hospital will remain open for access by public, presence of these activities and materials thereof will cause temporary visual blight at the construction site.</li> </ul>	<ul style="list-style-type: none"> <li>- Wherever possible, the contractor should ensure minimal footprint of construction activities.</li> </ul>
Occupational Health and Safety risks for Contractors and Workers	<ul style="list-style-type: none"> <li>- Construction activities have potential to pose occupational risks including fatal falls electrocution, exposure to excessive dust, noise, vibrations and eye and back injury.</li> </ul>	<ul style="list-style-type: none"> <li>-Orient all construction workers on safe work practices and guidelines and ensure that they adhere to them.</li> <li>- Training should be conducted on how to prevent and manage incidences. This should involve proper handling of electricity, water etc. and sensitization on various modes of escape, conduct and responsibility during such incidences. - -All must fully be aware and mentally prepared for potential emergency.</li> <li>- Use signage to warn staff and/ or visitors that are not involved in construction activities of dangerous places.</li> <li>- Strict instructions should be given for drivers of heavy equipment.</li> <li>- Supervision of works should be done regularly to ensure that safety conditions are met while any deviation from safety regulations is immediately reclaimed following the best practices regarding safety at work equipment.</li> <li>- Communication line must be ensured in amongst the hospital community, construction workers and drivers of heavy trucks.</li> <li>- Develop evacuation procedures to handle emergency situations.</li> <li>- Provide adequate OHS protective gear for the employees</li> </ul>
Accidents	<ul style="list-style-type: none"> <li>- Construction activities may result in a significant increase in number of heavy vehicles during transport of construction materials and equipment, increasing community risk of traffic-related accidents or injuries within and outside the hospital premises.</li> </ul>	<ul style="list-style-type: none"> <li>- Adopt best transport safety practices with the goal of preventing traffic accidents and minimizing injuries suffered by project personnel and the public</li> <li>- Ensure contractors regularly maintain vehicles to minimize potentially serious accidents such as those caused by brake failure commonly associated with loaded construction trucks.</li> </ul>

Social misdemeanor by construction workers	- With some disposable income to spend, this might induce illicit sexual relationships, with attendant risk for spread of HIV/AIDS and sexually transmitted diseases.	<ul style="list-style-type: none"> <li>- As a contractual obligation, contractors should be required to have an HIV/AIDS policy and a framework (responsible staff, action plan, etc.) to implement during project execution.</li> <li>- All construction workers should be orientated and sensitized about responsible sexual behavior in project communities.</li> <li>- Construction workers should not be allowed to interact freely or unnecessarily with patients or caretakers of patients.</li> </ul>
Air pollution due to dust and gases emission	Clearance of site and digging of the foundation may result into stockpiles of soils and vegetative debris	<ul style="list-style-type: none"> <li>- Stockpiles of soil and vegetative debris generated during site clearing activities shall be monitored and maintained to eliminate generation of fugitive dust.</li> <li>- These materials will be kept at designated area that will be secured and material covered with water proof nylon material.</li> </ul>
Increased erosion and potential landslide	Site clearance and digging of the necessary trenches and pits (e.g. foundation) loosen the soil and make susceptible to erosion and landslide.	<ul style="list-style-type: none"> <li>- Unnecessary vegetation clearance will be avoided.</li> <li>- At sloppy area the soil will not be disturbed to reduce soil erosion and land slide.</li> <li>- Exposed soil areas will be monitored to determine potential for erosion, silting and sedimentation particularly during storm events.</li> <li>- The contractor shall ensure that backfilling is done adequately, compacted, and the site restored.</li> <li>- In case of excess soil, its disposal will be through landfill to avoid removal in the event of rainfall.</li> <li>- Appropriate measures will be applied when the construction is carried out during the rainy season.</li> </ul>
<b>Phase: Operation</b>		
<b>Positive Impacts</b>		
Improved medical surveillance services	- Easing of access to diagnostic services for TB and other communicable diseases in Tanzania and the East African region hence improved health of the affected communities.	-Appropriate staffing with technical/ medical personnel adequately trained in use of newly installed equipment.
Employment	- Operation of the laboratory will create additional long-term technical and non-technical job opportunities for medical professionals, janitors, security guards	<ul style="list-style-type: none"> <li>-Encourage local and equitable employment,</li> <li>- Salaries and other benefits based on qualification and experience</li> <li>- Priority given to local residents for both professional and non-professional positions</li> </ul>

	<b>Negative Impacts</b>	
Improper waste management	<ul style="list-style-type: none"> <li>- Generation and improper management of medical waste (solid and liquid) waste</li> <li>- Improper waste decontamination and disposal can cause public health risks due to environmental pollution</li> </ul>	<ul style="list-style-type: none"> <li>- The hospital already has one incinerator on the site to enhance disposal relevant material through burning.</li> <li>- Wastewater discharged from laboratory should be aggregated and eventually pre-treated prior being released to the waste stabilization pond system.</li> <li>- Provide appropriate waste bins for the different types of waste generated in the laboratory to allow segregation and collection at the point of generation.</li> <li>- The collection of waste should be made at least once in 24 hours, and it should be done in such a way to minimize nuisance of smell and dust during collection and all the waste collected must be carried away from the storage site to an approved disposal point.</li> <li>- Hospital/ Laboratory staff should be trained or educated on the importance and means of waste management and handling during operation.</li> <li>- Overall, ensure proper waste management practices as recommended in the study on improvement of healthcare waste management in Tanzania<sup>1</sup>.</li> </ul>
Air pollution due to incineration of waste	<ul style="list-style-type: none"> <li>- Incineration of laboratory waste if carried out in an inappropriate facility could result into localized pollution of air.</li> <li>- Potential to degrade indoor air quality of nearby environment or offsite buildings during downwash of incinerator emissions</li> </ul>	<ul style="list-style-type: none"> <li>- Ensure operator of incineration unit is adequately trained to ensure efficient operation;</li> <li>- The incinerator should be operated at its design temperatures and combustion air supply;</li> <li>-The laboratory should be equipped with bio-safety areas and should also be equipped with all necessary equipment and have a ventilation system that fulfils standards of biosafety;</li> <li>-All exhaust air from the laboratory should pass through high efficiency particulate air filters; and</li> <li>-Waste should not be pre-treated with a chlorine-bearing disinfectant or should not be contained in PVC bags to avoid emission of dioxins or furans during incineration. For the same reason, no other material destined for incineration should contain chlorine-bearing chemicals.</li> </ul>



Occupational health and safety risks	<ul style="list-style-type: none"> <li>- Inadequate treatment or handling of contaminated samples or waste can create the potential that the laboratory staff would get exposed to life threatening infections in the course of their normal duties.</li> <li>- Electrocutation</li> </ul>	<ul style="list-style-type: none"> <li>-The primary measure to mitigate OHS impacts is prevention which entails identification of risks and instituting pro-active measures to avoid them. In part this can be achieved by following GIIP or national guidelines. For unavoidable risks, personal protective equipment (PPE) should be provided to workers.</li> <li>-Orient all staff on safe work practices and guidelines and ensure that they adhere to them.</li> <li>-Training should be conducted on how to prevent and manage incidences. This should involve proper handling of electricity, water etc. and sensitization on various modes of escape, conduct and responsibility during such incidences.</li> <li>-Regular drills should constantly follow on various possible incidences. This will test the response of the involved stakeholders. Such drills will keep them alert and they will become more responsive to in the case of incidences.</li> <li>-Use signage to warn staff and/ or visitors that are not involved in laboratory work of dangerous places.</li> <li>-Develop evacuation procedures to handle emergency situations.</li> <li>-Provide adequate OHS protective gear for the employees.</li> </ul>
Risk of fire outbreak	Risk of fire outbreak at the facility from ignitable materials in laboratories, cigarette smoking in non-designated places or improperly installed or old electrical connections with disastrous life and financial impact.	<ul style="list-style-type: none"> <li>-Provide fire extinguishers at strategic locations within the laboratory and ensure that all fire-fighting equipment are regularly maintained and serviced.</li> <li>-Key healthcare staff should have basic training in fire control through regular firefighting drills.</li> <li>-Fire emergency telephone numbers should be displaced in communal areas.</li> <li>-Install an automatic fire alarm system for the entire laboratory and provide enough water hose reel around the property with a fire reserve water tank attached with an automatic booster pump for hose reel.</li> <li>-Provide fire hazard signs such as ‘No Smoking’ signs. Directions to exit in case of any fire incidence and emergency contact numbers should be provided. The contact/emergency numbers should be displayed generously within the facility.</li> </ul>
<b>Phase: Decommissioning</b>	<b>Negative Impacts</b>	

Loss of scenery and aesthetics	Haphazard disposal of demolished waste / abandoned building and related structures	<ul style="list-style-type: none"> <li>-All materials remains after project implementation will be taken back to warehouse for future use.</li> <li>-Unusable materials remains shall be taken to the approved District dumping site.</li> <li>-The site will be rehabilitated to its original state, whereby will be handled over to plot owner/Village government.</li> </ul>
Loss of healthcare services	Eventual closure of laboratory services	<ul style="list-style-type: none"> <li>-Ensure communities are well and timely informed closure of the services. At a minimum a 3-months notices should be provided to local communities</li> <li>-Ensure communities know alternative places where healthcare services can be accessed.</li> </ul>

## **Major Significant Impacts**

The conclusion of the Environmental and Social Impact Assessment is that construction of the laboratory building can be completed without causing irreversible environmental or social impacts of high significance. The identified potential environmental and social impacts can be mitigated.

## **Resettlement Action Plan (RAP)**

The project is being implemented on the developer's owned land area. As such no displacement and or resettlement of people is involved. Therefore, no Resettlement Action Plan (RAP) was considered or developed.

## **Stakeholder Engagement**

Stakeholder consultations were carried out, including interviews and meetings with officials from Government departments and district authorities, and a number of public meetings were held with the villages at the project site and along the transmission line. A multidisciplinary team including environmental experts considered all aspects of the project that can cause environmental or socio-economic changes at a public and stakeholders' consultation and meetings. They evaluated the significance of each aspect of the project in terms of defined criteria, which take account of the scale, extent, duration, the potential to implement mitigation measures and controls and the likelihood and timescale of environmental recovery.

Overall, stakeholders consulted revealed that the proposed a necessary venture that will save their lives and improve their socio-economic well-being. However some stakeholders pointed out issues, which they were concerned with and sought clarification in, order to clear doubts. The concerns included: Fears about possible increase of medical costs (e.g. testing and diagnosis) due to improved service quality; Possible impacts of site clearance, accidents, spread of HIV/AIDS due to influx of construction works; Other health and safety risks due to increased number of visitors coming for treatment from neighboring regions and countries; Need for better housing for workers to ensure enthusiasm of laboratory workers and; Fear over sustainability of the quality of the services given possible influx of people in need of health care far more that estimated service requirement and set budget as well possible increase of workload for workers. These issues have been considered in the ESMP to ensure effective actions are taken to address them.

**Consideration of Project Alternatives:** Alternative for location of the laboratory and no action options are considered. The conclusion is that the recommended alternative is the "Proposed Alternative" because it recognizes the viability and need for the proposed development, is designed to address environmental issues and concerns, meets the regulatory requirements and is within reach by the promoter base area i.e. St. Benedict's Ndanda referral hospital.

## **Monitoring and Auditing**

The EIS presents an outline Environmental and Social Monitoring Plan (ESMP) to record parameters to be monitored and frequency of monitoring.

## **Cost Benefit Analysis**

The EIS presents an assessment of the project, in terms of negative impacts, compared to the socio-economic benefits that will not happen if the project is not implemented. Environmental cost benefit analysis is assessed in terms of the negative versus positive impacts. The potential benefits of the project, in terms of financial and social benefit are substantial. Similarly, the environmental impacts can be reasonably mitigated and the financial resources needed to mitigate negative impacts, when compared to the required investment, are relatively small.

## **Decommissioning**

The laboratory building is likely to remain in place for over 20 years (design life) unless other factors may lead to its premature destruction. In the case when decommissioning is considered, this will take place as a series of structural demolition activities that will demolish the building and its related structural members of the predominantly concrete building. However, before the option of structural demolition is considered, an alternative use after, say structural strengthening by component member's rehabilitation should be considered.

## **ACKNOWLEDGEMENT**

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## LIST OF ABBREVIATION

AIDS	Acquired Immunodeficiency Syndrome
BRN	Big Results Now
BOD	Biological Oxygen Demand
CBO	Community-Based Organization
COD	Chemical Oxygen Demand
CSO	Civil Society Organizations
DC	District Commissioner
DEO	District Environmental Officer
DOE	Director of Environment
DMO	District Medical Officer
EA	Environmental Assessment
EAPHLNP	East Africa Public Health Laboratory Networking Project
EIA	Environmental Impact Assessment
EIA	Environmental and Social Impact Assessment
EIS	Environmental Impact Statement
EMA	Environmental Management Act
EMP	Environmental Management Plan
ESMP	Environmental and Social Management Plan
HIV	Human Immunodeficiency Virus
ILO	International Labour Organization
MKUKUTA	Mkakati wa Kukuza Uchumi na Kupunguza Umasikini
NEMC	National Environment Management Council
NEP	National Environment Policy
NGO	Non-Governmental Organization
NSGRP	National Strategy for Growth and Reduction of Poverty
OHS	Occupation Health and Safety
OSHA	Occupational Health and Safety Act
OP	Operational Policy
PAH	Polycyclic Aromatic Hydrocarbon
PMO-	Prime Minister's Office
RALG	Regional Administration and Local Government
PPE	Personal Protective Equipment
PVC	Polyvinyl Chloride
R&D	Research and Development
SMP	Social Management Plan
SPSS	Statistical Package for Social Sciences
STDs	Sexually Transmitted Diseases
TAC	Technical Advisory Committee
TANESCO	Tanzania National Electric Supply Company
TB	Tuberculosis

TBS	Tanzania Bureau of Standards
TOR	Terms of Reference
Tshs	Tanzania Shilling
TNS	Temporal Noise Shaping
TTCL	Tanzania Telecommunication Company Limited
OP	Operational Policies
OSHA	Occupational Safety Health Agency
VPO	Vice President's Office
VTC	Vocational Training College
WB	World Bank
WEO	Ward Executive Office
WSP	Waste Stabilization Ponds
WWF	World Wildlife Fund

### **CHEMICAL SYMBOLS**

CO	Carbon monoxide
CO <sub>2</sub>	Carbondioxide
SO <sub>2</sub>	Sulphadioxide
NO <sub>x</sub>	Nitrous oxide

# 1 Introduction

## 1.1 Project Background

The East Africa Public Health Laboratory Networking Project is a combined initiative of the Government of Tanzania, Rwanda, Uganda, Kenya, Burundi and World Bank in support of efficient laboratory networking. They have jointly mobilized resources to revamp public health laboratory services delivery. The Project will deliver rehabilitated public health laboratories provided with critical equipment, improved technical and managerial skills for laboratory workers and strengthened institutional governance. Construction works will be done at the National Public Health Laboratories- Dar es Salaam while satellite (regional) laboratories at St. Benedict's Ndanda hospital, Sumbawanga regional hospital, Kigoma regional hospital, Musoma regional hospital, Kibong'oto National TB hospital and Mnazi mmoja hospital Zanzibar will be expanded.

The overall development project objective is to strengthen capacities for diagnosis and surveillance of Tuberculosis and other communicable diseases by establishing a network of efficient, high quality and accessible public health laboratories and by promoting innovation and knowledge sharing. This objective will be achieved through delivery of three key results areas or components namely;

- a) Regional diagnostic and Surveillance capacity
- b) Joint training and Capacity building
- c) Joint Operational Research and knowledge Sharing

This is an Environmental and Social Impact (ESIA) report for the St. Benedict's Ndanda hospital.

## 1.2 Environmental Impact Assessment Requirements

The project is essentially about development of a one-storey building infrastructure for laboratory and other hospital operations. The EIA regulation of 2005 GN No. 349 of 2005 puts the project under type B mandatory list of projects, which requires EIA.

## 1.3 Objectives and Scope of the EIA

The primary objective of the study is to undertake an Environmental and Social Impact Assessment (ESIA) of the proposed construction of the National Public Health Laboratories under the East Africa Public Health Laboratories Networking Project (EAPHLNP) in order to ensure compliance with;

- (i) The National Environmental Act 2004 and EIA and Audit Regulations of 2005 The NHLP's Environmental Management Plan
- (ii) World Bank's environmental and social safeguards requirements

## 1.4 Scope of Work

The purpose of this study is for undertaking the ESIA of the construction of the proposed National Public Health Laboratories under the EAPHLN project. The methodology for undertaking this task will involve desk work by reviewing existing ESMF and RPF for EAPHLNP, extraction of relevant information from the project documents, grant agreement (parent and subsidiaries), various progress reports, sub-project documents, screening manuals, checklists. Desk work will be followed by the fieldwork (site visit) in order to observe and consult with key and relevant stakeholders on site. From these, the following activities will be conducted:

- (a) A detailed review and assessment of the implementation of the sub-projects financed under EAPHLNP, with the view to establishing the level of compliance with World Bank safeguard policies and Government of Tanzania environmental and social guidelines, procedures and legislation;
- (b) An assessment of methodology and any existing checklist for screening submitted to sub-projects that are financed under the EAPHLNP Project. Such a checklist will be a guide for screening sub-projects against their environmental and social viability or otherwise. It may also include the types of sub-projects that will not be financed by the Project;
- (c) A review of the Tanzanian legislative, regulatory and administrative regime, especially those that relate the environment and social aspects of surrounding communities in the proposed EAPHLN Project activities. This review will include ascertaining consistencies or otherwise deviation from the Tanzania legislative, regulatory and administrative regime and the World Bank safeguard policy requirements.
- (d) An assessment of institutional capacity that exists or otherwise for implementing environmental and social safeguard concerns that might occur as a result of implementing activities under the EAPHLN Project. This assessment will include a status assessment of EAPHLN Project coordination and implementation arrangements and capacities and capabilities of institutions identified to manage and monitor the implementation of sub-projects, including capacity for screening of sub-projects. The analysis will also extend to assessing progress in identifying gaps relating to staffing, training, skills upgrading, and management/monitoring procedures, etc.
- (e) A menu of costed mitigation actions for any pending impacts from past and on-going sub-projects.

## 1.5 Approach and Methodology

### *Specific Social Methodology*

ESIA team conducted environmental and social survey and consultative meetings in selected parts of Ndanda village, Mwena ward and Masasi district council in order to gather relevant information related to social impacts of proposed road projects and other subcomponents as explained in ToR of this study.

ESIA study was conducted in a participatory and consultative manner in order to gather information appropriate to the given ToR. The team sampled out specific number of individuals in Ndanda village and staff at St. Benedict's Ndanda hospital where the project is based. Likewise, participatory meetings and interviews were held with district and ward governments to determine key issues pertaining to the projects including perceptions, knowledge and attitudes of the beneficiaries. Also, consultations were made with local leaders (chiefs and

councillors), politicians and ward governments, politicians and representatives of communities at local levels. The aim was to gather relevant information related to the impact of the proposed projects as explained in the ToR of this study.

Consultant recognizes the requirements for social impact assessment studies to address site specific characteristics required for identification of positive and negative socio economic impacts and make recommendations on effective solutions to be considered during implementation of ESMP. To achieve this, Triangulation of various data collection methods was necessary to elicit various quantitative and qualitative data. These methods include review of secondary data/ information, focus group discussions, household interviews, and meetings with key community/family people/informers e.g. relevant staff at the hospital, relevant government officials and district and ward authorities and household interviews with affected people.

Various data analysis methods were used (e.g. SPSS and Excel) to come up with descriptive Statistics and establish baseline information. Qualitative information was collected from focus groups discussions, street/ward meetings and in-depth interviews with key informers. During the focus group discussions, the consultant identified perceived positive and negative impacts of the project and established community's opinion on a sound SMP, mitigation measures and their associated costs.

The specific objectives for the social impact assessment include:

- Obtain information on community concerns;
- Identify what the impacts on the community will be;
- Raise awareness of what effects will be expected; and
- Obtain suggestions and recommendations from the communities regarding the project.

## **1.6 Further Work**

As part of the ESIA, an Environmental Management Plan (EMP) has been prepared and integrated within this ESIA report.

The purpose of the EMP is to provide a framework for the management of mitigation measures and the monitoring of performance and compliance, during the construction and operation of the project.

The document does not form the final management plan but rather sets a framework and structure for the detailed development of plans by the contractor(s) and St. Benedict's Ndanda hospital.

## **1.7 Structure of the report**

The report is presented in accordance to the format given in Section 18 (1 and 2) of the Environmental Impact Assessment and Audit Regulations, 2005. It is presented in the following style:

- i) Executive Summary**
- ii) Table of Contents**
- iii) Acknowledgement**
- iv) List of Acronyms**
- 1. Introduction**
- 2. Project background and description**

- 3. Policy, administrative and legal framework**
- 4. Baseline/ Existing conditions**
- 5. Stakeholders Analysis**
- 6. Assessment of Impacts and Identification of Alternatives**
- 7. Environmental Mitigation Measures**
- 8. Environmental and Social Management Plan**
- 9. Environmental and Social Monitoring Plan**
- 10. Resource Evaluation / Cost Benefit Analysis**
- 11. Decommissioning and Closure**
- 12. Summary and Conclusions**
- 13. References**
- 14. Appendices**

# 2 Project Description

## 2.1 Project Area

### 2.1.1 The Project Location

The proposed project is located in the southern zone of Tanzania, in Masasi district, Mtwara region. The site for construction of the laboratory building is located at St. Benedict's Ndanda hospital (coordinates: Latitude 10°29.969'S and Longitude 39°1.615'E). The site is accessible by road using both private and public transport services, which are largely available all day. The nearest airport is in Mtwara approx. 160 km. There is also a landing strip in Masasi, some 40 km away from the site.

### 2.1.2 Site Description

The proposed building is to be erected in plot with title No. 1829, property of the Benedictine Fathers of Abbey-Ndanda located in Ndanda village, Mwena Ward in Masasi district, Mtwara region. The total area owned by Benedictine Fathers of Abbey-Ndanda under this title deed is 288 acres. However, part of this area is currently already occupied by other building including the St. Benedict's Ndanda referral hospital, Ndanda Nurses and Midwifery Training school, Chaplaincy (Ndanda mission), Ndanda Vocational Training College, as well as residential houses for staff and other assistants.

The proposed development is located inside the hospital area where other hospital buildings such as theatre (on the North), X-ray department (on the West), TB/Ultra Sound department (on the South) and ward for admitted patients (on the East) are located. As such, other facilities such as electricity, water and waste management systems are already in place.

The ground floor of the new laboratory is expected to house all lab related operations (i.e. diagnosis and testing) while the top floor (first floor) is expected to house administrative and R&D offices.

