THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY
UNIVERSITY OF DAR ES SALAAM

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PROPOSED CONSTRUCTION OF THE UNIVERSITY OF DAR ES SALAAM CAMPUS AT PLOT NO, 1,2,3,4, &5, BLOCK "C" NGONGO AREA, KIDUNI MTAA, JAMUHURI WARD, IN LINDI MUNICIPAL, LINDI REGION.

Environmental and Social Impact Assessment (ESIA) Report

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EXECUTIVE SUMMARY

Introduction

The Ngongo Site Sub-project is one of the Higher Education for Economic Transformation (HEET) Project being implemented by the UDSM at various locations in the country under the World Bank Financial Support (HEET-P166415). The Project Development Objective (PDO) of the HEET Project is to strengthen the learning environment and labour market alignment of priority programmes at beneficiary higher education institutions and improve the management of the higher education system. The UDSM HEET Project is divided into two lots whereby Lot 1 covers the MJNM Campus, CoICT-Kijitonyama, SoAF-Kunduchi, and Lot 2 covers Ngongo Site, in Lindi Municipality, Likunja Site in Ruangwa District, and IMS Buyu in Zanzibar.

According to the WB requirements, the environmental and social impacts assessment must be conducted for this project in accordance with the World Bank Environmental and Social Framework (ESF), the project's Environmental and Social Management Framework (ESMF), Environmental and Social Safeguarding Policies and relevant Environmental and Social Standards (ESSs), which aim to offset the anticipated social and environmental risks and impacts.

Therefore, in compliance with the WB requirements, the ESIA study was conducted for the Project. The objective of the ESIA study was to identify potential environmental and social risks/ impacts associated with the project and thereafter propose appropriate mitigation measures for the identified adverse (negative) impacts and enhancement measures for the identified beneficial (positive) impacts. The intention is to maximize the project benefits avoid or minimize adverse impacts, and to ensure the project is being implemented in an environmentally friendly and socially acceptable manner.

The ESIA study involved a review of relevant project documents, including national policies, legislations, and World Bank Safeguard Documents such as the Environmental and Social Framework (ESF), ESH Guidelines, and Environmental and Social Standards. The document review was followed by fieldwork, mainly conducting a visual inspection of the project site to establish the existing baseline conditions and conducting stakeholder consultation to obtain their views/concerns/opinions regarding the project. Therefore, this executive summary aims to present some major findings from the ESIA study.

Project Description

This project aims to construct buildings and associated infrastructure for the University of Dar Es Salaam (UDSM) College of Agriculture and Fisheries (CoAF) at Ngongo Campus. These include the Administration Building, Lecture Rooms Building to accommodate 360 students, Laboratory and Workshop Building, Hostel Building to accommodate 512 students, Cafeteria Building, and Dispensary Building. The associated infrastructure includes internal roads network; an external fence; water distribution network, sewer network, power distribution network; fibre optic telecommunication network.

The Ngongo Campus occupies a total area of about 113 HA. It forms boundaries with street road to the south and south-west, Ngongo River to the north, north-west, and north-east, and Mtwara-Mingoyo Road to the east. The total construction cost of the project is estimated to be Tanzania Shillings (TZS) 6,996,990,000.00. The Government of the United Republic of Tanzania will fund the project through UDSM in collaboration with the MoEST and World Bank.

The proposed administration building comprises a ground and first floor with a total floor area of about 892.541 Square metres (SQM), and the Lecture Hall, which is designed to accommodate 60 students, has a ground and first floor with a total floor area of about 594.863

Square metres (SQM). The proposed female hostel building at UDSM Ngongo Campus has three storeys (one storey can accommodate 512 students), with a total floor area of about 581.070 Square metres (SQM), and a male hostel has three storeys with a total floor area of about 589.185 Square metres (SQM).

The laboratory (total floor area of about 395.546 Square metres (SQM)) will be provided with a parking area, five lab rooms, reception, corridor, waiting area, pantry area, and janitor room, toilet rooms and storage room. In contrast, the proposed workshop building will comprise Ground Floor and First Floor with a total floor area of about 540 Square meters (SQM).