The building is to adopt a standard lab design to cater for a waiting area for the patients and safety cabinet system for the TB testing and will involve the following activities: - Electrical and mechanical works, Installation of water storage tanks and underground and overhead, Installation of fire-fighting equipment. Thus, according to levels and categories of health laboratories in Tanzania, the new laboratory falls under **level 4 category** (Massambu et al. 2009). **Level 4** laboratories according to this clarification refers to laboratories that has an automated high-throughput equipment run by laboratory personnel (technicians, technologists, and scientists) with at least an advanced diploma level of training

### 2.1.3 Environmental Profile of the St. Benedict's Fathers of Ndanda

Ndanda hospital is renowned for its environmental consciousness. The area managed by the mission is the greenest of all in the region throughout the year. The area is covered with trees both natural and planted, creating an evergreen forest ecosystem that has attracted a good number of flora and fauna that can be seen by any passing-by/visiting person. For many years the St. Benedict's Fathers of Ndanda have maintained deliberate efforts to conserve the environment through planting of trees and prevention of other agents of environmental degradation such as human induced fires, clearing of forest land for agriculture and grazing of livestock, as well as cutting down trees for both timber and non-timber products including charcoal, firewood and medicine.



The areas managed by the St. Benedict's Fathers is part of the great Makonde Escarpment which is the main source of the Ndanda water spring, a popular mineral water in the region. And because of its clean environment, it is only in Ndanda where one can drink water straight from tap in Tanzania

Because of these efforts the St. Benedict's Fathers of Ndanda received an Environmental award from the Division of Environment in the Vice President's Office in 2013 (*See appendix 3: Trophy*) Currently the St. Benedict's Fathers of Ndanda has embarked on environmental awareness and sensitization programme which is aimed at reducing deforestation and degradation pressure on forests on the edges of the Makonde escarpment. This program seeks to sensitize communities on the use of improved stoves to reduce charcoal needs as well as provide them with tree nurseries for establishment of woodlots which can the supply fuel wood and poles for domestic use. It also intends to train communities on the upstream to adopt environmentally friendly farming practices such as conservation and climate smart agriculture.



Fig.1. Map of Tanzania showing the location of St. Benedict's Ndanda hospital

## 2.2 Project Activities

The project requires construction of one-storey laboratory building at St. Benedict's Ndanda hospital. The main project activities fall under the construction and operational phases as discussed below;

### 2.2.1 Mobilization Phase

This initial phase of project implementation will commence when all necessary permits and preparatory processes have been successfully completed. The mobilization phase will entail:-

- Preparation of campsite site for construction crew
- Preparation of site for construction materials i.e. industrial source e.g. cement and the metal ware materials
- Transportation of materials, equipment and machinery to the site
- Stockpiling of materials
- Recruitment and deployment of construction work force

- Identification of source of local materials i.e. gravel, stone and sand for concrete (Borrow pit) and water.
- Security and safety

### **2.2.2 Construction Phase**

The Construction phase will involve;

- Securing the designated site/area
- Transportation of construction materials from borrow pit (e.g. stone, sand, gravel, etc) and storage area to the construction site.
- Transportation of equipment, workforce to the designated site
- Mechanical and electrical work
- Excavation of a pit for the pole foundation
- Erection of the poles, including, reinforcements at the base
- Erection foundations and relevant walls
- Security and safety

This stage will involve finishing works will include the following;

- Plastering of walls at recreational Parks;
- Painting of recreational facilities/buildings;
- Fixing ceiling board and fencing;
- Plumbing and electrical installations; and
- Cleaning of road surface to remove loose particles and debris

### **2.2.3 Demobilization Phase**

Demobilization will entail:

- Reinstatement of the excavated area(s) including borrow pits and quarry sites
- Removal of any remaining construction materials
- Use of spoils to reinstate the excavated area
- Removal of spoiled material from the sloppy areas to avoid the movement of soil and sediment
- Clearing of stock yard
- Transportation of equipment and machinery from the site
- Rehabilitation or restoration of the construction
- Security and safety

Subsequently, the contractor will engage in the demobilization process. The process will involve the removal of the camps, clearing of the working site of solid wastes such as plastics and metals.

### **Land restoration works and demobilization**

Following the completion of the lab construction, restoration of land will follow to give the sites its original condition to improve scenery and environmental functions. Measures to control storm water along roads and consequently soil erosion will be implemented. Restoration tasks will entail the use of curbstones, top soils/spoils, and paving bricks, paving slabs and planting of ornamental and shed trees. be done by use of imported and desirable quality soil materials.

### **2.2.4 Borrow pits and Quarry sites**

For borrow pits and quarry sites, the rehabilitation programme may may entail stabilisation of the inactive mining pit or borrow area with herbaceous perennial plants, stabilising the soil, preventing wind or water erosion from causing on-site or off-site damage and improving the aesthetic appeal and the ability of the site to support wildlife.

For quarry site, rehabilitation of the site will be the responsibility of the owner as the sites are privately owned. Best Management Practices and guidelines for managing quarry sites and may be used which include:

- Minimising the surface area of the borrow pit where possible;
- Minimise rock and borrow pit cuts where possible;

- Maintain the floor of the borrow pit slightly above the elevation of the surrounding area to promote drainage to avoid creating quarry lakes and to prevent permanent degradation in borrow pits;
- Prevent erosion and sedimentation through appropriate control measures;
- Protect archaeological resources
- Maintain air quality through dust control/suppression;
- Use progressive rehabilitation in closing borrow pits no longer than needed.

### **2.2.5 Operational phase**

The activities for operation phase will largely involve lab testing and diagnosis of TB and other communicable disease. Other activities will include:

- Monitoring performance and operation of Waste Stabilization Ponds to ensure it performance optimally
- Operating the machines in the new laboratory
- Monitoring the performance of the incinerators to ensure it runs as smoothly as possible

## **2.3 Workforce and Equipment**

The construction will employ Project Managers (the Contractor), engineers, supervisors, skilled and unskilled labour. A number of experts will be employed permanently to operate laboratory equipment and services. Additional people will be employed to maintain the lab building and other surrounding building.

## **2.4 Structure and Content of the Laboratory**

The structure of the proposed lab building is shown **in appendix 4**. But in the lab building will have the ground floor and one store designed to accommodate the following departments: Microbiology, Hematology, Clinical, Chemistry, Parasitology, Blood transfusion, Serology, Histology, Research rooms, TB screening room, Administrative officers- Lab manager, Quality office, Safety office and Conference room, IT Unit and Library.

## **2.5 Project Requirements**

The materials and equipment which will be required under the construction and operational phases of the project are presented below;

### **2.5.1 Construction phase**

In developing the project, the proponent is committed to use materials, which are environmentally acceptable. The construction of the building and associated infrastructure will require the use of soil/earth materials, blocks, sand, concrete aggregates, asphalt, and timber.

The equipment, which will be used at the construction sites, will include;

- Hauling trucks;
- Water tanks;
- Concrete vibrators;
- Trucks for material haulage; and

Ready mixed concrete will be brought to the site by trans-mixer trucks. At the end of construction phase, the contractor will use curbstones, top soils/spoils, and paving bricks, paving slabs and live plants for landscape restoration.

### **2.5.2 Operational phase**

During the operation phase, little materials will be used as input to run or service the project. For instance maintenance works such as, replacement of lights by use of incandescent bulbs. Asphalts and concrete mix will be used to repair roads and storm water drains respectively.

### **2.5.3 Products and by products**

The project is not expected to generate hazardous materials, which are toxic to human beings. Wastewater and liquid waste may be generated from washing rooms or toilets. Likewise solid waste may be generated by users of roads. Potential risks lie with proposed landfill and solid waste collection centers if solid waste management is not undertaken properly e.g. burning of refuse, a practice which will not be included under this project.

### **2.5.4 Testing and Commissioning**

The subproject and associated facilities will undergo safety tests before commissioning for use. The purpose is to make sure the facilities and equipment meets the design tests. The subprojects/facilities include the following;

- Bull dozers for the landfill;
- Street lights; and
- Electrical and water equipment or facilities at laboratory if applicable.

Following the installation and connection of power system or circuits, testing for street lights and overall electrical functions at the recreational parks and landfill, will be done by inspection engineers. This will involve emergency shut-off switch and emergency alarms before commissioning of the laboratory.

### **2.5.5 Operation and Maintenance**

Regular maintenance; oiling and replacement of worn out parts will be conducted on regular basis for liquid and solid waste equipment. The landfill will need protection regular inspection of fence for safety and security.

## **2.6 Other Requirement and Support Services**

### **2.6.1 Water Supply**

It is envisaged that water supply for workers during construction will be obtained from the existing water supply system for the hospital. Based on the estimation of the number of workers, an average of 3 to 5 cubic meters of water will be required per day. Accordingly, once built the laboratory will be connected to the central water system of the hospital and therefore will operate efficiently given the current reliable water supply services in Ndanda given the presence of the famous Ndanda spring which water the whole of Nanda and Masasi district.

### **2.6.2 Energy Supply**

During construction the project will require power for lighting of the camp at night as well as for the camp and construction operations. Fortunately the hospital premises are well lit from TANESCO's Power supply. In addition the St. Benedicts Fathers have a hydropower plants generating 200kW which is used as back up during outage of TANESCO power. Therefore, this hydropower will also be used as a backup during construction and operation of the laboratory.

### **2.6.3 Staff**

Based on the preliminary estimations the contractor will consists of about 20 construction crew at site. Most of these workers will be residing in the nearby Villages and shuttling to the construction site. During operation the laboratory will be run by hospital staff, especially laboratory technicians. It is expected that the workload will increase and therefore the need to prepare for recruitment of additional staff during operation phase.

## **2.7 Management of Construction Waste**

During construction the core project wastes will include solid waste, namely food remains, packaging materials, plastic and glass bottles, paper wastes and domestic waste-water (grey water and sewage).

Bottles of all kinds will be recycled or reused, biodegradable wastes will be dumped in the controlled pit (to be dug and fenced at site), and paper waste will be burnt on site. Non-biodegradable waste such as batteries, glass, tins, cans, and metals will be collected in separate bins and thereafter sorted for recycling. Biodegradable domestic wastes will be handled through the existing earth pit. It is estimated that about 1 to 3 cubic meter of waste water will be generated per day. Engine oil and other hydrocarbons remains will be collected for recycling. Where possible reusable glass and metal shall be collected and accumulated and thereafter provided to scrap dealers.

Construction wastes will include solid waste i.e., spoils and remains of construction materials (e.g. sand, stone and gravel). Packaging wastes will include Cardboard boxes, wooden drums and empty cement bags. Remains of the poles and conductors will also be among of the wastes generated though in small amount during transmission line establishment work. The remains of construction materials can easily and safely be disposed through burying together with spoils. These will also be buried away from the water source/river. Packaging material will be collected and sorted according to their nature ready for recycling or for final disposal at the designated dumpsite within the hospital or other approved dumpsite in Masasi

## **2.8 Safety and Health Issues**

A security wire fence will be constructed around the construction site for security and safety purpose with clear entry and exit gates. The entire compound will be guarded accordingly. The hospital management will make First aid arrangement for construction workers to access promptly in the case of accidents.

# **3. Policy, Legal and Administrative Framework**

## **3.1 Introduction**

There are a number of policies and legislations, which set out the legal and regulatory requirements and which are relevant to the proposed construction of the laboratory building of the St. Benedict's Ndanda hospital. There are also pertinent national standards governing environmental management and protection, health and safety. This chapter discusses Tanzania national and sectoral policies and legislation, which are relevant to environmental and social issues pertaining to the planning and implementation of the construction of this building.

## **3.2 Need for Environmental Impacts Assessment**

Environmental and Social Impact Assessment is one of the planning tools which are used to facilitate and promote sustainable development by integrating environmental consideration in the decision making process and ensuring that unnecessary damage to the environment is avoided and optimises resources use and management opportunities. Any development-taking place in Tanzania is required to be screened for Environmental and Social Impacts in order to comply with requirement of the Environmental Management Act No 20 of 2004 and Audit Regulations of 2005. Under this regulation, hydropower projects are in the mandatory list requiring a full EIA. In spite of the EIA and Audit regulations, the EIA process is a cross cutting issues linking policies and legislations from other sectors which their consideration brings harmony between to the investment in the area. Among other things the policies and legislation pertaining to this project include the following:

## **3.3 National Policies**

The following policies have been reviewed within this section and are described below in relation to this project:

### **3.3.1 National Environment Policy (NEP) (1997)**

This is the main policy document governing environmental management in the country. The NEP defines environmental issues as both natural and social concerns and adopts the key principle of sustainable development. The NEP has also proposed the framework environmental legislation to be taken into account by the numerous agencies of the Government involved in regulating the various sectors. The NEP defines strategic plans for environmental management at all levels and provides an approach for mainstreaming environmental issues for decision-making.

The NEP requires Environmental Impact Assessment (EIA) to be mandatory for all development projects likely to have significant environmental impacts. The intention is to ensure that the development projects are implemented in an economically sustainable manner while safe-guarding environmental and social issues for the benefit of present and future generations. Undertaking the EIA study of the project complies with the requirement of the policy.

### **3.3.2 National Health Policy (2003)**

The National Health Policy profiles the health Sector as one of the priority sectors of the Tanzania Government as is reflected in the annual incremental increase in budgetary allocation to the sector.

This is also drawn from, the Tanzania Development Vision 2025 which identifies Health as one of the

priority sectors whereby among its main objectives is achievement of high quality livelihood for all Tanzanians.

The policy notices however, that in order to achieve its vision and mission, Environmental health and sanitation, is one of the areas that needs to be given due attention for promotive and preventive health. The policy notices that Environmental health and sanitation is one of the best indicators for measuring social and economic developments which can be achieved by, among other things) enhanced environmental cleanliness, monitoring of water quality and safety, monitoring of food quality and safety of locally produced foods and imported foods at ports of entry, manufacturing, packaging and sales outlets. Therefore, in order to achieve this goal the policy commit the ministry of health to:

- Formulate of guidelines on different aspects of environmental health and sanitation.
- Collaborate with other stakeholders with the aim of achieving better environmental health and sanitation.
- Enforce solid and liquid waste management at each facility.

Therefore, the current efforts of the St. Benedicts Ndanda hospital to conduct this ESIA contributes to the policy's objective.

### **3.3.3 Water Policy (2002)**

The Water Policy recognizes water as important requirement for all humans to maintain health and to restore and maintain the functions of natural ecosystems. It supports availability of water to ensure food security, electricity generation and other economic activities amongst other important activities. It also advocates for integrated and sustainable river basin management. The policy in addition, urges the protection and conservation of water resources in the Country Rivers and basins. Furthermore, the policy advocates for sufficient supply of water for socio-economic development and poverty alleviation.

### **3.3.4 The National Land Policy (URT, 1995)**

The National Land Policy emphasizes the importance of undertaking EIA for the management of land based development. Additionally the policy advocates the protection of land resources from degradation for sustainable development. Among other things the policy requires that project development should take due consideration the land capability, ensures proper management of the land to prevent erosion, contamination and other forms of degradation. Important sections of the policy relevant to the project in question are 2.4 (on use of land to promote social economic development), section 2.8 (on protection of land resources) and section 4 (on land tenure).

### **3.3.5 National Forest Policy (1998)**

The overall objective of the National Forest Policy (NFP) is to “enhance the contribution of the forest to the sustainable development of the country and the conservation and management of natural resource for the benefit of present and future generations.” One of the specific objectives of the NFP is to ensure ecosystem stability through conservation of biodiversity, water catchments and soil fertility. Thus, the NFP recognizes the importance of collaboration with other sectors (e.g. energy sector) in order to enhance capacity to manage and develop the forests. The policy identifies a lack of alternatives and affordable sources of energy as one of the contributing factors to the degradation of natural forests. It recognizes the need for incorporating Environmental Impact Assessment (EIA) in the planning and decision making process of any investment project in the country. Undertaking this development supports the policy by providing alternative energy source that will serve the forests. Furthermore, undertaking this specific study complies with the policy requirements. In support of the policy the project also intends to undertake reforestation to the acquired part of the land at site.

### **3.3.6 The National Investment Promotion Policy (URT, 1996)**

The policy has stressed the need for modernization of equipment and technological upgrading of process so as to enable optimal use of available resources, improved efficiency operation, improvement in the quality of products and co-products, etc. The policy in Chapter 2 underscores the importance of exploiting local natural resources. Sections 2.2.4 and 2.2.5 recognize the need to promote indigenous participation in economic development of our Nation and provides incentives (in the form of fiscal and non-fiscal) to encourage private sector investment such as the Benedictine Fathers of Ndanda. The proponent so complies with relevant provision of the policy.

### **3.3.7 The National Employment Policy (1997)**

The major aim of this policy is to promote employment mainly of Tanzania Nationals. Relevant sections of this policy are (i) 10, which lays down strategies for promoting employment and section 10.1 is particularly focusing on industry and trade sectors (ii) 10.6 which deals with employment of special groups i.e. women, youth, persons with disabilities and (iii) 10.8 which deals with the tendencies of private industries to employ expatriates even where there are equally competent nationals. The Benedictine Fathers of Ndanda will observe the above policy requirements in undertaking its activities in the area.

## **3.4 Legal Framework**

The following legal documents and Acts were reviewed to have an overview of legal requirement of this project:

### **3.4.1 Environmental Management Act (2004)**

The Environmental Management Act No. 20 of 2004 is the principal legislation governing environmental management in the country. The Environmental Management Act (EMA) recognizes "...the right of every citizen to a clean, safe and healthy environment, and the right of access to environmental resources for recreational, educational, health, spiritual, cultural and economic purposes."

Thus, the EMA "provides a legal framework for coordinating harmonious and conflicting activities by integrating those activities into overall sustainable environmental management systems by providing key technical support to Sector Ministries."

Section 81, subsection 1 in Part VI of the EMA requires a project proponent or developer to undertake an Environmental Impact Assessment (EIA) at his/her own cost prior to commencement or financing of a project or undertaking. The EMA prohibits any development to be initiated without an Environmental Impact Assessment (EIA) Certificate. The Benedict's Fathers of Ndanda Hospital through undertaking this study complies with the requirement of the law.

### **3.4.2 Water Resource Management Act, 2009**

The Water Resource Management Act 2009 is a new principal legislation dealing with the protection of water resources and control of water extraction for different uses. According to section 43 (1) any person who diverts, dams, stores, abstracts or uses water from surface or underground water sources, or for any such purpose constructs or maintains any works, shall apply for the water use permit in accordance with this law. Section 9 of the Act requires that any proposed development in a water resource area or watershed EIA study to be carried out prior to commencement.

Furthermore section 39 (1) of this act, requires owner or occupier of land on which any activity or process is or was performed or undertaken, or any other situation exists which causes/has caused or is



likely to cause pollution of a water source, to take all reasonable measures to prevent any such pollution from occurring, continuing or recurring.

Undertaking this EIA study the Benedictine Fathers of Ndanda complies with the Act requirements. The Benedictine Fathers of Ndanda have also been permitted by the respective water basin office to install a hydropower plant in the Ruvuma River and use certain amount of water for power production (see appendix 7) acquired water use permit. Design of the hydropower plant has also considered the environmental flows at the by-pass area based on the ecological assessment at site. Undertaking this study prior commencement will integrate mitigation measures that will offset all possible pollution in to the water course.

### **3.4.3 The Land Act, Cap 113, R.E 2002**

The basic principles of the Land Act 1999 are adopted from Land Policy 1995. The Act contains provisions of critical environmental importance. One of important fundamental principles of the Land Act is “*to ensure that land is used productively and that any such use complies with the principles of sustainable development*”. The project activities will be conducted in consent with this principle in order to preserve the environmental integrity of the area. This will be ensured by implementing the Environmental Management Plan as outlined in this report.

### **3.4.4 The Village Land Act, 1999 (No. 5 of 1999):**

The Act Provides for the management and administration of land in villages, and for related matters. The Land Act referring to the National Land Policy confirms that all land in Tanzania is public land vested in the President as trustee on behalf of all citizens. The following are some of the main objectives of the Land Act:

- To ensure that existing rights in, and recognised longstanding occupation or use of land, are clarified and secured by the law;
- To facilitate an equitable distribution of, and access to, land by all citizens;
- To regulate the amount of land that any one person or corporate body may occupy or use;
- To ensure that land is used productively and that any such use complies with the principles of sustainable development;
- To take into account that an interest in land has value and that value is taken into consideration in any transaction affecting that interest;
- 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; and
- Provided that in assessing compensation for land acquired in the manner provided for in this Act, the compensation shall be based on the following: - Market value of the real property; Disturbance allowance; Transport allowance; Loss of profits or accommodation; Any other cost, loss or capital expenditure incurred with respect to the development of the subject land; Interest at market rate; and Provision of an efficient, effective, economical and transparent system of land administration.

The Benedictine Benedict’s has acquired formally the land from the village government for the purpose intended. Thus, the company complies with the provisions of the village land Act.

### **3.4.5 The Occupational Health and Safety Act (2003)**

The Occupational Health and Safety Act No. 5 of 2003, deals with regulation of health, safety and welfare of workers in factories and workplaces. Some of the provisions of this Act could be relevant to the project. In particular, the contractors that will construct the proposed power plant and the

transmission line. The St Benedictine Fathers of Abbey shall include the OHS issues in the procurement procedure to acquire a contractor who shall be aware of the obligations regarding the workforce health and safety measures stipulated in this Act.

### **3.4.6 The Mining Act No 5 of 1998:**

This Act provides for prospecting of minerals, mining and dealing in minerals. It also provides for building materials including all forms of rock, stones, gravel, sand, clay, volcanic ash or cinder or other minerals being used for the construction of buildings, roads, dams, and aerodromes or similar works.

The relevancy of this Legislation to the project is when the construction of the new building at St. Benedict's Ndanda hospital and its associated structures (like the earth dam/embankments) will require building materials (i.e. gravels, stones, sands etc.) from licensed areas. The proponent will ensure the sources of materials are licensed by the Ministry.

### **3.4.7 The Local Government Act (1982)**

The Local Government Act of 1982 forms an important legal basis for rural councils and rural authorities which were reintroduced in the early 1980s. The Act establishes and regulates district councils, township authorities and village authorities. Important provisions are the subdivision of districts into divisions and wards and the establishment of ward development committees along with procedures for implementation of schemes and programmes at ward level. In the context of development projects which entail compensation and relocation the Act thus allows for the active participation of ward authorities and ward development committees in the resettlement process.

Part V of the Act describes the functions of local government authorities. Important provisions in the context of resettlement are section 111 and 114. Section 111, subsection b, states that the local government authorities shall: "promote the social welfare and economic well-being of all persons within its area of jurisdiction". Furthermore, subsection c obliges the local authorities to: "further the social and economic development..." On a general basis this section of the Act thus grants local government authorities a role in resettlement processes to ensure that the affected people's social welfare is taken care of.

Another important provision in the Act with regard to resettlement is Section 114 which allows the local authorities to acquire land for the purposes of any of its functions with the prior approval of the central level authorities.

The Act also provides for the protection and management of the environment. Section 111 of the Act promotes social welfare and economic well-being of all residents within their areas of jurisdiction.

Section 118 deals with protection and management of the environment. The District Councils are required to take necessary measures to control soil erosion and desertification; to regulate the use of poisonous and noxious plants, drugs or poisons, regulate and control the number of livestock; maintain forests, manage wildlife, ensure public health, and provide effective solid and liquid waste management.

The Local Government Act of 1982 empowers the local governments to enact by-laws to protect public health and regulate land pollution problems. The Local Government Act of 1982 contains provisions to protect human health and regulates pollution problems.

In connection with the St Benedict's the developer will collaborate with the authority in development of the project particularly in compensation issues along the transmission line.

## **3.5 Relevant Safeguard Policies**

### **3.5.1 World Banks Safeguards Policies**

The World Bank's set of safeguard policies consists of a number of Operational Policies (OP), Operational Directives (OD), and Bank Procedures, which are considered particularly important in

ensuring that Bank supported projects, are environmentally acceptable and that negative environmental and social impacts are minimized or mitigated. The present ESIA is structured to meet the requirements of World Bank safeguard policies on Environmental Assessment as detailed in Operational Policy 4.01. The Bank's environmental assessment procedures are considered the umbrella policy for the Bank's "safeguard policies". Specific documents relevant to this project are presented in **Table 2** below:

**Table 2: World Bank Operational Policies**

Environmental Assessment (OP 4.01) in October 1998	The policy requires Environmental Assessment to be undertaken of all supported projects to ensure that they are environmentally sound and sustainable, and to improve the basis for decision making.
Involuntary Resettlement (OP 4.12) in June 1990	The Bank’s policy on involuntary resettlement advocates the following: <ul style="list-style-type: none"> <li>• Involuntary resettlement should be avoided where feasible, or minimised, exploring all viable alternative project designs;</li> <li>• Measures to avoid resettlement and provision of sufficient investment resources to enable displaced people to share project benefits.</li> <li>• Meaningful consultation of affected persons and participation in planning and implementation in resettlement programs; and</li> <li>• Provision of assistance to people affected by the project (PAPs) to improve and restore livelihoods /standards of living.</li> </ul>
<b>Environmental and Social Framework (ESMF)</b>	Health Care Waste Management is ESMF under the World Bank-financed Regional Health Systems Strengthening Project. As such <b>National Policy Guidelines for HCWM</b> and associated documents on standards and procedures, and monitoring plans applies directly to this project
Indigenous Peoples (OP 4.20), September 19991	This operational directive is intended to ensure that indigenous peoples and ethnic minority groups are consulted and benefit from World Bank funded operations in a culturally appropriate way, and that adverse impacts on them are avoided, or where not feasible, minimised or mitigated.
OP 7.50 Projects in International Water	The objective is to ensure that Bank-financed project affecting international waterways would not affect relations between the bank and its borrowers and between states and the efficient utilization and protection of international waterways. Contravention occurs if any river, canal or body of water that forms a boundary between, or any river or body of surface water that flows through two or more states; any tributary; or any bay, gulf straight or channel bounded by two or more states is affected.
Public Disclosure	World Bank policy provides that key stakeholders be systematically identified and involved in project planning and implementation. The WB policy seeks to ensure that all interested parties can access information on specific projects.

Therefore, development of the project will take on board issues pertaining to these safeguards policies as elaborated in various local sectoral Policies and Acts above.

**Other Acts Relevant to Environmental Aspects are presented in table, appendix 11**

**3.5.2 International Labour Conventions**

The Government of Tanzania has ratified the U.N. Convention on the Rights of the Child. Consequently, it has ratified the International Labour Organization (ILO) Convention No. 59 (Fundamental Conventions, 2002) regarding the minimum age for the admission to employment. These are shown in **Table 3** below:

**Table 3: International Labor Conventions**

ILO fundamental rights of workers (1999)	Employers are prohibited to employ children below the age of 14 years. Children aged between 14 and 18 years may be employed to do light work, which is not harmful to their health and development. The work should not prejudice them from attending school or expose them to hazardous conditions. The Convention prohibits all forms of slavery or practices such as forced labour.
ILO Conventions on Occupational Safety and Health (1997/1996)	The conventions speak about protection of workers in the field of occupational, safety and health. It asks for measures to protect workers from the risks related to chemical, physical and biological agents at work. It speaks about the need to protect the working environment for example air pollution, noise and vibration.

### 3.6 Administrative Framework

The Environmental Management Act cap 191 gives mandate to NEMC to enforce compliance process. It empowers NEMC to determine whether a proposed project should be subjected to an EIA, approves consultants to undertake the EIA study, invites public comments etc. In carrying EIA review NEMC carries site verification visits, convenes the Technical Advisory Committee (TAC) and advises the responsible Minister to issue Environmental Certificate/approve the EIS. Continuously NEMC is responsible for carrying out monitoring and auditing of environmental performance of the project. The key institutions that have a role to play as far as EIA for this project is concerned include VPO, NEMC, government ministries and other agencies. A full list of these institutions and their respective mandates is provided in **Appendix 5**

# 4. Baseline Conditions

## 4.1 Introduction

This chapter considers the baseline environment, for all physical, biological and human. Associated with each topic, a consideration is made as to the value of the resource which allows for the assessment of potential impacts by the sub projects.

### 4.1.1 Physical Environment

#### Introduction

The physical environment within the project area is shaped by its geographical location within central East Africa. This location and altitude has helped to shape the physical environment influencing not only the land through the geology and soils but also the climate and hydrology of the region. All these processes and factors have defined the landscape of the project area.

The region can be characterised by its climate, the distinct wet and dry seasons playing a significant role in the regions hydrology and soil development.

#### Sources of Information

The following sources of information have been used specifically in the collation of the physical baseline for the project area.

- Soils of Tanzania and their Potential for Agriculture Development – Draft Report, Mlingano Agricultural Research Institute, November 2006;
- Ministry of Agriculture, Food and Cooperatives’ website: <http://www.kilimo.go.tz>;
- Tanzania Standard Topographic sheet 1:50,000 scale maps;
- Socio-economic profile report for Mtwara-Mikindani Municipality;
- Physical field assessment/ Site visit and survey;
- Marine data from Marine Conservation projects for example MACEMP;
- Consultation meetings with Municipal staff and executives;
- NGOs;
- Private developers;
- Contractors; and
- Local elders.

### 4.1.2 Administrative Units

The administrative situation within the project area it is important to understand the administrative system within Tanzania. The hierarchical system of local government is presented in **Table 4** below:

**Table 4: The hierarchical system of local government**

Regional	The regional administration is the highest level of local government within Tanzania. The regional authorities are responsible for the coordination of all the district development activities.
Municipal or District	The Municipal or district authorities are responsible for all development activities and permission to undertake any development activity must be obtained from the district or municipal director. A permit is required in order to obtain information or assistance from the director’s office. This process helps to minimise potential misunderstandings through open consultation and informative dialogue.

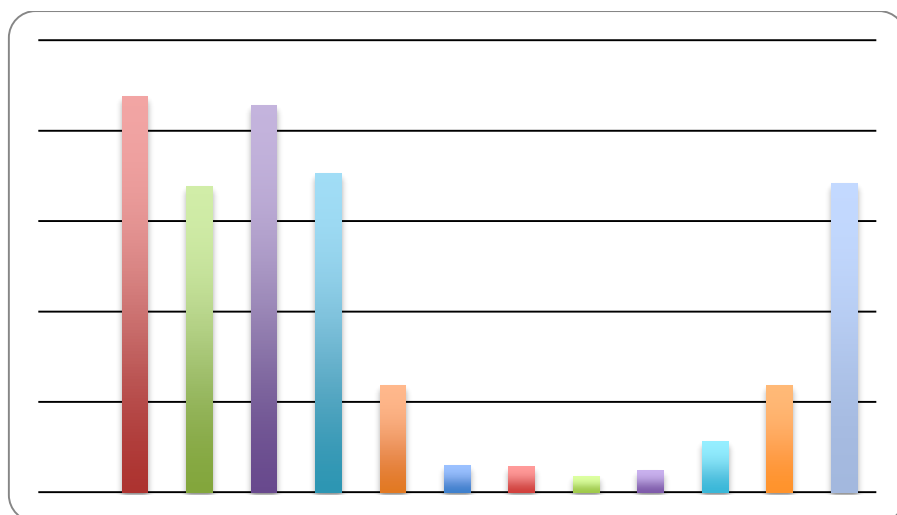
Division	Division comprise a number of wards. The responsibility of the division is to coordinate wards and ward development activities.
Wards	Wards comprise a number of villages. The responsibility of the wards is the coordinate villages as well as village development activities. The wards also monitor all such activities which take place within the villages.
Streets or Village	This is the lowest level of local government and is where the development activities are conducted and coordinated

### 4.1.3 Climate

The project area is located in eastern Africa and is predominately affected by air masses and weather systems from the east and the Indian Ocean. It has typical tropical climate influenced by Monsoon winds of Indian Ocean that subsequently influence the rainfall in the area.

The town has bi-season climate, a hot humid rainy Season from November to May influenced by dominant North – East winds humid dry Season from June to October influenced by South-East Winds. Average annual precipitation is about 800mm -1000mm.

The highest and lowest monthly mean air temperatures are 27°C and 23.8°C in December and July respectively. Relative humidity varies between 87% in March and 79% in October.



**Fig 2. Mean Total Precipitation (mm) for Mtwara Region 1961-90**

**Source:** Tanzania Meteorological Agency Website Data, based on World Meteorological Organisation (Ministry of Water Development, 2004)

### 4.1.4 Water Resources

Hydrology

Water catchment areas for Mtwara-Masasi are located in the Makonde Plateau and is available throughout the year.

### 4.1.5 Population

According to the 2012 national Census, Masasi district had a population of 350689, combining both Masasi district council and Masasi Town Council. In addition, Masasi district and collectively has 7 divisions, 34 Wards and 130 villages (only Masasi District Council). The annual growth rate in 2012 was 1.2%.

#### **4.1.6 Water Quality**

Water from Makonde plateau is of high quality and residents simply drink water directly from the tap.

There are no records of existing contaminated land along the project area. Industrial activities are limited in the Mtwara –Masasi because of inherent poor communication with other towns and cities and even neighbouring country of Mozambique. The petroleum depots outside the port harbour such as BP and Oilcom are well connected by strong pipes safeguarding it against possible leakage.

In general the proposed project does not comprise any large scale industry or potential sources of significant contamination.

#### **4.1.7 Geology and Soils**

Geology determines soils. The region has two geological zones and hence two geologically determined soils types. The first zone is geologically the coastal sedimentary formation extending some 125 Km from the Indian Ocean to the edge of the Makonde Plateau of Newala. This zone produces deep, well drained, sandy soils of low fertility and low moisture holding capacity. They are produced from sandstones. Some areas give rise to marine heavy clay soils or verticals. Further, coastal limestone produces red, well drained, heavy textured soils.

The second zone geologically extends west of the coastal sediments. It is a zone of pre-cambrian basement rocks consisting of gneisses and granulites. Soils from this basement are variable. They are deep, well drained, red clays to the north of Masasi town. These are the best soils in the region since they suit best the upland crops of the region. South of Masasi coarse grained sandy soils occur frequently.

The project area lies on sedimentary deposits from Jurassic and lower Cretaceous. There is a marbled extension of rocky limestone along the coastal line.

The coastal soils are sedimentary, well drained sandy soils with low fertility and low moisture holding capacity.

The cause of soil degradation can be considered under two broad categories; agriculture and fertiliser use. Evidence of some localised erosion was visible during the site visits to the project particularly around Masasi, notably associated with erosion along routes of communications (tracks and paths) and on bare sloping ground. Heavy rains during the wet season often result in the breakup of soils from the impact of the rains. This then makes them susceptible to being washed away over the surface of the ground.

#### **4.1.8 Gas and mineral deposits**

On- and off- shore of the two regions of Lindi and Mtwara abound with gas reserves (and perhaps oil) that have attracted investments and other developments in the regions especially infrastructure and heavy industries like the cement. On shore and offshore oil and gas exploration and production activities are bound to increase as a number of blocks are yet to be licensed, exploratory drilling is being undertaken and in some areas production of gas is under design. The gas (at present) has a strong pulling effect to other energy intensive business activities including power generation, cement production ,petrochemical activities that are currently taking place in the gas sector.

## **4.2 Biological Environment**

### **4.2.1 Introduction**

The project area is a designated development area and therefore no significant existence of forestry and wildlife resources that could be impacted by the proposed projects. Water resources can be considered as the most sensitive part of the district in terms of conservation. Any pollution in terms of hydrocarbons pollution will put the water resources at risk. This means that adequate measures must be put in the project activities /area to ensure oil and chemical if applicable do not find its way to the water ways and consequently to the nearby ocean.

### **4.2.2 Natural Resource and Protected Areas**

The natural vegetation in the project area is secondary and most areas are today under construction or subsistence farming. The woody vegetation is dominated by cashew nut trees with little remnant of coastal forest which originally inhabited the area. As with the physical environment, the biological environment is affected by anthropogenic and infrastructural development. There are no natural habitats within the project boundaries to be impacted on. The present baseline does not include significant biological value, this being primarily related to the nature of the habitat present. As such significant further degradation of the biological environment is unlikely.

### **4.2.3 Vegetation and land use**

The large area of Mtwara region is now cultivated predominantly with Cashew nuts, but the vast majority of the land is still covered by natural miombo and coastal forests. In the valleys or depression you have tropical or valley grasslands. The current land use along the urban and per urban area of Mtwara Municipality can be considered within the following categories: Urban Settlement, Urban infrastructure, Open areas, Cultivated Land, Salt pans, Beach sands and Water bodies. Terrestrial ecology is coastal forests and shrubs. Most degraded because of extraction of charcoal and timber. Fleets of bicycles can see in the morning hours transporting sawn timber and charcoal from urban per urban areas to the town centers. Forest lands and resources have been remarkably reduced after extensive cutting and encroachment by urbanization. Mtwara area is famous for Makonde carvings which name is derived from the name of the predominant ethnic group. The carvings are curved from black tree species use of *Dalbergia melonoxylon* or Mpingo is on placed on the list of protected and endangered species in Tanzania.

The urban setting is characterized by planted exotic trees for shed and ornamental purposes. Some plots are planted with hedges and other plants.

### **4.2.4 Agriculture and livestock keeping**

Most agricultural output, which occurs in the per urban areas, is by small holder farmers hence subsistence. The main food crops include cassava, sorghum, millet and, maize and rice. Cashew nut is the most important cash crop. Sesame and groundnuts also contribute to the cash income of the peasant farmer. Coconut is important along the Coast. Mtwara region has chronic shortage of food and most food stuff is supplied from other regions. Horticultural farming is taking place in the depressions where moisture favors the farming even in the dry seasons. Subsistence agriculture outside the core urban area includes farming of cash crops such as coconut, cashew nuts, simsim and groundnuts, and food such as cassava, banana, maize, sorghum, rice and pigeon peas. The standard of livestock keeping in Mtwara region is very low.

### **5.2.5 Settlement**

A large proportion of the project area is comprised of hospital buildings. No community member is residing in the proposed project areas.



## **4.2 Socio-economic conditions**

### **4.2.1 Introduction**

The human environment within the project area can be characterized as a sparsely populated settlements linked with a few roads, both tarmac and more traditional gravel tracks and paths. The economy of the majority of the area is subsistence based although sufficient is grown and harvested for some trade to be undertaken.

### **4.2.2 Limitations**

Much of the information for the social impact assessment is based on secondary data.

Many of the district profiles are incomplete and/or lacking important information while some data for example demography or gender is aggregated.

Most of the data, particularly population numbers are relatively old i.e. based on the 2002 population census.

### **4.2.3 Ethnicity**

The ethnicity of the project area is composed of Makonde, Yao and Makua and other smaller tribes from all over Tanzania.

### **4.2.4 Infrastructure**

There is a network of roads within the Municipality, both gravel and tarmac including a main road from the south-North to Dar es Salaam (tarmac/earth). Boats/ships for ferrying from and to Lindi region as well as Dar es Salaam have stopped providing services for several some years now. Daily flights are available between Mtwara and Dar es Salam airports.

### **4.2.5 Power supply**

There is a network of power supply within the town. Power is supplied by generators which uses natural gas/ ARTUMAS PROJET. The town is connected to 132 kV transmission line.

### **4.2.6 Communication/Transport**

The use of commuter buses is common within the project area. Other Types of transport are ships, tri cycles, tri-motorcycles (Bajajs), motorcycles and boats. Buses connect towns. Telephone communication is available both through TTCL and the mobile phone network.

Traffic accidents are likely in all roads. Motorcycles and tri cycles are fast emerging type of public transport in Mtwara and notorious for accidents.

### **4.2.7 Noise, Air Pollution and Dust**

The project area, in general, currently has a low level of noise and air pollution although during the dry season and in certain areas higher levels of dust are caused especially along the earth roads. Locally some areas are subjected to higher levels of noise, notably along the main road network. The level of vehicle use of these is however low and the extent of noise pollution limited. The level of noise is relatively insignificant because of low traffic volumes and limited industrial activities. Noise from the power generators of ARTUMAS is also low. According to the Tanzania Bureau of Statistics (TBS, the allowable noise levels are as shown in **Table 5** below.

**Table 5: National standards of maximum permissible noise levels (dB) at work places**

Noise level (Leq dBA)	Duration in minutes/ hours per day	Duration in minutes/ hours per week
85	8 hrs	40 hrs
88	4 hrs	20 hrs
91	2 hrs	10 hrs
94	1 hr	5 hrs
97	30 min	2.5 hrs
100	15 min	1.25 hrs
103	7.5 min	37.5 min
106	3.75 min	18.75 min
109	1.87 min	9.37 min

#### 4.2.8 Health Services

Generally there is well distribution of health services within the Masasi. Most of the people are living within five kilometers of reach to the health centre. However services provided by health services available in the council are limited to the following drawbacks:

- Inadequate number of expert doctors;
- Insufficient number of ambulances;
- high needs of referral hospital;
- Shortage of medicines and other medical equipment;
- Deterioration of some of the buildings; and
- Insufficient number of staff quarters.

Health institutions are facing a big challenge whereby health facilities have been allocated in remote areas where infrastructure is a big problem. Installation of radio calls in these health centers is important for better referral system.

#### 4.2.9 Water Supply

Ndanda has a reliable supply of water throughout the year. This water is from the Ndanda water springs which provides about 80% of water consumed both for business and domestic functions in Ndanda and Masasi district.

#### 4.2.10 Institutional Setup and Capacity of Mtwara region (2009/2010)

The institutional set up and capacity for Mtwara is shown in *Appendix 6*

#### 4.3.11 Livelihood

Main source of livelihood as described by the respondents is farming. Main crop produced by the majority is cashew nut followed by coconut and vegetables. Food crops grown include cassava, beans, potatoes and maize. Generally 98.4% of interviewed people own farms and only 1.6% do not have farm/plots at all. For those who have farmland, 87.1% of the farms are within their own villages at distance of 0-4 km and 11.5% depend of farmlands are on adjacent parts of municipal areas in one of the neighboring villages at distance of up to six kilometers and very few walk above six kilometers.

Sizes of farms owned range from up to ten acres. Majority (40.4%) poses 1-2 acres followed by those who own 3-4 acres (29.2%), 7-10 acres (16.1%) and 5-6 acres (9.2%). The survey revealed that about all farms (93.9%) are usually cultivated every year and 6.1% are for some years left without development for reasons like inadequate capital, limited/insufficient labour force at family level, deterioration of soil fertility, inadequate climate and limited technology.

### **4.3.12 Community Social Services**

Social services accessed by the communities were also explored. The results show that 20.1% of affected structures were not connected to electricity services at the time this study was undertaken and 79.9% were connected. Also, 2.5% of the structures were connected to telecommunication services and the rest 97.5% were not. Concerning to private water connections 11.6% were connected to this service but the majority 88.4% depended on communal water sources.

On the other hand almost all affected families (98.4%) dispose their solid wastes outside the compounds on informal facilities whereas only few families' (1.6%) disposes municipal collection points. For liquid wastes about all families (98.9%) lack improved drainage systems and very few i.e. (1.1%) families disposes on drained facilities like cesspit emptier areas or dug holes within farms/plots.

### **4.3.13 Health**

Regarding health services very few (12.8%) access them at neighbouring streets whereas majority (86.1%) access these services at their own streets within distances of 1-2kms (76.5%), less than 1km (21.3%). In the course of the survey, the Consultant learned that access to appropriate modern treatment was inaccessible to many community members due to factors including high costs of treatment since health services are subjected to cost sharing system. This incident is so much prominent in low income communities because cash flow is very little and unreliable, therefore they opt to go to laboratories for advice and then but treatments from pharmacies.

## **4.4 Waste Management**

### **4.4.1 Solid waste management**

Currently the St. Benedict's Ndanda hospital produces about 50kg of solid waste per day. This waste is handled properly by trained personnel including by segregating and placing different categories of waste into different groups for their final disposal. After separation, degradable wastes are sent into the dump pit for final disposal while rest (non-biodegradable materials) is sent to the incineration chamber for incineration.

The incinerator used by the St. Benedict's Ndanda hospital is one of the latest ones with capacity of processing 1000kg of waste per hour. However, wastes generated current by the hospital is only 50kg, meaning that incinerator is able to handle addition solid waste from operation of the new laboratory.

### **4.4.2 Waste water Management**

Ndanda hospital has a centralized sewerage system in sewage through subsurface drainage system converges to constructed waste stabilization ponds which include anaerobic pond, primary and secondary facultative ponds, and maturation ponds. These are preceded by a number of septic tanks before being discharged into the pond. The waste water from different parts of the hospital are pumped through the system to the ponds. The pond is located about 1km away from the hospital premises and is fenced and there a security guard to prevent unauthorized people from accessing it for bathing and other activities of such kind. The land between the hospital premises and the ponds also belongs to St. Benedict's Fathers and therefore there no land related conflicts either for the location of the pond or transmission of waste water from hospital to the ponds. **Figure 3** below shows the WSP at St. Benedict's Ndanda hospital.



**Fig 3. Waste water Stabilization pond at St. Benedict's Ndanda hospital**

In general terms, the system seemed to be working properly with no bad smells. However, no tests were conducted for BOD/COD. On the basis of proposed project, the system seems to be well placed to handle additional effluent from new laboratory operations. However, relevant tests should be undertaken to determine the effectiveness of the system before additional sewage is added into the system from new laboratory. Key parameters to be tested include PH, turbidity, BOD/COD, such color, salinity, total dissolved solids, Sulphate, phosphate and Nitrate-Nitrogen, among others. *The table under Appendix 12 presents allowable levels of various elements of waste water.*

From the ponds, treated waters are released into the soil area of about 1sq km downstream which also belongs to St. Benedict's hospital. Table below presents standard parameters for WSP

#### **4.4.3 Safety and Fire Management**

The St. Benedict's Fathers of Ndanda has fire-fighting equipment including fire brigade (**figure 4**) which is also used to fight man-induced fires in forest adjacent to the mission in the Makonde escarpment. Within the hospital premises, there is a designated area for assembly in case of fire accidents. The management reported that fire drills are conducted regularly to hospital staff to ensure preparedness.

**Figure 4. Fire brigade of the St. Benedict's Fathers of Ndanda**



# 5 STAKEHOLDER ANALYSIS

## 5.1 The Stakeholders

The study team conducted stakeholders' consultation between April and May 2015. Consultations involved individuals, groups or organizations that might be affected or might affect either positively or negatively the proposed development in one way or the other. These stakeholders are found at both national and local levels) and range from government authorities to local community members. Stakeholders identified and their relevancy to the proposed project are enlisted below. At the local level (i.e. in the project area-Masasi and Mtwara), the main stakeholders were identified to be:

- Local government- Masasi district Council where consultations were conducted with District Executive Director, District Medical Officer, District Engineer, District Health Officer, District Environmental Officer).
- At the ward level consultations were done with Ward Executive officer (WEO) and ward councilors while,
- At the village consultations were done with Village chairperson, village executive officer and elderly members of the local community from villages surrounding the project.
- At the St. Benedict's Ndanda hospital consultations were held with hospital management and staff including lab technicians, Maintenance unit, safety officer, Matron, hospital cleaners, and representative of hospital administrator, board secretary
- The Contractor).

Others stakeholders included NGOS/CSOs dealing with poverty, HIV/AIDs, environmental Village executive officer,

At the national, a national dissemination meeting was held in Dar es Salaam and was attended by various representative of government agencies and ministries including the Dar es salaam City Council, Division of Environment in the Vice President's Office, NENC, Ilala and Kinondoni Municipal Councils and PMO-RALG, Occupation Safety Health Agency (OSHA) and the Ministry of Natural Resources and Tourism.. Others participants NGO representative such WWF, Shivyawata and several social and environmental experts from private companies and consulting firms.

Key issues considered during consultations include Envisaged negative environmental impacts, negative social impacts, and potential positive impacts of the project, management aspects of the identified negative impacts, enhancement mechanism of positive impacts and aspects to be considered for sustainable project operations. In all cases Stakeholders' views were sought on their supportiveness of the project.

## 5.2 Stakeholders' Concerns

### 5.2.1 Project acceptance

Consultation with stakeholders indicated that they generally construction of the laboratory building at the St. Benedict's Ndanda hospital as in their views this development would improve significantly the health and welfare thereby triggering several other socio-economic development. For this reason, all stakeholders consulted were in favour. Many of the stakeholders acknowledged the crucial role Ndanda hospital plays people residing in the Southern region of the country but also to those in neighboring countries especially Mozambique. They pointed out the fact that the hospital had recently been upgraded to be the referral hospital for the region based on recognition of its excellency in provision of best healthcare services. Hence, these stakeholders felt that construction of the modern laboratory at the

hospital was a timely undertaking. They warmly welcomed the development were all excited and eagerly looking forward to enjoy the access to improved healthcare services to be brought by the new laboratory.

## **5.2.2 Perceived Project Impacts**

The fact that the proposed laboratory building will be built within the premise of the St. Benedict's Ndanda hospital that owns the land area as well as the other areas to be used in support of the new laboratory left many stakeholders with not particular conflicts or reservation. Specific comments from these stakeholders are summarized below:

### **5.2.2.1 Need for improved healthcare services**

The need for improved access to better healthcare was highly expressed almost by all stakeholders while some institutions showing their readiness to contribute whatever they could afford to just to ensure that the construction of the lab building completed as soon as possible. Some officials from the Masasi District council promised to offer what political support need to ensure success of the project.

A popular community leader and an Old Man (79-years), Mr. Mwenye Mchekenge remarked during the stakeholder meeting at Ndanda that he was very pleased to this project go to Ndanda hospital. He said he did not see himself having lived all those years (79) without the healthcare services from Ndanda hospital. He attributed his good health to the dedicated lab testing and diagnostic services of the Ndanda hospital. In his concluding remarks he urged that he wished the proposed laboratory building and its functions would be looked after well so that it present and future generations could benefit from this support just like today's generation is benefiting from the hospital (Ndanda) that was built way back in early 1900'S.

### **5.2.2.2 Public Involvement and awareness raising**

The essence of involving the community was also highly expressed both the villagers and district officials. Villagers pointed that they had been informed about the new development and had no reservations to raise about. The district officials on their end pointing out that their involvement would benefit the project in particular by making sure that whatever assistance come into their knowledge they would consider Ndanda hospital as the first priority. The Masasi District Commissioner, Mr. Benard Ndutta who had just arrived in the district following his relocation from the lake zone explained how long he waited to get to Ndanda. He pointed out that Ndanda Hospital was one of the oldest hospital in medical care history of Tanzania that he had been hearing about on a positive note since his childhood. He note that he was particularly pleased to find from records in his office that his predecessor had been participated actively in all the early planning sessions including accompanying the Ndanda hospital team to Mozambique to inform them about the project. The DC, commended this as true model of the Public-Private-Partnership arrangement in Tanzania between faith based organizations (the St. Benedicts Fathers of Ndanda), the government and the World Bank. He argued, more ought to be learnt from this model.

### **5.2.2.3 Some concerns about the project**

Besides the all-good-project consensus among stakeholders about the new laboratory building, some villagers had some fear about costs for improved medical services. One villager wanted to get confirmation if pricing for healthcare services was going to remain the same or change after construction on the new laboratory and improvement of lab services. The hospital administration was in attendance clarified that medical care cost would not just rise like that as pricing is usually set by the government and hospitals have to follow those guidelines.

Other stakeholders had some fears about possible influx of people who might come into the area (Ndanda) in response to improved healthcare services and decrease the amount of medical services available to the residents (i.e. competition for limited resources). This question was responded to by both the Medical In charge of the St. Benedict's Ndanda hospital-Dr. Crispin Sapuli and the Masasi DC.

Dr.Sapuli confirmed that the hospital would try to have enough medication for the people of Ndanda at all times and that in times of crisis, the residents would be given priority. The DC on his side advised the participants that entry into the country is always regulated by relevant authorities such that in the case of sudden influx (as in the case of refugees) host territory would usually be provided special support by the central government in order to supplement existing resources and in so doing ensure that local communities do not suffer such consequences.

Dancing on the same tune , another stakeholder expressed his worry that with increased workload for lab staff due to more demand for testing and diagnostic, lab staff would be overwhelmed and exhausted such that they might end up jeopardizing the test results. So he suggested that the hospital administration should be sure to hire enough technicians commensurate with the demand. In addition the same stakeholder observed that in order to be effective, lab technicians should be provided with housing near the hospital so that they could offer services appropriately. Hence he again challenged the hospital administration to include this as one of the priorities for sustainable healthcare provision of health care services.

#### **5.2.2.4 Environmental degradation**

Some experts in the room such as the district Environmental officer, Mr. Obadia Bishoge registered his concerns about potential negative impacts on the environment that could arise from sourcing of the materials for construction but also waste from construction if no proper mitigation measures are taken. Mr. Bishoge also hinted on the possible social impacts from interaction between local community members and new members-the construction crew- which could lead to spread of HIV/AIDS and other infection. Hence, he urged the study team through the EIA process, to identify and propose appropriate measures that would ensure effective operation of the building and the same time safeguard both people and the environment. In addition, Mr. Bishoge also called up the project developer and his team to keep in touch with his office to share and exchange information as the project advances.

#### **5.2.2.5 Employment opportunities**

The stakeholders noted that the project would provide employment opportunities to locals during construction, while others mentioned some of the benefits for the project to be the market for local produces as well as food staffs and construction materials during construction. A warning was given, however, that contract should ensure not employ children under 18 years of age as this would be against the labor law by ILO.

#### **5.2.2.6 Appropriate Building facilities for People with disabilities**

One the stakeholders lamented that many of the modern building tend to forget the needs of people with disabilities or special needs. He argued that a building like this should take this into consideration and design a laboratory with facilities catering for all especially those with special needs. He pointed out that the building should ensure easy access for wheelchair, provide special washrooms for disabled and ensure that slopes at the access points is well calculated to avoid over-turns. These should also be supported by the ramps.

### **5.3 Issues considered for sustainable project operation**

- The proponent should maintain the good communication and relationship with surrounding communities and the district government
- Local communities should report to the hospital administration any environmental and Social negative impact which they note as resulting from this projects.
- Local communities should cooperate with the St. Benedict's Fathers' efforts in conservation of the forest ecosystems along the Makonde escarpment which is the main source of the Ndanda water spring which is source of water for the whole of Masasi and neighboring areas

# 6 Impact Assessment (EIA)

## 6.1 Introduction

The potential environmental and social impacts are presented in this chapter. The proposed project is expected to cause negative and specific impacts on the physical and biological environment. The impacts will be realized within and around the site where the building will be constructed. Direct impact will be within the boundaries of the subprojects or clusters. These impacts are predominately short-term and temporary in nature and are likely to affect the human and physical environment. Impacts presented in this section are a result of field observation, consultation and prediction of impacts. Generic predictions of impacts are also presented at this stage. The neighboring community was informed about the project details through the consultation process. The study team obtained feedback about their concerns and feelings. Detailed minutes from stakeholders' consultation are presented in *Appendix 7* 'Stakeholders' consultation'. This assessment is not considering an alternative to the proposed site because the selection is based on suitable potential options for development as judged by engineering side. Thus, the developer has made decisive economic commitments. For example, the developer considered a range of factors such as linkage with other hospital facilities, proximate with other hospital department, cost of establishing new sewage system in case of an alternative site was used.

### 6.1.1 Environmental impact rating scale

To ensure a direct comparison between various EIA team studies, a standard assessment methodology was used to assess the significance (the importance of the impact in the overall context of the affected system) of the identified impacts. The criteria that were considered in the determination of the impact significance are:

- **Severity/Benefit:** the importance of the impact from a purely technical perspective;
- **Spatial scale:** extent or magnitude of the impact (the area that will be affected by the impact);
- **Temporal scale:** how long the impact will be felt;
- **Degree of certainty:** the degree of confidence in the prediction;
- **Likelihood:** an indication of the risk or chance of an impact taking place;

To ensure integration of social and ecological impacts, to facilitate specialist assessment of impact significance, and to reduce reliance on value judgments, the severity of the impact within the scientific field in which it takes place (e.g. vegetation, fauna) is assessed first. Thereafter, each impact is assessed within the context of time and space, and the degree of certainty in the prediction is indicated.

The impact is then assessed in the context of the whole environment to establish the "significance" of the impact. This assessment incorporates all social, cultural, historical, economic, political and ecological aspects of the impact. Thus, the severity or benefit of an impact within a specialist discipline is first assessed before the significance of the impact is evaluated in a broader context. Consequently two rating scales are required, one to determine the severity or benefit, and one to determine environmental significance.

### 6.1.2 Severity / benefit

**Severity** is based on the professional judgement of the various specialists to evaluate the extent to which negative impacts would change current conditions, or how beneficial positive impacts would be on a particular affected system (for ecological impacts) or a particular affected party (for social impacts). The severity of impacts can be evaluated with and without mitigation order to demonstrate how serious the



impact is when nothing is done about it. The word mitigation means not just “compensation”, but also ideas of containment and remedy. For beneficial impacts, optimisation means anything that can enhance the benefits. Mitigation or optimisation must be practical, technically feasible and economically and socially viable.

### 6.1.3 Spatial scale

The spatial scale defines the extent or area over which the impact will take place.

**Table 6 Spatial scale**

<b>Localised</b>	A few hectares in extent. The specific area to which this scale refers is defined for the impact to which it refers.
<b>Study Area</b>	Includes the entire Village Area.
<b>District</b>	Includes area within Masasi District
<b>Regional</b>	The impacts will be of such a nature that it may affect the Mtwara Region.
<b>National</b>	The impacts will be of such a nature that it may affect the entire Tanzania.
<b>International</b>	The impact would affect resources and processes outside the border of Tanzania

### 6.1.4 Temporal scale

The temporal scale defines the times over which the impacts would continue to occur.

**Table 7 Temporal scale**

<b>Temporal scale</b>	<b>Explanation</b>
<b>Short term</b>	Less than 2 years.
<b>Medium term</b>	Between 2 and 5 years
<b>Long term</b>	Between 5 and 20 years, and from a human perspective essentially permanent
<b>Permanent</b>	More than 20 years, and resulting in a permanent and lasting change.

The impact discussions follow below.

## 6.2 Design Phase

- Building designs that lacks provision for the needs of people with disabilities and or special needs

*Mitigation measure*

- Ensure building designs has provisions for people with disabilities and or special needs in terms of access point for wheel chairs (including upstairs), washrooms,

## 6.3 Site Selection Phase

- Impacts on current vegetation cover and loss of biodiversity due clearance and levelling of the site (e.g. Deforestation- cutting tree down for construction/supporting top roofs/ canopies)

*Mitigation measure*

- Clearance will be strictly limited to the defined project area, mainly for construction
- Construction workers to use existing access road to avoid soil disturbance
- Workers will be sensitized to avoid clearance
- Use metal and Aluminum frames in supporting top walls but also for roofing, windows and doors

## **6.4 Mobilization Phase**

### **6.4.1 Positive Impacts**

#### **6.4.1.1 Income to material/ equipment suppliers and contractors**

Development of the project will entail civil works requiring materials such as bricks, lumber and cement. This is a positive but short-term and reversible impact.

Enhancement measure: Earth materials needed for construction, for example, aggregate (stones and sand) are obtained from quarry operations. Conscious or unwitting purchase of these materials from unlicensed operations indirectly supports, encourages and promotes environmental degradation at illegal quarry sites and can cause medium- to long-term negative impacts. It should therefore be a contractual obligation for contractors to procure construction materials from legitimate or licensed sources (as advised by local authorities).

#### **6.4.1.2 Employment**

Construction will avail skilled and unskilled job opportunities. This would be a positive but short-term and reversible impact, lasting only during the construction period.

*Enhancement measure:* Wherever feasible, local people should be considered for job opportunities commensurate with their level of skills. Adequate occupational health and safety standards should be provided to ensure the work environment is conducive.

Nevertheless, employment will not be provided to school children especially those under the age of 18 years

### **6.4.2 Negative Impacts**

#### **6.4.2.1 Garbage generation**

Demolition and reconstruction activities will lead to generation of waste that may consist of timber or metal cuttings, debris, paper/cement bags, empty paint and solvent containers, broken glass among others. Some of the waste materials such as paints, cement, adhesives and cleaning solvents contain hazardous substances while some of the waste materials including metal cuttings and plastic containers are not biodegradable and can have long-term and cumulative effects on the environment. It impacts on the environment through blockage of drainage systems and negative impacts on human health.

Other wastes which will be generated by non-construction activities because of the presence of the workers at the site include food debris, contaminated water from washing, cleaning equipment, construction tools and vehicles.

*Mitigation strategies:*

- i) The wastes should be properly segregated and separated to encourage recycling of some useful waste materials.
- ii) Waste collection should be made at least once in 24 hours and it should be done in such a way to minimize nuisance of smell and dust during collection.
- iii) The contractor and hospital administration should work hand in hand to facilitate sound waste handling and disposal from the site.

### 6.4.2.2 Borrow Pits and Quarry sites

Aggregate to be used for construction is obtained from a private owned quarry which is also used by the municipal and people in Masasi. The surroundings are well drained. The soil material is predominantly sand which is suitable for construction purposes. Because of nature of the soils, possibility to form a water pond during rainy season is low.

#### *Mitigation measures*

- i) Rehabilitation of abandoned roads through reshaping, re-contouring, and resurfacing with topsoil and seeding for vegetative growth.
- ii) Removal of structures such as bridges, culverts, cattle guards and signs. ,
- iii) The regarding of sand stockpiles should be removed from property boundaries to eliminate the potential for offsite discharge from storm water flow.
- iv) Practice good soil conservation and seed bare ground during the post-mining phase to aid in minimizing and/or reducing the potential for storm water to wash sediment loads from un-vegetated areas into nearby waterways, leading to rill or gully erosion over that period.
- v) Ensure use of seeds that are conducive to the season and type of soil present should be used to vegetate any bare areas.
- vi) Mulching (using hay or erosion control blankets, for example) also aids in seed germination and helps prevent or minimize sheet, rill and gully erosion.

In addition, Borrow pits can be managed by practicing **Best Management Practices** and guidelines which include:

- Minimising the surface area of the borrow pit where possible;
- Maintain the floor of the borrow pit slightly above the elevation of the surrounding area to promote drainage to avoid creating quarry lakes and to prevent permanent degradation in borrow pits;
- Prevent erosion and sedimentation through appropriate control measures;
- Protect archaeological resources
- Maintain air quality through dust control/suppression;
- Use progressive rehabilitation in closing borrow pits no longer than needed

### 6.4.2.3 Generation of noise

Noise is perceived as one of the most undesirable consequences of construction activity. Relatively high noise levels are expected in the area during construction phase. Noise will mainly result from use of machinery especially during demolition and construction activities. Though the level of discomfort caused by noise is subjective, the most commonly reported impacts of increased noise levels are interference in oral communication and disturbance in sleep or during resting time. Given that the proposed site is located in the vicinity of other hospital units above the children cancer ward, disturbance or discomfort resulting from demolition and construction noise cannot be ruled out.

#### *Mitigation strategies:*

- i) Contractor will be careful when selecting the working equipment to avoid use of old equipment or damaged equipment with high level of noise emissions that would have a negative impact in the environment.
- ii) Contractor will ensure that equipment is properly maintained and fully functional.
- iii) Construction workers should be aware of the sensitive nature of workplaces they are operating in and advised to limit verbal noise or other forms of noise. For example, metallic objects or tools can be passed on to a colleague rather than dropping or throwing them with loud bangs.
- iv) The contractor should ensure that noise levels emanating from machinery, vehicles and noisy construction activities are kept at a minimum for the safety, health and protection of people

in the nearby buildings.

- v) Noise and vibration can also be minimized at the project site and surrounding areas through sensitization of construction truck drivers to switch off vehicle engines while offloading materials.

#### **6.4.2.4 Traffic and fugitive emissions**

Fugitive emissions include dust and exhaust fumes. The sources of dust emissions will include demolition and re-construction activities and transport vehicles delivering building materials. Emission of large quantities of dust may lead to significant impacts on construction workers and the hospital community/ local commercial/ residents.

The trucks used to transport various building materials from their sources to the project site contribute to increases in emissions of SO<sub>2</sub>, CO<sub>2</sub>, CO, NO<sub>x</sub> and fine particulate along the way as a result of diesel combustion. The impacts of such emissions can be greater in areas where the materials are sourced and at the construction site as a result of frequent idling of vehicle engines, frequent vehicle turning and slow vehicle movement in the loading and offloading areas.

Deteriorated air quality would be of critical effect to especially asthmatic construction workers, patients and health workers with either minor or severe health impact depending on level and duration of exposure.

*Mitigation strategies:*

- i) The construction activities will be carried out during the day;
- ii) Control travel speeds of construction vehicles along the access road especially within the hospital;
- iii) Trucks should be covered during haulage of construction materials;
- iv) An alternative entry gate near the proposed site should be used to deliver materials;
- v) Wherever dust suppression is necessary, water should be sprayed over dusty areas;
- vi) Keep all construction equipment in good operating condition to reduce exhaust emissions;
- vii) All dust should be quickly swept away to avoid migration to other non-construction areas;
- viii) Ensure that all equipment leaving the site, clean up their tires in case they are dirty; and
- ix) Construction work should be undertaken by an experienced and duly registered contractor with a verifiable sense of environmental awareness and responsibility.
- x) Workers will be provided with PPE and the use of PPE shall be enforced.

#### **6.4.2.5 Temporary scenic blight**

Construction activities will require material, equipment and cordons at the hospital. Since the hospital will remain open for access by public, presence of these activities and materials thereof will cause temporary visual blight at the construction site. Presence of construction activities will alter visual impressions accustomed to.

*Mitigation strategy:* Wherever possible, the contractor should ensure minimal footprint of construction activities.

#### **6.4.2.6 Occupational health and safety (OHS) Risks for Contractors**

Construction activities have potential to pose occupational risks some of which could be life-threatening, for example, falling debris could injure workers if personal protective equipment (PPE) are not provided or used. Working with high voltage and hot works (welding) pose a risk of electrocution. Back injury could occur if workers lift heavy objects using inappropriate body posture. Other potential hazards might be: inadequate lightning or limited level of visibility given

that work will take place inside a closed building, loss of attention and lack of concentration while working.

*Mitigation strategies:*

- i) Orient all construction workers on safe work practices and guidelines and ensure that they adhere to them.
- ii) Training should be conducted on how to prevent and manage incidences. This should involve proper handling of electricity, water etc. and sensitization on various modes of escape, conduct and responsibility during such incidences. All must fully be aware and mentally prepared for potential emergency.
- iii) Use signage to warn staff and/ or visitors that are not involved in construction activities of dangerous places.
- iv) Strict instructions should be given for drivers of heavy equipment.
- v) Supervision of works should be done regularly to ensure that safety conditions are met while any deviation from safety regulations is immediately reclaimed following the best practices regarding safety at work equipment.
- vi) Communication line must be ensured in amongst the hospital community, construction workers and drivers of heavy trucks.
- vii) Develop evacuation procedures to handle emergency situations.
- viii) Provide adequate OHS protective gear for the employees. The guide below should be useful:

**Hearing** (Over 80 Decibels for 8 hours a day requires hearing protection)

- Ear Muffs: One size fits all, comfortable, less ear infection risk
- Ear Plugs: Small, lightweight, can get dirty and cause infection

**Face/Eye** (Working with any chemical or using any mechanical equipment)

- Face Shield: Protect face from splashing and particles
- Safety Glasses: Protection from solids (cutting, sanding, grinding)
- Safety Goggles: Protects eyes from splashing

**Hand** (Use correct gloves for the job)

- Chemical Gloves: (Nitrile, Latex, PVC)
- Gloves for other use: special gloves for cutting, burning, abrasions/ blisters

**Body**

- Overalls: Can protect against dust, vapours, splashes

**Foot Protection**

- If electrical hazard present ensure boots offer protection
- Safety Toe/Steel Toe Boots: Always worn when potential for falling hazards exists
- Water/Chemical Resistant Boots: Use in a spill situation
- Non-slip boots for working on wet/slippery floors.

**5.4.2.7 Accidents**

With an increase in number of heavy vehicles during transportation of construction materials and equipment, there will be an increase of hospital community risk of traffic-related accidents or injuries. Traffic accidents would be a significant social impact and especially likely to involve children, women, disabled and elderly people.

*Mitigation strategies:*

- i) Adopt best transport safety practices with the goal of preventing traffic accidents and minimizing injuries suffered by project personnel and the public, as follows:
  - Emphasizing safety aspects among project drivers. Specifically ensure drivers respect speed

- limits through trading centres and areas within the hospital;
  - Adopting limits for trip duration and arranging driver rosters to avoid overtiredness;
  - Position traffic guides at road junction to the hospital to control driver speeds;
  - Employ safe traffic control measures, including road signs and flag persons to warn of dangerous conditions and children crossings.
- ii) Ensure contractors regularly maintain vehicles to minimize potentially serious accidents such as those caused by brake failure commonly associated with loaded construction trucks.
- iii) Overall, ensure proper waste management practices as recommended in the study on improvement of healthcare waste management in Uganda.

## 6.5. Operation Phase

### 6.5.1 Air pollution due to incineration of waste

Incineration of laboratory waste if carried out in an inappropriate facility could result into localized pollution of air. The key emissions to the air from operation of the incinerators are odour, particulate matter, hydrogen chloride, nitrogen oxides, sulphur dioxide, carbon monoxide, and volatile organic compounds (from methane to polycyclic aromatic hydrocarbons (PAH), dioxins and furans (PCDD/F) Dioxins are known to promote cancers in humans. Downwash of incinerator emissions has potential to degrade indoor air quality of nearby environment or offsite buildings. In addition, to incinerator emissions, there is also a risk of contaminated air from the laboratory mixing with the outside environment if poorly ventilated.

*Mitigation strategies:*

- i) Ensure operator of incineration unit is adequately trained to ensure efficient operation;
- ii) The incinerator should be operated at its design temperatures and combustion air supply;
- iii) The laboratory should be equipped with bio-safety areas and should also be equipped with all necessary equipment and have a ventilation system that fulfils standards of biosafety;
- iv) All exhaust air from the laboratory should pass through high efficiency particulate air filters; and
- v) Waste should not be pre-treated with a chlorine-bearing disinfectant or should not be contained in PVC bags to avoid emission of dioxins or furans during incineration. For the same reason, no other material destined for incineration should contain chlorine-bearing chemicals.

### 6.5.2 Occupational health and safety risks for laboratory staff and the general public

Inadequate treatment or handling of contaminated samples or waste can create the potential that the laboratory staff would get exposed to life threatening infections in the course of their normal duties, and in this case brings at risk the health of individuals in the laboratory team and the general public health as well. This transmission can take place through staff equipment, clothing and vehicles transporting samples. The infectious waste could be in gaseous, liquid or solid forms. A list of OHS risk sources for staff is presented below:

- i) Inadequate lighting and ventilation in workplaces
- ii) Lack of safe access particularly for disabled employees
- iii) Lack of adequate training (or neglect of safety precautions/ guidelines) in use of equipment and handling of samples
- iv) Misuse of equipment and materials for functions they are not designed
- v) Lack of safety signage in specific areas
- vi) Electrical hazard
- vii) Eye hazards such as splashes
- viii) Chemical hazards (acids, alkalis, expired drugs, oxidizing and reactive chemicals)

ix) Biological hazards (samples of blood or other body fluids with potential to cause diseases).

Biological agents can be classified into four groups:

1. Biological agents unlikely to cause human disease;
2. Biological agents that can cause human disease and are likely to require additional controls, but are unlikely to spread to the community;
3. Biological agents that can cause severe human disease, present a serious hazard to workers, and may present a risk of spreading to the community, for which there usually is effective prophylaxis or treatment available and are thereby likely to require extensive additional controls; and
4. Biological agents that can cause severe human disease, are a serious hazard to workers, and present a high risk of spreading to the community, for which there is usually no effective prophylaxis or treatment available.

*Mitigation strategies:*

- i) The primary measure to mitigate OHS impacts is prevention which entails identification of risks and instituting pro-active measures to avoid them. In part this can be achieved by following GIIP or national guidelines. For unavoidable risks, personal protective equipment (PPE) should be provided to workers.
- ii) Orient all staff on safe work practices and guidelines and ensure that they adhere to them.
- iii) Training should be conducted on how to prevent and manage incidences. This should involve proper handling of electricity, water etc. and sensitization on various modes of escape, conduct and responsibility during such incidences.
- iv) Regular drills should constantly follow on various possible incidences. This will test the response of the involved stakeholders. Such drills will keep them alert and they will become more responsive to in the case of incidences.
- v) Use signage to warn staff and/ or visitors that are not involved in laboratory work of dangerous places.
- vi) Develop evacuation procedures to handle emergency situations.
- vii) Provide adequate OHS protective gear for the employees.

### **6.5.3 Risk of fire outbreak**

Without provisions for fire safety, there is a risk of fire outbreak at the facility with disastrous life and financial impact. Fires can start from ignitable materials in laboratories, cigarette smoking in non-designated places or old electrical connections.

*Mitigation strategies:*

- i) Provide fire extinguishers at strategic locations within the laboratory and ensure that all fire-fighting equipment including fire brigade are regularly maintained and serviced.
- ii) Key healthcare staff should have basic training in fire control through regular fire-fighting drills.
- iii) Fire emergency telephone numbers should be displaced in communal areas.

- iv) Install an automatic fire alarm system for the entire laboratory and provide enough water hose reel around the property with a fire reserve water tank attached with an automatic booster pump for hose reel.
- v) Provide fire hazard signs such as 'No Smoking' signs. Directions to exit in case of any fire incidence and emergency contact numbers should be provided. The contact/emergency numbers should be displayed generously within the facility.

## 6.6 Consideration of Alternatives

### 6.6.1 Introduction

The discussion and analysis of alternatives in Environmental Impact Assessments considers other practicable strategies that will promote the elimination of negative environmental impacts identified. This section is a requirement of the Environment Impact Assessment and Audit Regulations, Gn No.349/2005, and is critical in consideration of the ideal development with minimal environmental disturbance.

In analyzing the environmental impacts, there are usually two or more development alternatives to consider for each issue. The alternatives may encompass a wide range of consideration and can represent a choice between the construction and operation of a development and the non-development option. With this in mind, the general principle involved in identifying the option(s) of the proposed project development is to ensure that the option chosen would result in optimal social, economic and environmental returns. In effect the option chosen should corroborate well not only for the developer, but also for the environment and stakeholders in the area. The option with the highest cost benefit factor, the most technically feasible and with least residual impact is identified as the preferred option. The following alternatives have been identified and have been discussed with project assigned consultant as means of reducing environmental effects. They are discussed in further detail below:

### 6.6.2 Alternative Site

The ADB EIA Guidelines, Annex 2 (1992) asserts that "project options should be provided within the constraints of the aim and broad social economic, technical and environmental factors". In the context of this study therefore the choice of site has been dictated by the suitability of the specific site in terms of its well linkage with existing hospital departments such as Old laboratory, outpatient and inpatient departments and TB unit. Furthermore, the location connects well with other supporting facilities such centralized sewerage system, incinerator and dumpsite and has easy access from the road for people with disabilities.

Based on the above, the recommended alternative is the "Proposed Alternative" because it recognizes the viability and need for the proposed development, and supports communication and close relations during all stages of the development in relation to the base of the client.

### 6.6.3 The Alternatives considered during preliminary design

The other alternative considered preliminary design of the project has taken on board a number of alternatives which also addresses key components of environment, economic and social as well as viability of the project. One of these alternatives was a **different Location within the hospital compound alternative**. While this was possible given availability of land elsewhere, it would have brought with it formidable social, economic and environmental concerns. From an environmental perspective, locating the new laboratory building elsewhere would mean construction/extension of the necessary infrastructures such sewerage system to link with the new building. This exercise which would add stress and disturbance on the environment during construction of new pipe lines. From a social



standpoint, new location for the laboratory would increase walking distance for sick persons from inpatient and outpatient departments to access the services.

#### **6.6.4 The “No action Alternative”**

The “no action” alternative is required to ensure the consideration of the original environment without any development. This is necessary for the decision-makers in considering all possibilities. The selection of the “No Action” alternative would mean the discontinuation of project leading the leaving Ndanda hospital as currently is.

The “No-action” alternative would have significant negative social consequences including stagnation of healthcare service given the current status of Ndanda hospital as the referral hospital and therefore required to have modern equipments for testing and diagnosis. This would affect not only people of Ndanda but people of the whole Southern region as well as those from neighboring countries of Mozambique.

#### **6.6.5 Overview of Alternative Analysis**

In practice, if more than one site is available for selection for development of the proposed project a screening exercise could be used and the site qualifying above the others has to undergo a detailed characterization for its suitability in terms of provision of laboratory services, accessibility and other socio-ecological aspects. Consideration would also be given to proximity to other hospital buildings and facilities.

The client has identified only one site as the best for the proposed project. Based on the above, the recommended alternative is the “Proposed Alternative” because it recognizes the viability and need for the proposed development, is designed to address environmental issues and concerns, meets the regulatory requirements and is within reach by the promoter base area i.e. Ndanda hospital. The few identified impacts are of the nature and scale where they can be mitigated under proper planning and implementation of the measures proposed along with its plans in the report.

# 7. Impacts Mitigation

## 7.1 Introduction

The identification of appropriate mitigation measures is an important aspect of the ESIA. Many of the potential impacts identified in the preceding chapter can be eliminated or reduced through the implementation of appropriate mitigation measures at a strategic planning level or when applied to specific project tasks and activities.

## 7.2 General Commitments

Much of the mitigation proposed for the project can be considered under a range of general commitments.

### 7.2.1 Information and Awareness Raising

An important mitigation measure across the project is consultation and the availability of information. Many of the impacts and problems predicted for the project may be associated with insufficient or inadequate information being provided to the affected communities and people. Whilst provision of information for the project has already started as part of the ESIA consultation process, it is important that this continues throughout the project both from the contractor and from developer. Should the project progress to the implementation and construction phase, information and awareness creation will be an important component from the outset. Key issues to be raised and addressed will include, but not be limited to, the following:

- Nature and details of construction works and program, control and management;
- Technical issues such as fire risks and safety issues;
- Social issues such as restrictions, noise, dusts, termination of some activities, information relating to working areas, progress and project timing; and
- Indirect risks from construction such as HIV, AIDS and other STDs, traffic safety, etc.

The transparency and readily availability of information to the local communities and affected people will be an important component in the successful implementation of the project.

### 7.2.2 Project Design

The ESIA has identified that the construction may have an impact on a number of aspects of the project environment. It is important that a suitable process / protocol is adopted by which the design, implementation and future use will be undertaken. This will include preparation of a design protocol to ensure that negative impacts are minimized through careful design and positioning of the planned subprojects.

The design of the sub projects includes roads, drainage and sewerage system, parks/gardens, dumpsite and incineration chamber.

In addition the project design should ensure that the Building designs takes into consideration the needs of people with disabilities and or special needs as provision of access point for wheel chairs (including upstairs rooms) as well as provision of special washrooms and ramps at the access points. This also includes provision of the most direct entry from main gates.

### 7.2.3 Management of Construction Site

It is important that the construction site is managed appropriately, both from a health and safety perspective as well as with regard to impacts on the physical, biology and human environments.

A responsible person should be appointed for the construction site and an instruction manual or handbook for site procedures is developed. This will include, but not be limited to, the following topics.

- Control of site including workshops;
- Securing (fencing) and management of the working area;
- Working hours;
- Control of discharges;
- Storm water runoff management;
- Management of construction waste materials (plastics, debris);
- Management and removal of wastes;
- Control of noise and dust;
- Liaison with local community / residents;
- Landscape restoration; and
- Emergency procedures (such as fire and spill response).

Following completion of the construction works, appropriate consideration will be given to the decommissioning of the construction site. This will ensure that no significant impacts are caused in the process of withdrawal of construction workers and equipment. For example, aversion of contamination, waste or damage.

In addition borrow pits and quarry sites will also be decommissioned through reinstating into their original condition. This will involve:

- Rehabilitation of abandoned roads through reshaping, re-contouring, and resurfacing with topsoil and seeding for vegetative growth.
- Removal of structures such as bridges, culverts, cattle guards and signs. ,
- The regarding of sand stockpiles should be removed from property boundaries to eliminate the potential for offsite discharge from storm water flow.
- Practice good soil conservation and seed bare ground during the post-mining phase to aid in minimising and/or reducing the potential for storm water to wash sediment loads from un-vegetated areas into nearby waterways, leading to rill or gully erosion over that period. Ensure use of seeds that are conducive to the season and type of soil present should be used to vegetate any bare areas.
- Mulching (using hay or erosion control blankets, for example) also aids in seed germination and helps prevent or minimise sheet, rill and gully erosion.

#### **7.2.4 Health and Safety Measures of OSHA for Construction workers**

Tender/contract documents will include Occupational Health and Safety requirements. The contractors will be required to prepare a Health and Safety Plan / Procedure for the construction works and to ensure its implementation.

The contractors will also ensure compliance of the project with the national Health policy, construction policy and Occupational Health and Safety Act (OSHA).

Health and Safety measures will be important for not only the construction work force but also the public. Key consideration for Health and Safety include:

- Responsibility for health and safety issues placed under appointed person or contractor;
- Personal protective equipment (PPE) should be provided and used on site as appropriate;
- Appropriate warning and control signs should be used;
- First aid facilities and competence should be readily available;
- Appropriate welfare facilities should be available at construction site; and
- Measures against work place accidents.

### **7.3 Physical Environment**

Mitigation measures for the physical environment are presented with regard to both general consideration as well as component specific aspects.

### **7.3.1 Liquid and solid waste**

#### *Construction phase:*

- Routine safety procedures should be developed for the handling, storage and disposal of construction material containing pollutants;
- Control of releases of liquid waste will be important where construction site are located near water supply structures; and
- Metals for example metal off-cuts should be collected and secured in waste bins before they are safely disposed of to prevent harm to human being.

### **7.3.2 Storm water**

To mitigate impacts of storm water, the design for run-off surface and drainage ditches for roads has observed and considered local conditions and fall/gradient of the sites.

### **7.3.3 Aesthetic and Tourism impacts**

Mitigation on aesthetic changes around the construction sites will be by replacement planting. This would involve the planting of suitable tree and vegetation species to act as a screen between any sensitive receptors and the new infrastructure.

### **7.3.4 Oil pollution and soil contamination**

To minimize the potential for environmental contamination, oil products used in vehicles and tracks should be stored in secure facilities with impermeable concrete floors and covering roofs. In addition, waste/leakage oil should be contained in oil separators in the camps or workshops. The use of tested and approved materials for farm tanks, well-maintained tanks and the application of good environmental practices can reduce contamination of oils to soils.

## **7.4 Biological Environment**

### **Tree cutting**

The developer is committed to avoid using trees for supporting higher walls, window and doors. Instead developer intends to use Metal and Aluminum frames for these activities.. Other general mitigation measures are:

- Careful design to minimize environmental disturbance;
- During the detailed planning stages, an assessment will be made as to the exact positioning of construction areas to reduce the impact on planted trees; and
- Need for a restoration plan with regard to vegetation following completion of works.

## **7.5 Human Environment**

### **7.5.1 Employment**

The developer is advised to open a recruiting office for job seekers away from the site to minimise influx of job seekers.

In order to counter the worry over job restriction to local people, the developer is bound to implement measures that will safeguard local employment.

### **7.5.2 Noise and Dust pollution**

Noise and air pollution impacts are predicted around the project area. They are in general short-lived with temporary impacts that are associated with the construction works. As such, mitigation measures relate primarily to construction procedures.

Consultation with affected communities is an initial mitigation measure, which is important to ensure that those likely to be affected by the works are aware of what the works will entail, the duration and likely impacts on them.

Control of construction site represents the best potential means to mitigate noise and air pollution. Measures will be detailed as part of the construction procedures which will be drafted during the design stage. Typical measures to control noise and air pollution may include:

- Sensitive location of noise sources / machinery;
- Working day in accordance with legal requirements, night working avoided where possible;
- Limiting working day for noisy activities;
- Screening of activities by iron fencing
- Liaison with local community for suitable timings of noisy activities (noisy excavation);
- Observe noise limits during procurement and installation of equipment. Use standard levels from OSHA or Tanzania Bureau of Standards (TBS);
- Covering of stockpiled soil/aggregates during the dry season;
- Spraying of access road and construction site with water;
- Putting in place all important infrastructures and supporting materials to avoid unnecessary accidents and consequential injuries and fatalities; and
- Use of high efficiency vehicles for transportation of raw materials and products and measures against dust pollution and accidents prevention.
- Turning off vehicles, machines and other engines when not working

The client is committed to maintain noise emission to the level accepted in the country as shown in table 7 below

**Table 8: Permissible noise levels in Tanzania**

Noise level (Leq dBA)	Duration in minutes/ hours per day	Duration in minutes/ hours per week
85	8 hrs	40 hrs
88	4 hrs	20 hrs
91	2 hrs	10 hrs
94	1 hr	5 hrs
97	30 min	2.5 hrs
100	15 min	1.25 hrs
103	7.5 min	37.5 min
106	3.75 min	18.75 min
109	1.87 min	9.37 min

### 7.5.3 Fire risks

To counter fire risks during operational phase, the developer is obliged to undertake the necessary precautionary measures. The potential for safety related accidents may occur at worksites. It is possible electrical equipment and human errors such as smoking may results into accidents during construction phase. Workable measures against fire can be summarized below as follows;

- Installation of fire extinguishers on sites;
- Have emergency plans on site; and
- Installation of warning signs against smoking at sensitive areas.
- Installation of automatic fire detection alarms

#### **7.5.4 Human safety**

Compliance with occupational health and safety (OSHA of 2003) regulations to improve the effectiveness of the safety management system, and/or raise the level of health and safety awareness amongst staff and contractors as well as stakeholders

#### **7.5.5 Traffic disruption and accidents**

The contractor and developer should implement adequate measures against traffic accidents. In particular, the developer is obliged to employ temporary traffic management as recommended in the tender/construction contract documents to be prepared as part of the project designs.

Speed bumps/ Signboards written in local languages will be necessary in controlling the speed of vehicles especially close to site. To make this measure a success, the developer will create liaison with local authority and Traffic Police. Additionally, awareness creation about possible accidents is important to both drivers and project workers. Use of signboards, periodic checking and maintenance of project vehicles and equipment is necessary.

The tender/construction contract documents will also include requirements for safety of worksite personnel as established in the Occupational Health and Safety Act No. 5 of 2003 and Standard Specifications for Road Works (2000), Section 1237 as well as safety for road users. The contractors will also have to prepare plans for emergency procedures in case of accidents. Measures to avoid disruption of vehicle movement along Port road during construction should be instituted.

#### **7.5.6 Disruption of water utility services, power and oil supply pipes**

There is a need to observe the following;

- Proper design to safeguard utilities of TANESCO, TTCL, gas supply pipes and other utilities; and
- Sharing of design information.

#### **7.5.7 Diseases and Health hazard**

There is need to put in place **measures** that will ensure promotion of education and awareness campaign against HIV/AIDS and STDs among workers. The education and awareness creation campaigns should also target workers and community in the project area and those competing for work. There is a need for contractor to collaborate with the client to formulate messages against STDs and HIV. These messages should be in a language familiar to the local community. It is essential that septic and soak pits at site are disinfected before demolition. The contractor is obliged to provide zero accommodation at site. However where necessary, the contractor is obliged to provide temporary safe pit latrine at site for workers during construction phase.

#### **7.5.8 Solid and liquid waste management**

The contractor is required to comply with work place and environmental safeguards including proper disposal of medical waste such as solid and liquid waste. All these should be handled properly through segregation and the point of generation through to disposal point at the disposal site (incinerators and waste stabilization ponds). The service and maintenance of equipment and machines should take place away from project site to avoid oil spillage to natural waterways. Additionally, measures to recover solid materials (glass, metal) should be implemented if necessary.

The design works should ensure that the appropriate structures for safe disposal of solid and liquid waste are from the laboratory is well linked with the central system (e.g. sewerage) for effective operation. This will include systems for pits and incinerators for solid waste. Also, waste water pipes and sign boards to warn people against haphazard waste disposal. During operation phase, these facilities should be given regular maintenance services.

### **7.5.9 Pretreatment of hazardous liquids during operation phase**

The basic principle of effective wastewater management is a strict limit on the discharge of hazardous liquids to sewers. Chemical waste, especially photochemicals, aldehydes (formaldehyde and glutaraldehyde), colorants and pharmaceuticals, should not be discharged into wastewater but should be collected separately and treated as a chemical health-care waste. Pretreatment is recommended for wastewater streams from the laboratory. This pretreatment could include acid–base neutralization, filtering to remove sediments, or autoclaving samples from highly infectious patients. Non-hazardous chemicals such as syrups, vitamins or eye drops can be discharged to the sewer without pretreatment. For kitchen waste, a grease trap can be installed to remove grease, oil and other floating materials from kitchen wastewater. The trap and collected grease should be removed every 2–4 weeks.

Collected body fluids, small quantities of blood and rinsing liquids from theatres and intensive care can be discharged in the sewer without pretreatment. Precautions against blood spatter should always be taken (e.g. wearing personal protective equipment [PPE] and following standardized handling procedures), and care should be taken to avoid blood coagulation that could block pipes. Larger quantities of blood may be discharged if a risk assessment shows that the likely organic loading in the wastewater does not require pretreatment. Otherwise, blood should be first disinfected, preferably by a thermal method, or disposed of as pathological waste. Blood can also be disposed of directly to a septic tank system if safety measures are followed.

It is important to note that 5% sodium hypochlorite (NaOCl – bleach) is not effective for disinfecting liquids with a high organic content such as blood and stools. Sodium hypochlorite should never be mixed with detergents or used for disinfecting ammonia-containing liquids, because it might form toxic gases. Lime milk (calcium oxide) can be used to destroy microorganisms in liquid wastes with high organic content requiring disinfection (e.g. stool or vomit during a cholera outbreak). In these cases, faeces and vomit should be mixed with the lime milk in a ratio of 1:2, with a minimum contact time of six hours. Urine can be mixed 1:1, with a minimum contact time of two hours (Robert Koch Institute, 2003).

Wastewater from the dental department should be pretreated by installing an amalgam separator in sinks, particularly those next to patient treatment chairs. Mercury waste must be safely stored using general guidelines for safe storage (e.g. UNDP, 2010).

Radioactive wastewater from radiotherapy (e.g. urine of patients undergoing thyroid treatment) should be collected separately and stored in a secured place until the levels of radioactivity have decreased to background concentrations. After the required storage time, the wastewater can be disposed of into a sewer.

### **7.5.10 Social disruption and Conflicts**

There is a need to prepare the community well in advance so that they are not caught unaware about project effects. Awareness creation about the incoming changes will reduce the impact. The developer is obliged to collaborate with local leadership and relevant sectors to work against the following;

- Influx of job seekers during construction phase;
- Reckless drivers taking short cuts and posing accident risks and disrupting traffic movement; and

- There is a need for sensitization and education to the local community and project incoming workforce to help them understand the dangers of creating social conflicts around the project site.

## **7.6 Summary from Public consultation**

### **7.6.1 Community Participation and Consultation**

Dissemination of project information among villagers from villages surrounding the hospital, hospital villager leaders, ward leaders staff and users of the hospital, Masasi district officials and, and communities in the neighboring regions (Mtwara, Lindi and Ruvuma), stakeholders in Dar es Salaam and from neighboring countries such as Mozambique has been an important aspect of the public participation process. Local communities have been adequately informed about the proposed project and that they are free to register their concerns with the office of developer (the hospital management). In particular, most local leaders are now aware of the proposed projects and public disclosure notice have been put in key notice board and posted to local offices.

The consultant consulted the project stakeholders including groups, individuals' residence and executives of the Masasi Council.. The outcomes from the consultative process are summarized below:

### **7.6.2 Stakeholders' Project Appreciation**

Stakeholders acknowledged that the proposed project will create significant social the benefits;

- The project will improve healthcare services and welfare of community members through access to enhanced health care and treatment services provided by modern laboratory facilities and equipment as well as qualified personell
- The project will reduce the rate of spread of new infectious/communicable disease due to early diagnosis
- The project will reduce finance and time costs for patients to travel to other advanced hospital such as Muhimbili in Dar es Salaam to have test done
- Overall the project is looked as a positive development in the area.

## **7.7 Mitigation Measures for Negative Impacts**

This section presents a summary of mitigation measures basing on stakeholders input, expert analysis, experience with similar and or related projects and best practice. The proposed mitigation measures on each anticipated problems are presented in matrix form below.



**Table 9: Summary of Mitigation measures**

Topic	Predicted Impacts	Impact phases	Mitigation Measures
PHYSICAL Environment			
Modification of landscape	Alteration of physical environment	Construction	Limit construction works to the design.
BIOLOGICAL ENVIRONMENT			
Tree cutting and Aesthetics	Clearance of natural vegetation, Trees and ornamental plants to pave way to the construction works.	Construction	Minimize tree cutting. Replant after construction using suitable tree species. Include tree replacement in project design.
HUMAN ENVIRONMENT			
Employment	The project will create temporary and permanent employment.	Construction & Operation	Encourage local employment.
Noise pollution	Construction works will disturb neighbours/ public by creation of noise.	Construction	Observe ambient sound levels and attenuate equipment. Observe noise limits during procurement of equipment
Air pollution by dust and odour	Transportation of sand and aggregates to working sites. Road works (clearing, excavation). Creation of nuisance odour from solid waste collection centers.	Construction  Operation	Watering and covering of earth materials Create buffer zone to keep residence away from new landfill area. Immediate treatment of waste at landfill by burning or covering by soil/sand.
Contamination of water supply and spread of communicable diseases	Transportation waste by trucks may contaminate water or human environment.	Operation	Daily inspection of sewerage trucks. Consult MTUWASA about sewerage and water supply systems. Severance of water pipes

Topic	Predicted Impacts	Impact phases	Mitigation Measures
Diseases or HIV/AIDS	Risk for spreading of communicable diseases such as HIV/AIDS between workers and host community	Construction	Awareness creation
Accidents and disruption of traffic and pedestrian movement	Interruption of traffic and pedestrian movement by project activities. Children/elderly people crossing roads to access recreational parks. Reckless driving on tarmac roads	Construction &  Operation	Use of sign/warning posters at project sites against traffic accidents  Construction of humps/road bumps to slow down speeding vehicles.
Safety to workers and road users.	General construction works. Possible burning accidents by hot asphalt.  Accidents related to running of solid waste equipment	Construction  & Operation	Adhere to OSHA* and contractors regulations. Practice safety and Health measures/policy. Regular maintenance of equipment and use of Instruction manuals. Hoarding of working sites.
People with disabilities	Lack of easy access facilities use of the laboratory		Ensure building designs provides needs of people with disabilities such as easy access point to the lab using wheel chairs (including upstairs rooms) as well as provision of special washrooms and ramps at the access points. This also includes provision of the most direct entry from main gates.
Solid waste	Haphazard disposal of solid waste such as plastics and metal objects may contaminate water supplies and affect human/animal life if ingested.	Construction Operation	Proper handling of waste by installation of facilities for solid. Fencing of dumpsite and incinerator to prevent unauthorized people from accessing the sites

OSHA\* = Occupational Health and Safety Authority.

The population of Masasi district and whole Mtwara region together with neighboring regions will benefit economically and socially from the proposed project in the following ways:

- Creation of temporary employment during construction;
- Increased income for local community, especially those supplying raw materials such as sand, gravels and other materials.
- Reduced queue and waiting time for lab test results due to enhanced lab testing using modern and advanced machines;

**Table 10: Proposed Mitigation Measures in social perspective and show of responsibility**

S/No	Negative Impacts	Mitigation measures	Responsible
	Increased road accidents to people and livestock	To prevent speeding and accidents, road signs showing speed limits should be put in appropriate places. Roads should be user friendly for the disabled. There should be road signs, service roads and bus stops. Bumps should be installed especially near schools and other congested areas such as bus stops. Bumps and zebra crossings should be clearly demarcated.	Designing Consultant/ Supervising Engineer
	Lack of facilities for people with disabilities or special needs	Ensure Building designs takes into consideration the needs of people with disabilities and or special needs as provision of access point for wheel chairs (including upstairs rooms) as well as provision of special washrooms and ramps at the access points. This also includes provision of the most direct entry from main gates.	Designing Consultant/ Supervising Engineer
	Spread of STI including HIV/AIDS	Prevention of the spread of contagious diseases like HIV/AIDS requires educational programs to raise the community awareness, counseling and HIV/testing centers. Another technique for combating the spread of the disease is through the use of existing voluntary testing centers (VTCs) at St. Benedict's hospita. The VTCs will be useful for those who are ready for voluntary testing to establish their health status. The centers will likewise provide counseling services both for people who are already infected and for those who are healthy. Such counseling is functional since it provides knowledge on how to combat the problem.	Municipal Health Officer and Contractor
	Air pollution and noise from operating machines	Working hours should be minimized around human settlements, especially on weekends and public holidays. Work sites should be watered frequently to minimize dust pollution	Contractor
	Deforestation and pressure on natural vegetation	Limit hap hazard tree cutting and encourage use of iron and Aluminum materials during construction.	Regional authority Municipal council

The effect of mitigation measures are presented in the Table 10 below:

**Table 11: Summary of mitigation measures- during the construction phase**

Impact	Nature	Significance rating	
		Without mitigation	With mitigation
Lack of facilities for disabled	Negative	High	low
Cutting of trees	Negative	Medium	Low
Loss of crops	Negative	Medium	Low
Employment opportunities	Positive	Low	High
Impacts of noise and dust	Negative	Medium	Low
Impacts on HIV/AIDS spread	Negative	High	Low
Impacts on road traffic/accidents	Negative	High	Low
Land loss	Negative	High	Low
Impacts on human safety	Negative	High	Low
Impacts of water supply	Negative	High	None
Impacts of electric power supply	Negative	High	None
Surface runoff and flooding effect	Negative	High	Low
Loss of habitats/housing	Negative	High	Low

# 8. Environnemental & Social Management Plan (ESMP)

## 8.1 Background

Environmental and Social Management Plan (ESMP) is widely applicable management tool in development projects. The ESMP is one of important components of Environmental Impact Assessment (EIA) in Tanzania according to EIA and Audit regulation of 2005. It is also an essential requirement for environmental safeguards according to World Bank Policy as supported under Operation Principle (OP) No. 4.01

Primarily, ESMP is required to address the details measures to be taken during the implementation and operation of a project to eradicate or reduce significant environmental and social impacts, or to minimise them to acceptable levels. Second, it shows the necessary and practical actions required to implement the mitigation measures in the Environmental Statement. EMP serves to ensure environmental and social (safety, health) impacts are managed throughout the construction and operation phases.

The **main objectives** of the ESMP for Ndanda hospital project is to identify the possible environmental impacts of the proposed sub-projects and develop measures to minimise mitigate and manage the predicted impacts. Whilst considering the construction and operation phases of the project, the ESMP consists principally of the following:

- Mitigation measures,
- Monitoring measures and
- Institutional measures.
- Costs

The ESMP for Ndanda hospital [roject is presented as part of ESIA process. It provides a strategic framework for implementation of mitigation measures during project operations. A revised EMP has to be prepared by developer at the commencement of the project. The plan will be reviewed from time to time to ensure it is continuously appropriate. However, it will need to address a series of key points as noted in the subsequent sections. As the project designs are not completed and consequently approved yet, the contents and issues raised in ESMP are more of a generic and based on baseline study and concerns expressed by stakeholders. The ESMP will be reviewed and detailed based on final project designs, decisions and availability of resources.

## **8.2 ESMP activities**

### **8.2.1 General Mitigation activities**

The EMP activities are based on the proposed mitigation measures and should be managed in a way to reduce the impacts on the surrounding environment and communities. This includes the following management /mitigation activities:

- Measures to avoid pollution of soil and water resource by leachate from waste stabilization pond as well as dump site management;
- Pollution of underground soils and water by hydrocarbons (construction and waste water );
- Reduce traffic obstructions;
- Management of effluent at camps during construction;
- Measures to avert dust and noise pollution;
- Measure against traffic/children accidents within hospital premises
- Safeguard local employment especially for youth and women;
- Measures to safe guard workers general health and safety at work places;
- Solid waste management plan including written procedure and record of disposal; and
- Tree planting and restoration of disturbed landscapes.

Notably, important mitigation measures were undertaken during project planning/designing as this can ensure that many impacts are avoided as part of the design and subsequently procurement/engagement of the contractor/equipment, installation safety measures at recreational parks and damp sites. For example, Preferences will be to equipment with low noise and vibrations.

### **8.2.2 Air pollution by Dust**

The developer will ensure contractors implement measures to control or minimize dust and noise pollution. The developer in collaboration with the contractor should monitor workers against dust effects such as increase of bronchitis diseases.

The contractor should be required by the developer to abide with Department of Works/ OSHA / Contractors regulation which addresses how to deal with dust pollution at work place.

The developer in conjunction with contractors is obliged to undertake adequate measures to minimize dust pollution. Workable measures include the following:

- Control dust at project site by checking vehicle speed and covering and irrigation of potential dust sources;
- Inspection of workers health in regard to dust impacts/air borne diseases;
- Inspection of PPE in relation to prevention of respiratory diseases;

- Training of managers and workers on dust management; and
- Awareness raising amongst workers and local community against effects dust pollution and protection measures.

### **8.2.3 Leachate and hydrocarbons control and management**

It is important that developer takes responsibilities for mitigation measures to reduce the potential for contamination of soils and water system during construction and operation. It is preferable that such measures are implemented in the entire construction and operation phases. The design for the landfill will include Leachate treatment system.

Key mitigation to be implemented will include, but not be limited to, the following:

- Leachate/ contamination of underground soils and water at damp site
- Oil and fuel leaks from construction equipment
- Proper oil disposal at contractors' workshop
- Periodic assessment/monitoring of effluent and pollution for water and soil.
- Organize visit by team of experts from NEMC, health officers and Inspectors from Department of works, NGO representatives for monitoring of effluent and hydrocarbon pollution.

### **8.2.4 Health and Safety Measures**

Health and safety measures for workers will be improved by Ndanda hospital-the developer. Measures to ensure the contractors provide personal protective equipment (PPE) to workers, good sanitary conditions at site and appropriate and safe waste disposal are the focuses of the health and safety measures to be improved further. The hospital will collaborate with Department of Works/OSHA to ensure the contractors obtain compliance licence which addresses how to deal health, safety and welfare of workers at workplaces. However, some of the provisions of this Act that are relevant to the project could be further improved. Essentially, the provision of PPE to workers and enforcement of safety are crucial safety measures.

The developer is obliged

### **8.2.5 Traffic Disruption (Construction phase)**

The developer is obliged to ensure minimum or non-occurrence of traffic disruption during construction of roads. Temporary traffic management measures will be put in place during construction works for safety of site workers and other road users. The developer will collaborate with Traffic Police Department to prepare plan for temporary road diversion and alternative access roads.

### **8.2.6 Facilities for People with Disabilities**

to ensure that building designs takes into consideration the needs of people with disabilities and or special needs as provision of access point for wheel chairs (including upstairs rooms) as well as provision of special washrooms and ramps at the access points. This also includes provision of the most direct entry from main gates.

### **8.2.7 Summary of Environmental and Social Management Plan (ESMP)**

The Environmental Management Plan (**Table 11 below**) provides way forward for implementation of the identified mitigation measures. The St Benedict's Fathers shall be responsible for overall implementation of the EMP. The Contractor shall implement components relevant to mobilization and construction and Environmental Control Officer shall be designated to make day to day follow ups (e.g. supervision and liaising with stakeholders). The Environmental Officer will also ensure that all employees at the project site have their environmental responsibilities and accountabilities clearly outlined. Specific accountabilities and responsibilities outlined in the specific ESMP will be communicated to responsible staffs. The estimated costs for implementing the mitigation measures are just indicative. Appropriate bills of quantities should clearly give the actual figures. In any case the consultant used informed judgement to come up with these figures.



**Table 12 Environmental and Social Management Plan**

Phase	Potential Direct Impacts	Management Measure	Target Level/ Standard/ indicators	Responsibility	Estimated costs /Period-TZS
DESIGN PHASE	Lack of facilities for people with disabilities/special needs	Ensure that building designs takes into consideration of the needs of people with disabilities including access point for wheel chairs (including upstairs rooms) as well as provision of special washrooms and ramps at the access points. This also includes provision of the most direct entry from main gates.	Access by people with disabilities	Developer	2,000,000.00
SITE SELECTION	Impacts on current vegetation cover and loss of biodiversity due clearance and levelling of the site	<ul style="list-style-type: none"> <li>▪ Clearance will be strictly limited to the defined project area, mainly for construction</li> <li>▪ Construction workers to use existing access road to avoid soil disturbance</li> <li>▪ Workers will be sensitized to avoid clearance of vegetation unless they are authorized by the project contractor.</li> </ul>	As minimum visual impact as possible	Developer	50,000.00
	Noise pollution from machinery and vehicles	<ul style="list-style-type: none"> <li>▪ Noise levels along the perimeters of the project area shall be monitored and recorded to insure that activities at the site are not exceeding standards.</li> <li>▪ Ensure workers were provided with ear muffins/masks during construction.</li> <li>▪ Assess dust effects by monitoring respiratory disease.</li> <li>▪ Servicing of SWC equipment/ trucks.</li> <li>▪ Timing of noisy activities (i.e. work will be carried out during the day.</li> <li>▪ Vehicles and equipments will be maintained and serviced as required to ensure they do not generate excessive noise.</li> <li>▪ Awareness raising among operators.</li> <li>▪ Inspection of PPE and enforcement of their usage</li> </ul>	Operation from 7am to 7pm weekdays/ below 70 dBA to the nearby receptors (URT, 2011) -Record of respiratory infections - Record public complains - Maintenance frequency for damp bulldozers.	Developer/ Contractor	700,000.00 during construction

MOBILIZATION/ CONSTRUCTION	Air pollution due to dust and gases emission	<input type="checkbox"/> Stockpiles of soil and vegetative debris generated during site clearing activities shall be monitored and maintained to eliminate generation of fugitive dust. <input type="checkbox"/> These materials will be kept at designated area that will be secured and material covered with water proof nylon material. <input type="checkbox"/> Equipment and vehicles shall be properly maintained in a fully serviceable condition to further minimize gases pollution.	Dust Not to exceed 250mg/Nm <sup>3</sup> (24h mean value) at site and along routes (URT, 2009) GHG - as minimum as possible	Developer/ Contractor/ or	400,000.00 during construction
	Increased accidents due to increased traffic	<input type="checkbox"/> Provision of road/warning/safety signs <input type="checkbox"/> Awareness to drivers and <input type="checkbox"/> Maintaining speed limits for main roads and on constructed access roads.	Low risk to workers Zero exposure/In place PPEs	Developer/ Contractor/N EM C/	300,000.00 during construction
	Haphazard disposal of construction Solid wastes and food remains	<input type="checkbox"/> Difficult to dispose wastes will be minimized and where practicable avoided such as plastic wastes <input type="checkbox"/> Encourage construction worker to use existing waste bins around the hospital. <input type="checkbox"/> Biodegradable wastes will be buried in pit on existing pit at the hospital <input type="checkbox"/> Non- biodegradable wastes will be sorted, collected, accumulated and then sent for recycling or re-use.	Zero littering	Developer/ Contractor/N EM C/hospital management	300,000.00 during construction
	Sanitary Risk	<input type="checkbox"/> Proper use of existing sanitary facilities at the hospital	Zero risk	Developer/ Contractor/N EM C/hospital management	2,000,000 during construction

	Occupational accidents at the work place	<ul style="list-style-type: none"> <li><input type="checkbox"/> machines to be properly maintained,</li> <li><input type="checkbox"/> cutting edges to be protected or guarded,</li> <li><input type="checkbox"/> Awareness to people including workers of the dangers and understand how to protect themselves and others.</li> <li><input type="checkbox"/> Supervisors to ensure that safety measures are in place and are enforced</li> <li><input type="checkbox"/> Also the contractor shall provide adequate training to construction workers on the health impacts of the construction</li> <li><input type="checkbox"/> Shall provide protective gear to construction workers.</li> <li><input type="checkbox"/> Approved working hours shall be observed in order to avoid careless mishandling due to fatigue.</li> </ul>	Low risk to workers Zero exposure/In place PPEs	Developer/ Contractor	500,000.00 during construction
	Borrow pits and Quarry sites	<ul style="list-style-type: none"> <li>• Rehabilitation of abandoned roads through reshaping, re-contouring, and resurfacing with topsoil and seeding for vegetative growth.</li> <li>• Removal of structures such as bridges, culverts, cattle guards and signs. ,</li> <li>• The regarding of sand stockpiles should be removed from property boundaries to eliminate the potential for offsite discharge from storm water flow.</li> <li>• Practice good soil conservation and seed bare ground during the post-mining phase to aid in minimising and/or reducing the potential for storm water to wash sediment loads from un-vegetated areas into nearby waterways leading to silt or gully</li> </ul>	Restored to natural environmental condition	Contractor/Developer	1,000,000.00
	Increased solid waste due to increased lab testing activities	<ul style="list-style-type: none"> <li>▪ Proper handling (e.g. segregation) of solid wastes</li> <li>▪ Ensure incinerator is working properly and all relevant solid waste including lab tissues and needles are incinerated accordingly</li> <li>▪ Ensure biodegradable wastes is collected regularly and put in</li> </ul>	Maintained natural environmental condition	Developer	500,000.00 per annum

OPERATION	Increased effluents from increased laboratory activities and well as other hospital department	<ul style="list-style-type: none"> <li>• Ensure new sewage is connected to the central sewerage system</li> <li>• Ensure hazardous liquids are pre-treated before release into the central sewerage systems (acid-base neutralization).</li> <li>• Ensure stabilization ponds are working optimally.</li> <li>• Ensure expired chemicals such as mercury are not released into the sewer system but stored in special facilities</li> </ul>	BOD/ COD do not exceed approved thresholds	Developer / Masasi Sewerage authority	1,500,000
SOCIAL ECONOMIC	Other Positive impacts of the project (Improve the welfare, health and wealth of local communities due to improved access to healthcare services)	<ul style="list-style-type: none"> <li>▪ Reduced healthcare cost, especially for diagnosis and testing</li> <li>▪ Reduced queuing time and associate opportunity cost for production</li> <li>▪ More (i.e. increased turn around time)</li> <li>▪ Healthier society with ability to participate actively in socio-economic activities</li> </ul>	As many connections as possible	Developer	As will be determined
	Employment Opportunity	<ul style="list-style-type: none"> <li><input type="checkbox"/> Optimize local employment.</li> <li><input type="checkbox"/> Ensure monitoring of labour standards among subcontractors and workers</li> <li><input type="checkbox"/> Management of local expectations</li> </ul>	As many local employees as possible	Developer	As will be determined
	Increased spread of HIV/AIDs and STDs	<ul style="list-style-type: none"> <li><input type="checkbox"/> Construction Workers will be sensitized on the issue of HIV/AIDs and STDs and on the usage of appropriate tools like condoms etc.</li> <li><input type="checkbox"/> HIV/AIDs testing will be conducted and counselling services will be done using existing VCT at Ndanda hospital</li> </ul>	Zero/minimal spread of HIV/AIDs & STDs	Developer/ Contractor	100,000.00 during construction
	Loss of aesthetics due to haphazard disposal of demolished waste/abandoned structures	<ul style="list-style-type: none"> <li><input type="checkbox"/> All materials remains after project implementation will be taken back to warehouse for future use.</li> <li><input type="checkbox"/> Unusable materials remains shall be taken to the approved District dumping site.</li> <li><input type="checkbox"/> The site will be rehabilitated to its original state.</li> </ul>	No solid waste accumulation on site is allowed	Developer/NEMC/ Hospital management	1,000,000.00 during decommissioning

DECOMMISSIONING	Loss of healthcare services	<input type="checkbox"/> No mitigation/ inevitable impact <input type="checkbox"/> Ensure advance notices to the public about cessation of services (at least a 3 months notice) <input type="checkbox"/> Ensure local community members are informed about other places where they can obtain healthcare services	No chemicals left or disposed of randomly on the environment	Developer	As will be determined
	Unused chemicals	All unused chemicals to be disposed of using applicable disposal standards (e.g. Secure relevant approvals from NEMC before disposal)		Developer	As will be determined

# 9. Environmental and Social Monitoring Plan

Based on the environmental and social impacts identified, the Environmental Management Plan (EMP) describes technical details of each mitigation measure, together with designs, equipment descriptions and operating procedures as appropriate. The EMP includes monitoring objectives that specify the type of monitoring activities that will be linked to the mitigation measures. Specifically, the monitoring section of the EMP provides:

- A specific description and technical details of monitoring measures that include the parameters to be measured, the methods to be used, sampling locations, frequency of measurements, detection limits (where appropriate), and definition of thresholds that will signal the need for corrective actions, e.g. the need for onsite construction supervision.
- Monitoring and reporting procedures to ensure early detection of conditions that necessitate particular mitigation measures and to furnish information on the progress and results of mitigation, e.g. by annual audits and surveys to monitor overall effectiveness of the EMP.

The EMP also provides a specific description of institutional arrangements, i.e. who is responsible for carrying out the mitigating and monitoring measures. Additionally, the EMP includes an estimate of the costs of the measures and activities recommended so that the project proponent can budget the necessary funds. **Table 13** below summarizes key environmental and social monitoring issues of the proposed project.

**Table 13: Environmental and Social Monitoring Plan (ESMP**

Phase	Potential Direct Impacts	Parameter to be Monitored	Monitoring Frequency	Monitoring Area	Measurement Unit	Target Level /Standard	Responsibility	Estimated Costs [Tsh]
SITE SELECTION	Soil disturbance and clearance of vegetation during leveling of the site	Vegetation cover/trees/grasses	After clearance	Construction site	M <sup>2</sup> , species/number of mature trees	As minimum as possible	Proponent	500,000
Mobilization / Construction Phase	Noise pollution	Noise level/PPEs	Once per Month	Project area	dB/visual	TNS, WHO, (Available PPEs for workers)	Proponent,, Contractor	1,500,000
	Air pollution from dust emission	Dust/particulate matters in the air	Once per Month	Project area,	ppm,	TNS, WHO	Proponent,, Contractor	1,500,000
	Air pollution from gas emissions	SO <sub>2</sub> , NO <sub>x</sub>	Once per Month	Project area, Exhaust	ppm, mg/m <sup>3</sup> ,	TNS, WHO	Proponent,, Contractor	1,000,000
	Increased erosion and potential landslide	Exposed surface/exposed spoils/gullies & lilies, blind vertical angles on slopes	Once per Month	Project area, access route	M <sup>2</sup> , visual	As minimum as possible	Proponent,, Contractor	1,000,000
	Traffic accidents	Accident records, Safety/warning signs on roads/awareness training to drivers	Once per Month	Project area, access route	Number of accidents, visual, training records	Zero accidents	Proponent,, Contractor	2,000,000
	haphazard disposal of construction solid waste and food remains	haphazard disposal of waste / wastes bins	Once per month	Project surrounding area	Visual,	No haphazard disposal of solid waste	Proponent,, Contractor	1,000,000

	Sanitary Risk	BOD levels	Once per month	100 meters downstream of the river	Mg/l	WHO/TNS	Proponent,, Contractor	1,000,000
	Occupational accidents at the work place	Availability of PPE, Measures to reduce risk/risk exposure	Once per month	Construction site	NA	All workers use protective gears	Proponent,, Contractor OSHA	2,000,000
	Increased effluents	BOD/COD levels	Once per month	Waste Stabilization ponds	Smell,	As minimum as possible	Proponent,, Contractor	2,000,000
	Increased solid wastes	Kgs	Every day	Incinerator and dump pit	Visual	0 kg	Proponent, Contractors	1,000,000
	Borrow Pits/Quarry sites	Pits/sites	Soon after construction is completed	Pits/quarry sites sites		Zero pits left	Proponent	1,000,000
SOCIAL ECONOMIC	Employment opportunity	Number of villagers employed	Once every six month	Project area	Number	As many as possible	Proponent,	1,500,000
	Other positive impacts of the power	Number of patient treated every year	Every year	Number persons tested and treated	Number	As many connections as possible	Proponent,	4,000,000
	Increased cases of STDs, HIV/AIDS	Number of HIV cases	Once every six months	Confidential file, Health centres or hospitals	Number of HIV/AIDS cases	As low as possible	Proponent, SDC	2,000,000
DECOMMISSIONING	Loss of aesthetics due to haphazard disposal of demolished waste/abandoned structures	wastes	One month after decommissioning	Project area	Area coverage	Zero wastes	Proponent, NEMC, OSHA	5,000,000



	Loss of healthcare services	-	-	-	-	-	-	-
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# 10. Cost Benefit Analysis

## 10.1 Financial Cost Benefit analysis to the Client

Cost benefit analysis is normally done in the framework of feasibility study. The aim of cost-benefit analysis is to inform decisions on:

- the costs of alternative ways of delivering a service;
- estimates of the size of a project; and/or
- whether a project should be undertaken

The costs may include:

- capital expenditures;
- operating and maintenance costs;
- staff costs;
- materials;
- research and development;
- opportunity costs; and
- Environmental health and other social costs.

Benefits may include:

- better, more cost-effective service delivery;
- the avoided costs-being the costs of the existing or conventional service delivery option;
- additional revenues generated;
- productivity savings; and
- Environmental, health and other social benefits.

Before the project is approved by the proponent it has to pass the net present value test. The costs and benefits were used to calculate the value of the project in light of social value in terms of the importance of the service to the public. According to the proponent, the net present value of this project is positive with a promising payback period. The conclusion from the developer indicates that the project is economically viable.

## 10.2 Quantifiable and Non quantifiable Benefits to the Developer

The St Benedict's hospital will be benefited directly from the proposed project as currently there is a need for a quick solution for better and advanced diagnostic and testing outbreak and communicable diseases in the region. Also there hospital has recently been upgraded to a referral hospital meaning that there will be increased demand for better diagnosis and testing. The project will also serve developers money that would otherwise be spent to send specimen to Dar es Salaam and other places for testing.

## 10.3 Quantifiable and Non quantifiable Benefits to the Community

The availability of better healthcare services in the area will have multiplier effect to the communities to in Mtwara region and beyond. It will improve significantly the health and wellbeing therefore serve as catalyst toward increased productivity and social well-being. It

will serve costs of having to travel to Dar es Salaam and overseas in search for better testing and diagnostic services. This in addition will serve so many lives that would otherwise be lost during transition. Thus, the benefits to the community resulting from the project cannot be overstated in the area.

#### **10.4 Quantifiable and Non quantifiable Benefits to the Government**

Improved healthcare services at Ndanda hospital will help the government to strengthen ties with neighbouring countries such as Mozambique that will seek medical services from this facility. Improved testing and diagnostic services at Ndanda hospital also provides the government with a strategic alternative which could serve the country in handling a large number of complex cases should current incidences of cross-border outbreaks continue.

#### **10.5 Environmental Cost Benefit Analysis**

Environmental cost benefit analysis is assessed in terms of the negative versus positive analysis. Furthermore, the analysis is considering whether the impacts are mitigatable and the costs of mitigating the impacts are reasonable. The benefits that will be obtained as the result of implementation of management and monitoring plan includes improved air quality, health conditions of workers and the surrounding environment. As it has been mentioned in Chapter 6 and 7, the benefits of the project, in terms of financial and social benefit are substantial, the environmental impacts are mitigatable and the financial resources needed to mitigate the impacts are relatively small compared with the actual capital investment. This project shall have a significant impact on the socio-economic aspects of the area and the entire of Mtwara region.

# 11. PRELIMINARY DECOMMISSIONING PLAN

## 11.1 Aim of the Preliminary Plan

The preliminary plan serves to establish decommissioning as an important consideration from the inception of the project, during design and throughout the operation of the laboratory building. The plan has the following purposes:

- a) The primary purpose of the preliminary plan is to ensure that the project designers are cognizant of decommissioning during the initial design of the project. Thus, where design choices that would enhance decommissioning are available for types of materials and system components, and location of components, these choices shall be made.
- b) Another purpose of the preliminary plan is to identify the ultimate decommissioning options and final project status. These options would be evaluated and narrowed to the decommissioning method of choice as the end of project life is approached.
- c) The final purpose of the preliminary plan is to demonstrate to regulatory agencies that important aspects of decommissioning are considered as early as possible during the initial design of the project. The plan serves as the starting point to demonstrate that areas such as decommissioning methods, costs, schedules, and operating impact on decommissioning will be reviewed and refined throughout the operating life of the laboratory building.

## 11.2 Content of the Preliminary Plan

The preliminary plan provides a general description of decommissioning methods considered feasible for the laboratory building. The description is intended to demonstrate that the methods considered are practical and that they protect the health and safety of the public and decommissioning personnel.

Design personnel should study the proposed decommissioning methods and take steps to ensure that the design incorporates features that will facilitate decommissioning. Considerations include:

- a) An estimate of manpower, materials, and costs anticipated to support decommissioning.
- b) A description of the anticipated final disposition and status of the laboratory building, equipments, and site.
- c) A discussion demonstrating that adequate financing will be programmed for decommissioning.
- d) Identification of records that should be maintained during construction and operation which might facilitate decommissioning, including a set of "as built" drawings.

### **11.3 Project Decommissioning Methodology and Schedule**

The Benedict's Fathers of Ndanda shall fund and implement all aspects of Project decommissioning, including but not limited to, all engineering, environmental assessment, permitting, construction, and mitigation activities associated with the removal of the structures, in accordance with this plan and mitigation of Project removal impacts on site. The Benedict's Fathers of Ndanda shall monitor environmental impacts during and after Project removal to respond to defined events during the monitoring phase.

1. Decommissioning will involve, but not limited to the specified list, because some issues or problems may surface during subsequent monitoring and audits:
  - a. The laboratory building and its supporting systems (e.g. sewerage system) will continuously be rehabilitated and renovated. While doing that there will be solid and liquid wastes which shall be disposed of according to the EMP.
  - b. Moreover during decommissioning the facilities will be dismantled accordingly to suit the new activity while doing that the rubble will be disposed of according to the directions of the Ministry of Health and Social Welfare.
2. Laboratory staff will be terminated from their employments and to them the future will look blunt. Three things will be observed: their contributions to the Social Security Fund will be made monthly as required by law; a training programme will be made to continuously advance them into apt skills and professions; and the termination benefits including transport and disturbance allowances will be made.

On decommissioning the St. Benedict's Fathers of Ndanda will search for experts' opinions in order to convert the entire building premises into another or other uses. According to the current priorities the possible uses will be:-

- a) Converting it into another department of the hospital if, rest of the hospital is maintained or Using it as medical training unit for medical trainees.
- b) Turn into community resource center, if the whole hospital is closed down.

The restoration plan for the entire hospital area and premises will be made by St. Benedict's Fathers of Ndanda (with support of medical experts, Chemical engineers and environmentalists) and then forwarded to Ministry of health and Social Welfare and NEMC for approval.

Also the proponent shall obtain all permits required to undertake decommissioning of the Project. This basically will include permit from Ministry of Health and Social Welfare, TRA, NSSF, Masasi District Council, etc.

# 12. Summary and Conclusion

The ESIS report establishes the baseline condition of the site and assesses the impact of the proposed construction of the one storey laboratory building on area resources. Issues pertaining to the proposed project considered are as follows: physical presence of the laboratory building in relation to the existing environment; materials sourcing, transportation, and storage; choice of technologies and associated atmospheric emission issues; management of liquid discharges and solid wastes and socio-economic impacts of the proposed development. The likely positive and negative impacts of the proposed project are identified and quantified to the extent possible. The issues/ impacts have been assessed and described in some detail to gain an adequate understanding of possible environmental effects of the proposed project – from site selection to decommissioning in order to formulate mitigation measures in response to negative aspects which have emerged.

A number of mitigation measures are recommended against the adverse activities/impacts during the site selection, mobilization construction, operation and decommissioning phases of the project. Measures recommended during the construction phase include, control of noise pollutions from heavy equipment and vehicles through proper inspection, control of air pollution from construction works and movement of vehicles through proper inspection and maintenance to reduce exhaust emissions, control of adverse impacts from construction debris by proper handling and immediate removal, control of soil and water pollution through proper storage and handling of oil wastes and control of solid wastes through existing waste management systems and frequent collection for sanitary disposal. Quality of water will be monitored on a regular basis whereas noise will be measured periodically. Borrow pits and quarry sites will to the extent possible also be reinstated to natural environmental conditions by using appropriate measures.

While during the operation phase, more emphasis has been placed on serious management of medical wastes (i.e. liquid and solid waste), other are ecological impacts on the receiving environments such as noise and air pollution, and public health hazards from waste, all of which will be assured with periodic monitoring system. All precautions against accidents will also be undertaken as indicated in the previous plan. In addition, waste stabilization ponds will also be monitored for BOD, COB and other relevant parameters to ascertain effective functioning of the waste management system. Similarly, performance of the incinerator will also be monitored to ensure optimal performance. The dump pit where biodegradable wastes is collected should be secured/fenced for safety against unauthorized personnel.

In all phases health and safety will be carefully considered and controlled through continuous inspection to prevent disease and accidents, and workers will undergo an environmental and safety briefing on safety and emergency rescue procedures before development begins. In wards and other areas in the hospital premises will be provided with adequate sanitary facilities, garbage bins and signage for exist just in case of emergency.

The proposed mitigation measures are included in an Environmental and Social Management Plan (ESMP). The ESMP consists of the set of mitigation, monitoring, and institutional measures to be taken during site selection to decommissioning of the planned facility to eliminate, offset, or reduce adverse environmental and social impacts. The plan also includes the actions needed to implement these measures. Moreover, the ESIA outlines specific environmental management and monitoring plans and identifies any necessary reporting requirements and schedules.

Given the nature and location of the development, the conclusion is that the potential impacts associated with the proposed development of construction of one storey-laboratory building are of a nature and extent that can be reduced, limited and or eliminated by the application of appropriate mitigation measures. The proposed environmental management plan and environmental monitoring plan if implemented will safeguard the tranquillity of both the environment and communities.

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# APPENDICES

## APPENDIX 1: TERMS OF REFERENCE FOR CONDUCTING ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT STUDY FOR THE PROPOSED EAST AFRICA PUBLIC HEALTH LABORATORY NETWORKING PROJECT IN TANZANIA.

### 1.0 Background information

#### 1.1 Overview of the East Africa Public Health Laboratory Networking Project (EAPHLN)

The East Africa Public Health Laboratory Networking Project is a combined initiative of the Government of Tanzania, Rwanda, Uganda, Kenya and World Bank in support of efficient laboratory networking. They have jointly mobilized resources to revamp public health laboratory services delivery. The Project will deliver rehabilitated public health laboratories provided with critical equipment, improved technical and managerial skills for laboratory workers and strengthened institutional governance. Construction works will be done at the National Public Health Laboratories- Dar es Salaam-Mabibo area with satellite (regional) laboratories at St Benedict's Ndanda hospital, and Kibong'oto National TB hospital.

The overall development project objective is to strengthen capacities for diagnosis and surveillance of Tuberculosis and other communicable diseases by establishing a network of efficient, high quality and accessible public health laboratories and by promoting innovation and knowledge sharing. This objective will be achieved through delivery of three key results areas or components namely;

- d) Regional diagnostic and Surveillance capacity
- e) Joint training and Capacity building
- f) Joint Operational Research and knowledge Sharing

### 2.0 The Project Management

The overall responsibility for project implementation is with the Ministry of Health and Social Welfare. At the national level the Permanent Secretary is providing leadership and ensure effective coordination through the Steering Committee. A Project Coordination Team (PCT) is providing oversight for project implementation and consists of a project manager, coordination team leader, M & E officer, Operations officer, Training Coordinator, ICT officer, Project accountant and Procurement officer.

### 3.0 The method of selection

A Firm/Consortium will be selected on the basis of **Quality and Cost Based Selection** procedures in accordance with the policies of the International Development Association (IDA) detailed Guidelines: Selection and Employment of Consultants by World Bank Borrowers, published in May 2004, and revised in October 2006 and May 2010. A copy of the guidelines can be obtained at the following website: [www.worldbank.org/procure](http://www.worldbank.org/procure).

### 4. Environmental Status of Tanzania

Tanzania's economy and the livelihoods of her people are strongly dependent on natural resources such as water, land, air plants and animals. These natural resources are increasingly

under pressure from unsustainable use, resulting in environmental degradation. The challenge is to utilize natural resources to develop the economy while at the same time conserving the environment to avoid the adverse impacts of pollution, soil erosion, deforestation and general degradation. It is on this note that the environmental and social audit are carried to check if environmental and social standards are met to verify compliance with National Laws and World Bank safeguard policies through use of relevant instruments such as the environmental management plan (EMP) .

#### **4.1 Objectives of the Assignment**

The primary objective of the consultancy is to undertake an Environmental and Social Impact Assessment (ESIA) of the proposed construction of the National Public Health Laboratories under the East Africa Public Health Laboratories Networking Project (EAPHLNP) in order to ensure compliance with;

- (i) The National Environmental Act 2004 and EIA and Audit Regulations of 2005 The NHP's Environmental Management Plan
- (ii) World Bank's environmental and social safeguards requirements

#### **4.2 Scope of Work**

The purposes of this consultancy is for undertaking the ESIA of the construction of the proposed National Public Health Laboratories under the EAPHLNP project. The methodology for undertaking this task will involve desk work by reviewing existing ESMF and RPF for EAPHLNP, extraction of relevant information from the project documents, grant agreement (parent and subsidiaries), various progress reports, sub-project documents, screening manuals, checklists,. Desk work will be followed by the fieldwork (site visit) in order to observe and consult with key and relevant stakeholders on site. From these, the following activities will be conducted:

- (a) A detailed review and assessment of the implementation of the sub-projects financed under EAPHLNP, with the view to establishing the level of compliance with World Bank safeguard policies and Government of Tanzania environmental and social guidelines, procedures and legislation;
- (b) An assessment of methodology and any existing checklist for screening submitted to sub-projects that are financed under the EAPHLNP Project. Such a checklist will be a guide for screening sub-projects against their environmental and social viability or otherwise. It may also include the types of sub-projects that will not be financed by the Project;
- (c) A review of the Tanzanian legislative, regulatory and administrative regime, especially those that relate the environment and social aspects of surrounding communities in the proposed EAPHLN Project activities. This review will include ascertaining consistencies or otherwise deviation from the Tanzania legislative, regulatory and administrative regime and the World Bank safeguard policy requirements.
- (d) An assessment of institutional capacity that exists or otherwise for implementing environmental and social safeguard concerns that might occur as a result of implementing activities under the EAPHLNP Project. This assessment will include a status assessment of EAPHLNP Project coordination and implementation arrangements and capacities and capabilities of institutions identified to manage and monitor the implementation of sub-projects, including capacity for screening of sub-projects. The

analysis will also extend to assessing progress in identifying gaps relating to staffing, training, skills upgrading, and management/monitoring procedures, etc.;

- (e) A menu of costed mitigation actions for any pending impacts from past and ongoing sub-projects.

#### **4.3 Description of the scope of the services required for Environmental and Social Assessment (ESIA)**

The consultants shall update the ESMF as well as carry out environmental and social assessment and prepare environmental and social assessment reports in accordance with the scope of services that will include but not be limited to the following:

- i. Identify policies, laws, regulations, standards and guidelines that are relevant for this project
- ii. Identify potential impacts (positive and negative) of the proposed activities under the East Africa Public Health Laboratories Project (EAHLP) on the environment (socio-economic and biophysical)
- iii. Review the ESMF document and establish if there are any new activities that are proposed under the new project which are not included in these safeguard documents
- iv. Include any new activities proposed under the new project (if any) into the existing ESMF and RPF and identify potential impacts and mitigation measures
- v. Identify and measures necessary for enhancing corporate environmental and social performance of EAPHLNP's activities (Identify areas of weakness and opportunities for improvement)
- vi. Determine the time frame and resource requirements for implementation of proposed practical corrective actions through preparation of an Implementation Plan/Environmental Management Plan (EMP) and Resettlement Action Plan (RAP).
- vii. Conduct public consultations with key stakeholders such as Government Ministries, NGOs, and community leaders and members to document their input and concerns with regard to the project as well as forming part of updating the ESMF. Among others, the following should be consulted: NEMC, District Environmental Officers, respective district leadership (both technical and political) and the communities. Evidence of consultations undertaken at the central government, district and community levels must be attached to the report. Community consultation shall be carried out at the project areas.

#### **4.4. Expected Outputs**

The main outputs of this assignment will be an ESIA report for EAHLP. This will contain the Environmental and Social Management Plan (EMP) and be prepared in accordance with OP. 4.01 and OP. 4.10 taking into account any activities under the proposed Tanzania East Africa Public Health Laboratory Project (EAPHLNP) and the EIA and Audit Regulations of 2005 as well as the applicable World Bank Ops. Furthermore, it will cover an analysis of likely environmental impacts and social risks in future and propose remediation measures or actions.

#### **4.5 Deliverables, Duration and Timing for Study**

The assignment shall be carried out and completed within twelve (12) weeks, from the date of the Contract effectiveness.

Detailed and acceptable Inception Report incorporating audit criteria/ methodology/ checklist/modalities for carrying out the consultancy and the expected outputs shall be prepared and submitted within the first two (02) weeks of signing the Contract. The Client shall review the Inception Report and give feedback to the Consultant within one (01) week. The consultant shall prepare, submit and secure approvals for the assessment TORs and update of the ESMF. The Consultant shall then proceed to conduct the study and compile the draft ESIA reports. The reports shall be submitted to NHLP for review and quality assurance check within eight (08) weeks of signing the Contract. The Client shall review and comment on the submitted reports within two (02) weeks from the date of report receipt and thereafter the Consultant shall prepare the final ESIA reports within the eleventh and twelfth weeks. The final reports shall incorporate comments from the Client. In addition, the study report should meet the requirements of the World Bank safeguards, the National regulations on EIA and Audits.

The consultant shall submit to the Client six (6) hard copies as well as two (2) CDs containing soft/ electronic copies (in word document and 'pdf' format) of the Final Project Audit Report.

**The timeframe of implementation of the assignment:**

No.	Item	Outputs Vs Payment	Duration
1.	Preparations for Environmental Study, prepare, submit and secure audit NEMC TOR approval	Inception Report (40%)	Two (02) weeks
2.	Review of the Inception Report by the Client	Review comments on the Inception Report	One (01) week
3.	ESIA Study Preparation of the draft Environmental & Social Assessment report	Draft ESIA report (40% payment)	Five (05) weeks
4	Review and Quality Assurance by the Client	Review comments on draft ESIA report	Two (02) weeks
5	Incorporation of review comments & finalisation of the ESIA report	Final ESIA report (20% payment)	Two (02) weeks

**Note:**

Payments for the Consultancy services shall be phased (percentage-wise) and made after receipt of acceptable outputs as indicated in the above table. The last 20% payment for the Final Environmental and Social Assessment report shall be paid after submission of acceptable Environmental and Social Assessment report to the client.

**5. Key Personnel for the Assignment**

The consultancy firm shall provide all personnel necessary for the completion of the Environmental and Social Impact Assessment study. The following key personnel shall be included as a minimum requirement for the consultancy.

**a) Environmental Specialist (Team Leader).**

Shall be a holder of a Graduate (Master's level) Degree in Environment, Natural Resources Management or related field and with at least four (04) years of relevant experience or a holder of a Bachelor's Degree in Environment, Natural Resources Management or related

field and at-least five (05) years' working experience in preparing ESIA's for development projects. Must be a Registered (Lead Expert) Environmental Practitioner with NEMC.

**b) Sociologist**

Must be a holder of at-least a Bachelor's Degree in any of the following fields; sociology, social work and social administration, social sciences, anthropology or related fields. Must have at-least three (3) years' related experience in Environmental and Social Impact Assessment as well as preparation of RPFs.

**c) Chemical engineers**

The Biodiversity Specialist should have at least an undergraduate chemical processing or similar field and, at-least three (3) years' experience in biodiversity management.

**1. Any Facilities, Services or Resources to be provided by NHLP**

The client will provide the project site maps, ESMF and RPF for EAHLN, relevant EIS, EIA certificates and samples of ESIA documents prepared and any relevant documents on request.

**2. Communication and Reporting Requirement**

All official communications regarding the project work shall be addressed to the Project Manager, EAHLN Project. However, the Environmental and Social Safeguards Specialist shall coordinate the Consultancy and will be the contact persons for day to day running of the assignment.

## APPENDIX 2: SIGNATURES OF CONSULTED STAKEHOLDERS

### ST. BENEDICT'S NDANDA REFERRAL HOSPITAL LABORATORY

Document Number: FM/GM/0060

Version: 02

Effective Date: 21<sup>st</sup> April 2015

Document Name: Attendance Register Sheet

#### ATTENDANCE REGISTER SHEET 21<sup>ST</sup> APRIL, 2015

#### STAKEHOLDERS MEETING ON ENVIRONMENTAL AND SOCIAL MANAGEMENT ASSESSMENT AND PLANNING

S/N	NAME	DESIGNATION	INSTITUTION & PHONE	SIGNATURE
1.	Bernard Nanta	De. Mubab	0769 280377	
2.	Rahim Ngaweje	Xg DMO	0714584373	
3.	Fr. Sylvanus Kassy OCS	Mkiki wa Bodi ya Hose	6787 039914	
4.	Remidius Kalkuly	Afisa Afiya Mazingira MOKSW	0767-285692	
5.	MARK Oluondo	CONSULTANT - WB	+254 720 320543	
6.	Damian M. Mgalanga	Divani, Ki. Mwenye	0754260711	
7.	Bonafas Mchekoni	Mwenye	-	
8.	Costancia B. Ngombo	Divani U/M.	0754435458	
9.	Razek H. Mullanzi	Kaimu wa NDANDA	0787883422	
10.	Sto A. Mfume	Afisa Afiya (W)	0784494583	
11.	OBADIA K. BILAGE	Afisa MAZINGIRA (W)	0783032788	

**APPENDIX 2: SIGNATURE OF CONSULTED STAKEHOLDERS**

MINISTRY OF HEALTH AND SOCIAL WELFARE  
 EAST AFRICA PUBLIC HEALTH LABORATORY NETWORKING PROJECT (EAPHLNP)  
 Environmental and Social Impact Assessment of the Proposed Construction of One-Storey Laboratory building at St Benedict's Ndanda Referral Hospital  
 National Stakeholder Consultation  
 NHLQATC Conference Room-NIMR Building 2<sup>nd</sup> floor  
 Date: 6<sup>th</sup> May 2015

SNO	JINA	DESIGNATION	INSTITUTE	EMAIL ADDRESS	MOBILE NO	SIGN
1	Fr. Sylvanus Keesy	BOT chairman Ndanda Hosp.	Ndanda Hosp.	frkessy@yahoo.com	0787039914	
2	Charles Lwiza	Hospital Administrator	Ndanda Hosp.	charleslwiza@gmail.com	0704886362	
3	ABEL SUGAONA	Environmental Consultant TREB-consult	TREB CONSULT LTD	abelnsah@yahoo.com	0713500157	
4	Emmanuel Kayaga	CEO African Consult	PLC	ekayaga@gmail.com	0711682875	
5	Shakuru Nyagarus	E-LINK CONSULT	Environment EXPERT	shakurynyagarus@yahoo.com	07548664031	
6	Benjamin Mtwaga	Legal Affairs Environment Issues	E-LINK CONSULT	bmtwaga@redes.com	0719547832	
7	Eric Mugunsi	Consultant	CONSULTANT NG FIBA	ericmugunsi02@gmail.com	0784533611	
8	FRANCIS GUGU	Executive Director	SHINYAWATA	sugufranc@yahoo.com	0784297921	

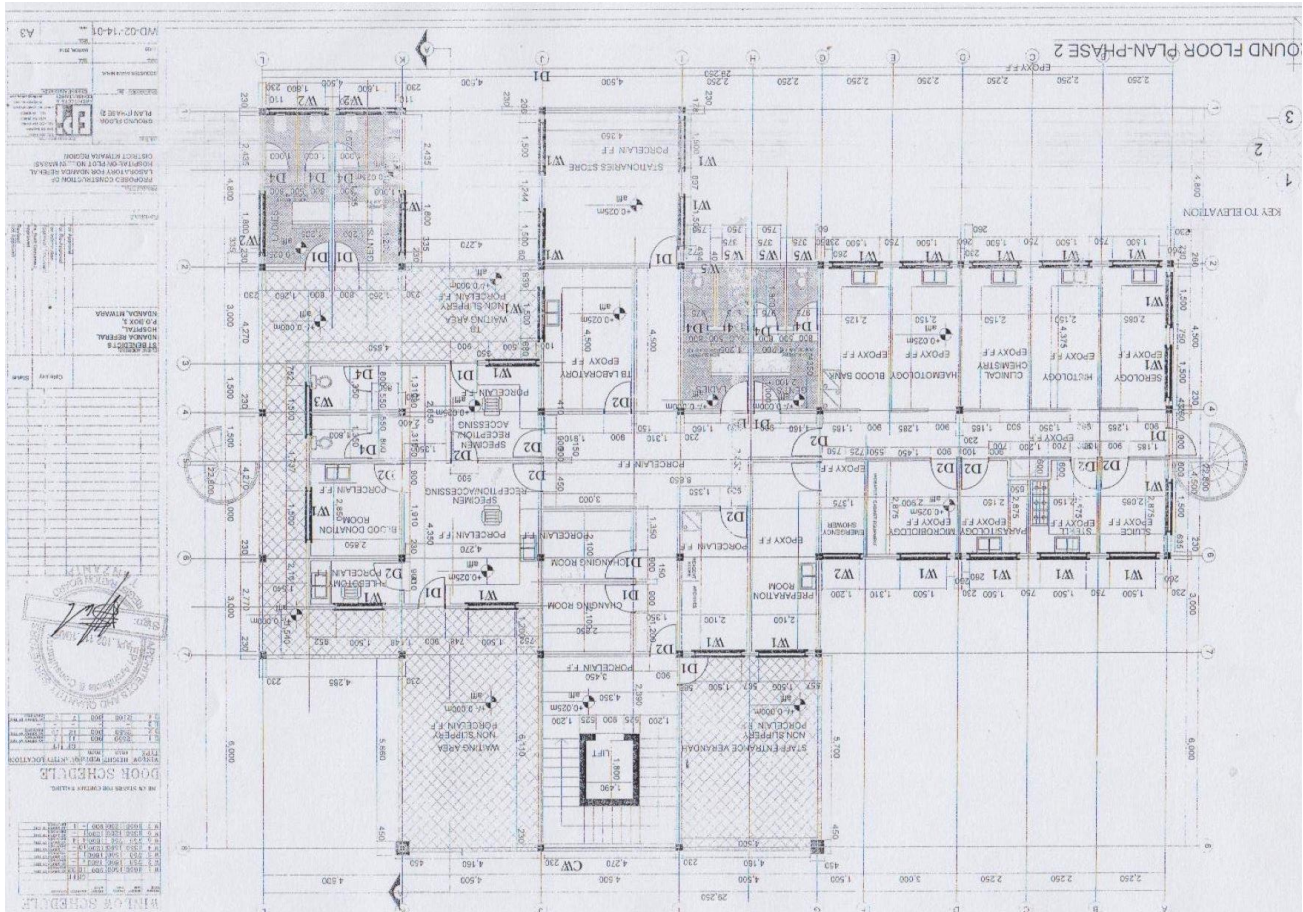
S/NO	NAME	TITLE	INSTITUTE	EMAIL ADDRESS	MOBILE NO	SIGN
9	Joseph Mwangi	Consultant	RO AP	joseph.mwangi@gmail.com	0757339700	
10	Ronaldine Leatulu	Env. Health Officer	MOTHA	kaleulu.ronaldine@gmail.com	0767-285692	
11	Dr. Yipuga	Sp. Health Training	WBS	yipuga@worldbank.org	283000470	
12	Jacqueline Mwa		EAPHLN	jacquela@yphn.org	071258625	
13						
14						
15						
16						

**APPENDIX 3: TROPHY AWARD OF BEST ENVIRONMENTAL PRACTITIONER 2013**





# APPENDIX 4: ARCHITECTURAL DRAWING OF THE PROPOSED LAB BUILDING AT St. BENEDICT'S NDANDA HOSPITAL



APPENDIX: Table 5: Key Institutions to the EIA Process

Level	Institution	Role and Responsibility
National level	Vice President's Office (Division of Environment)	<ul style="list-style-type: none"> <li>• Coordinate various environment management activities in Tanzania</li> <li>• Advise the Government on legislative and other measures for the management of the environment</li> <li>• Advise the Government on international environmental agreements</li> <li>• Monitor and assess activities, being carried out by relevant agencies in order to ensure that the environment is not degraded</li> <li>• Prepare and issue a report on the state of the environment in Tanzania;</li> <li>• Coordinate the implementation of the National Environmental Policy</li> </ul>
	National Environment Management Council (NEMC)	<ul style="list-style-type: none"> <li>• Carry on environmental audit and environmental monitoring</li> <li>• Carry out surveys which will assist in the proper management and conservation of the environment</li> <li>• Undertake and co-ordinate research, investigation and surveys in conservation and management</li> <li>• Review and recommend for approval of environment impact statements</li> <li>• Enforce and ensure compliance of the national environmental quality standards</li> </ul>
		<ul style="list-style-type: none"> <li>• Initiate and evolve procedures and safeguards for the prevention of accidents which may cause environmental degradation and evolve remedial measures where accidents occur;</li> <li>• Undertake in co-operation with relevant key stakeholders environmental education and public awareness;</li> <li>• Render advice and technical support, where possible to different stakeholders</li> </ul>
	Ministry of energy and Minerals	<ul style="list-style-type: none"> <li>• Issuing policy guidance</li> <li>• Providing legal frameworks</li> <li>• Setting operation standards for energy generation projects</li> <li>• Project monitoring.</li> </ul>
	Ministry of water	<ul style="list-style-type: none"> <li>• Issuance of water use permit</li> <li>• Guidance on the sustainable use of water resource</li> </ul>
	Ministry of Lands, Housing and Human Settlements Development	<ul style="list-style-type: none"> <li>• Land use planning</li> <li>• Issuing of Right of Occupancy</li> <li>• Valuation and compensation</li> </ul>
	Tanzania Investment Centre (TIC)	<ul style="list-style-type: none"> <li>• Facilitating investment activities in the country</li> <li>• Overseeing investment activities</li> </ul>
	The Benedict's Fathers of Ndanda	<ul style="list-style-type: none"> <li>• Carrying out EIA study</li> <li>• Project implementation including mitigation measures</li> <li>• Carrying out regular environmental monitoring and internal auditing</li> </ul>

Level	Institution	Role and Responsibility
Regional level	Mtwara Regional Secretariat Office	<ul style="list-style-type: none"> <li>• Oversee and advice on implementation of national policies at Regional level</li> <li>• Oversee enforcement of laws &amp; regulations</li> <li>• Advice on implementation of development projects and activities at Regional level</li> </ul>
District/level	Masasi District Director Office	<ul style="list-style-type: none"> <li>• Chief Executive Officer for all development activities in the District</li> <li>• Baseline data on social and economic conditions</li> <li>• Plan and coordinate activities on community-based natural resource and environment management</li> <li>• Enforcement of laws &amp; regulations</li> <li>• Coordinate environmental matters at the District level</li> </ul>
Ward Level	Mwena Ward	<ul style="list-style-type: none"> <li>• Oversee general development plans for the Ward.</li> <li>• Provide information on local situation and Extension services</li> <li>• Technical support &amp; advice</li> <li>• Project Monitoring</li> </ul>
Village Leaders	Ndanda Village	<ul style="list-style-type: none"> <li>• Information on local social, economic, environmental situation</li> <li>• View on socio-economic and cultural value of the sites and facility operations.</li> </ul>
		<ul style="list-style-type: none"> <li>• Rendering assistance and advice on the implementation of the project</li> <li>• Project Monitoring (watchdog for the environment, ensure well-being of residents)</li> </ul>
Community	<ul style="list-style-type: none"> <li>• Residents of Ndanda Village</li> <li>• Residents along the transmission line</li> </ul>	<ul style="list-style-type: none"> <li>• Information on local social, economic, environmental situation</li> <li>• View on socio-economic and cultural value of the site and along the transmission line and on proposed project operations.</li> </ul>

## APPENDIX 6: HUMAN RESOURCE CAPACITY OF MTWARA FOR IMPLEMENTATION OF ESIA

S/No	Department	Available Staff (No)	Staff Shortage (No)	Designation
1	Town Planning and Environment	1 Environmental Officer (BSc. Forestry &, MSc. Environmental Science). 1 Fisheries Officer (Diploma) 1 Town Planner & Environment (Diploma)	1	Environmental Officers
2	Health	3 Health Officers (Diplomas,) 1 Sanitation Officer (Diploma)	1	Environmental & Sanitation Engineer
3	Community Development	7 Sociologists ( Degrees) 3 Social workers (2 Diplomas,1 Certificate )	4 2	Assistant Sociologist – Diploma holders Assistant Sociologist-certificate Holders

## **APPENDIX 7: DETAILED STAKEHOLDERS CONSULTATIONS**

The consultants' team conducted consultation to a wide range of the stakeholders in light of the proposed construction of the laboratory building at the St. Benedict's Ndanda hospital. Meeting was held in Ndanda village at the Ndanda hospital's conference room. Also consultation was done with local government authorities (e.g. Masasi District Council, Masasi Municipalities, Ward and village government). Below are the views and concerns of the consulted stakeholders:-

### **Masasi District Commissioner:**

The team consulted the DC of Masasi, Mr. Bernard Nduta who praised the government for this initiative and indicated the paramount importance of his project. He proudly said that his office has been involved from the beginning (i.e. during planning) of this project. Giving an example, the DC said that his office participated in the sensitization meeting that was done in Mozambique in January 2015 and organized by Ndanda hospital. In addition, the DC made the following point:

- Best healthcare services is a need of people of all religions, political ideologies. Therefore this project will unit all the people in the region by addressing the common needs-healthcare services.
- Ndanda hospital is one of the longest serving hospital in the country and its services remains one of the best both at the regional and national level. Therefore, the hospital deserves this honour of having the latest laboratory in the region.
- The project will serve not only the people of Mtwara but the whole of Southern part of Tanzania but from neighbouring countries such as Mozambique.
- He asked why should the government continue to send samples for testing to Nairobi, Kenya, a process which is (i) time consuming, (b costly since samples have to be transferred urgently.
- Provision of healthcare services to people from other countries will improve and strengthen relationship with neighboring countries especially Mozambique
- The rapidly growing population of the Southern region calls for improved social services including better healthcare. This project therefore is timely and highly desired.

However, there could be some issues that need some careful planning such as avoiding any possible negative impacts on the people and the environment. Hence urged the consultants' team to identify all possible impacts and prepare appropriate Management Plan that will ensure negative impacts are minimized while enhancing the positive ones.

### **Masasi District Administrative Secretary (DAS):**

The team held a meeting with the District Administrative Secretary Mr. Dunford C. Peter. The DAS was very happy and comfortable with this project. He explained that he was aware of the project and that his office had been involved from the project planning stage. In addition he made the following remarks:

- The construction of the laboratory will improve health, lives and so the productivity and economic wellbeing of Masasi people and the whole Southern region.
- Increased waste from construction and operation of the laboratory needs to be considered and planned for accordingly. Most important is the solid waste from operations and laboratory specimens.
- Construction of the laboratory will create employment opportunities. Local people living in Ndanda and Masasi as whole should be given priority for job employment.

### **Representative of the Masasi District Medical Officer**

The consultants' team met the representative of the DMO who made the following remarks:

- Project is well located given the already existing hospital infrastructure and the role Ndanda hospital is currently playing (i.e. Ndanda currently serves as a regional hospital and is actually the referral hospital)
- Key environmental challenges are likely to be those associated with management of waste (both liquid and solid). So, the ESIA study should exhaust all the possible impacts and provide appropriate guidance to contractor and the client (the St. Benedict's hospital) for proper monitoring

### **Masasi District Lawyer**

The consultants' team met district lawyer Mr. Sifael Kulanga who noted the following:

- The project has not conflicts related to land because the construction will take place on developers own land area. The developer legally owns the land area through a certificate of occupancy and relevant title deed.
- The contract should be proactive to avoid possible negative impacts on the site. For example during construction the contractor and his team should mark clearly areas that are now supposed to be passed or visited. In addition, those areas should lit at night to ensure that admitted persons and their relatives do enter those areas accidentally.
- Also vehicles/trucks carrying building materials should be sensitized to drive carefully with the hospital premises. If possible speed humps should be introduced with the hospital premises to ensure speed for construction vehicles is reduced.

### **District Environmental Officer (DEO)**

The team consulted the District Environmental Officer, Mr. Obadia Bishoge about this project. Mr. Bishoge made the following remarks about the proposed construction:

- The DEO wanted to know about what level of assessment is being done for this particular project and why? Is it a full EIA or Partial EIA?
- Site clearance for construction of the building is likely to have some impacts both to the people and the environment. For example, Trees will be cut to give way for erection of the building. Plans need to be put in place to replace the cut trees. He noted that in fact, planting should according to the law, be done before the tree is cut.
- Both construction process and operation phases are likely to have different impacts on people. Therefore people should be given appropriate PPE to avoid unforeseen accidents.
- Sourcing raw materials for construction could lead to destruction of the environment if no deliberate plan is made to source materials from a known and reliable source that has clear environmental management plan. Thus, efforts should be made to ensure raw materials are acquired from a known sustainable source.
- Construction process might attract people who might have disposable income and therefore engage with local people, a process, which might lead to spread of HIV/AIDS infection. There, the contractor should make sensitization and awareness campaigns are made to both workers and local people in surrounding communities. Where possible, protection gears such as condoms should be made available to works.

### **Villages and Communities**

The team of consultants conducted with village members of Ndanda where the project is located. Their views and concerns are grouped in the following points:-

- Construction of the laboratory is highly welcome in the village. It will improve and ensure reliable healthcare services in the village and therefore contribute to communities' wellbeing, which is the foundation of socio-economic development. It will also bring employment to local dwellers through short terms engagement both during construction and operation phases
- Community were also positive on the project believing that their life standards will be improved from improved healthcare services.
- Members were worried about increase medical costs due to increased quality of testing and diagnostic services.
- Employment opportunities during construction, supply of the construction materials, supply of food staffs were some of the benefits anticipated by the villages around the plant site during construction phase.
- Improved health services will bring particular socio-economic benefits to women who normally spends more time in hospitals looking after sick relatives.
- Caution about HIV/AIDS should be included on the project signboard to show that contractor and his team are aware and cares about HIV infections.
- There is a need to request donors to support construction of better houses for new laboratory staff in order to motivate them to perform to the standard owing increased work load resulting from new machines and testing, e.g. for TB and other outbreaks
- Some members were worried that samples brought from neighboring countries for testing might infect local communities and therefore threaten lives.
- There is a possibility in increase in the number of people due to immigration of people into the area in search for better healthcare. Are the infrastructure well equipped to handle such large number of people? Also possible increased workload for lab staff due to increased number of people for testing. There is a need for having a proper plan for staff so as to ensure they don't get exhausted and therefore mess up the result.

APPENDIX 8: BEST OVERALL CERTIFICATE 2014/15





## APPENDIX 9: BEST LABORATORY 2014/15



## APPENDIX 10: BEST LABORATORY 2014



## Appendix 11: Other ACTS Relevant for Environmental Management in Tanzania

Act	Responsible Ministry or Sector/Authority	Specific Measures applicable to the proposed project
The EIA and Audit Regulations (2005)	Vice presidents' Office/ NEMC	The regulations provide the basis for undertaking EIAs and Environmental Audits for various types of development projects with significant environmental impacts. It also outline step[s] to be followed in carrying out EIA such as ; Project registration, scoping and full EIA
Environmental Management (EMA) of 2004	Vice presidents' Office	Overall, it speaks for sustainable management of environment protection of environmental pollution. It is against discharge of effluent from any commercial, industrial or other trade wastes systems into receiving waters without a consent duly granted by an authorized Water Officer.
Public Health (Sewerage and Drainage) Ordinance Cap. 336 (1956)	Ministry of Health, local governments and Water and Sewerage Authorities	The ordinance deals with various conditions regarding the regulations of sewerage and drainage systems. For example against poor disposal of sewerage, chemical effluent and hot materials into natural water courses and environment and subsequently risking human health.
The Contractors Registration Act Cap 235	Contractors Registration Board	The law requires the contractors to ensure that all construction sites abide to the laws of occupational health and safety in the construction sites. The contractors should also comply to; To maintain and provide site workers with proper PPE. To register all accidents and its causes at construction site. Ensure access to fire-fighting equipment and hygienic facilities on site This Act requires all construction contracts to be executed by registered companies and entitled class in respect to the project size
The local Government Act of 2000	Ministry of Regional Administration and Local Government and	The Act requires stakeholders of proposed development projects to be informed about the EIA process. It states that the local government is responsible for prevention of damages on historical heritage and archaeological sites. It empowers the local governments to control pollution of water resource and regulation of drainage and sewerage works

Explosives Act, No. 538	Ministry of Infrastructure Development. Ministry of Energy and Minerals	The law requires all persons using explosives in their activities to possess an explosive licence. It is applicable for the proposed project especially if explosives are used during excavation works.
The Land Regulation Act (2001)	Ministry of Lands, Housing and Human Settlement Development	Regulation 4 and 10 of Land (Compensation Claims) Regulation (L.N. No. 79) of 2001 stipulates that , compensation shall take the following forms among others: <ul style="list-style-type: none"> <li>• Monetary compensation;</li> <li>• Plot to plot compensation</li> <li>• Replacement of building</li> </ul> The basis for the value of any land shall be the market value of such land. The assessment of the value of land and any improvements needs to be done by a Qualified Valuer and verified by the Chief Valuer of the Government
The Occupational Health and Safety Act No. 5, 2003.	OSHA, Ministry of Labour, Employment and Youth Development	The Act deals with the regulation of health, safety and welfare of workers in factories and workplaces. It requires the project contractors to provide Personal Protective Equipment (PPE) to workers at the site to protect them from accidents and health hazard. The project developer is duty bound to register the work place and submit the building plan of the proposed project to the Chief Inspector of OSHA for the approval. This regulation is relevant to the proposed project.
Waste Management Regulation Act No.7, 1982.	Ministry of Health and Social Welfare	The Act empowers the District Councils to take necessary measures to safeguard of public health. Additionally, it requires the provision of effective solid and liquid waste management to protect human health and regulates pollution problems. It requires the implementation of sufficient measures to control solid and liquid waste. Requires precautions to be taken against the risk of fire and measures to be taken in order to ensure safe evacuation and regular inspection of fire-fighting equipment. Also, it provides guidelines for protection of all those who work under dusty, smoky or environments with exhaust fumes.
The Employment and Labour	Ministry of Labour, Employment and Youth Development	The Employment and Labour Relations Act No. 6 of 2004 repealed the Employment Ordinance Cap 366. It speaks about restriction of child labour and stipulates the employment age limits. The Act sets the basic minimum age

Relations Act (2004)		for employment at 12 years of age and requires that 12 to 14 year old child workers receive a daily wage, work on a day-to-day basis, are provided transportation home each evening, and obtain permission to work from their parents. It restricts children from working in dangerous or injurious places as well as in many industrial occupations. This Act is relevant to the proposed project.
The Workmen's Compensation Act (2002)	Ministry of Labour, Employment and Youth Development	The Workmen's Compensation Act Cap 263 the amendment of 2002 makes provisions of compensation or benefits as result of injuries or diseases or death at work place. However, the legislation is undergoing reform to make it encourage the prevention of accidents instead of compensation. The contractors of the project should observe this regulation.
The Contractors Registration Act Cap 235, 1997.	Contractors Registration Board, Ministry of Infrastructure Development Ministry of Labour, Employment and Youth Development Contractors Registration t	It requires the contractors to ensure that all construction sites abide to the laws of occupational health and safety in the construction. These include the Contractors Registration By-laws 1999. The By-laws administered by Contractors Registration Board govern contractors to legally do as follows: to maintain and provide site workers with proper PPE. to register all accidents and its causes at construction site. to provide site workers with PPE. Ensure access to fire-fighting equipment and hygienic facilities on site. This Act requires all construction contracts to be executed by registered companies and entitled class in respect to the project size. This regulation is applicable to the proposed project

## APPENDIX 12: Permissible limits for municipal and industrial wastewaters

Parameter	Units
pH	6.6 – 8.5
Electrical conductivity	
Total suspended solids	100 mg/l
Sulphates (SO <sub>4</sub> )	500 mg/l
Dissolved Oxygen	
BOD <sub>5</sub>	30 mg/l
Total Phosphates as P	6 mg/l
Turbidity	300 NTU
COD	60 mg/l
Nitrates (NO <sub>3</sub> )	20 mg/l
Ammonia-Nitrogen	
Colour	300 TCU
Fluorides (F)	8 mg/l
Chlorides (Cl)	200 mg/l
Mercury (Hg)	0.005 mg/l
Total Chromium	1.0 mg/l
Chromium VI	0.1 mg/l
Oil and grease (fatty matters and hydrocarbons)	10 mg/l
Temperature	20 – 35 °C
Organochlorine pesticides	0.0005 mg/l
Pesticides other than organochlorines	0.01 mg/l

Source: TZS 860:2006 (TBS, 2006)