The proposed cafeteria building will have a total floor area of about 605.492 Square metres (SQM) with a canteen is designed which can accommodate 122 students at once**.** The proposed Dispensary building will have a total floor area of about 285.753 Square metres (SQM).

The total construction cost of the project is estimated to be Tanzania Shillings (TZS) 6,996,990,000.00. The Government of the United Republic of Tanzania will fund the project through UDSM in collaboration with the MoEST and World Bank. The UDSM will be the implementing Agency through the dedicated Project Implementation Unit.

The construction period is estimated to be about 18 months, whereby 1 month will be for the mobilization period, 16 months will be for the construction period, and 1 month will be for the demobilization period. After the construction period, the Campus infrastructure will be operated for an estimated period of 50 years. Thereafter, the Campus infrastructure will have to undergo renovation. The campus is subject to expansion, depending on future funding.

Policy, Legal and Institutional Arrangement

Tanzania is committed to attaining sustainable development goals. Chapter 3 of this ESIA report discusses some of the national laws, policies, strategies, plans, and legislation relevant to this project.

Furthermore, this ESIA study has also complied with the following tools:

- World Bank's new Environmental and Social Framework (ESF);
- The World Bank Environmental and Social Safeguarding Policy for Investment;

WB relevant Environmental and Social Standards. This ESIA study has applied 5 out of 10 Environmental and Social Standards (ESSs), which are:

- ESS1- Assessment and Management of Environmental and Social Risks and Impacts;
- ESS2 - Labor and Working Conditions;
- ESS3 - Resource Efficiency and Pollution Prevention and Management;
- ESS4 - Community Health and Safety; and
- ESS10 - Stakeholder Engagement and Information Disclosure

Baseline Environmental and Social Conditions

The project area is within the surveyed area, with more than 70% of the plots being undeveloped. Continental and lacustrine sedimentary formations dominate the project area. The sub-soil is dominated by marine limestone, mainly comprised of sandy clay and clayey sands. The project area comprises Mesozoic rocks, limestone, sandstone, shales and mark. Si The dominant naturally grown trees are mango trees, neem trees, and cashew nuts.

The major water supply of Ngongo residents is from LUWASA, nearby small wells and river Lipururu found near the project area; also, the area has a telecommunication system and

electricity from the national grid. There is also the presence of one primary school and one secondary school near the project area.

The major social economic activities in the flanking project area are agricultural activities and salt production. The local people depend on coconut, sugar cane, banana, maize, groundnuts, and cashew nuts as their commercial crops and salt production, which is sold along the highway (T7), as their daily source of income.

Stakeholder Engagement and Public Consultations

The stakeholders' identification and engagement process was conducted based on the World Bank Environmental and Social Standards (ESS10), Stakeholders Engagement Plan (SEP), EIA and Audit Regulations, 2005 and its amendment of 2018. The SEP provides details on the engagement needed associated with project activities. It covers both national and sub-national engagement; however, a greater focus was placed on sub-national stakeholders.

The stakeholder consultation involved face-to-face interviews with representatives of relevant government institutions, agencies and local government authorities. These include Lindi Regional Office, OSHA Zonal Office – Mtwara, Fire and Rescue Force - Regional Office, Lindi Municipal Council, Lindi District, Jamuhuri Ward, and Kiduni Street. The consultation also involved the adjacent local community members, who are the residents of Chuo Kikuu Street ("Mtaa"). The identification of stakeholders was based on how they are related to the project, how the project is going to affect them, and why they should be consulted. During stakeholder consultation, grievances, Gender-based Violence (GBV), Sexual Exploitation and Abuse (SEA) and Sexual Harassment (SH) were also addressed.

The following are the identified stakeholders during the EIA study:

- Ministry of Education, Science and Technology (MoEST)
- University of Dar es Salaam (UDSM)
- Division of Environment in the VPO
- National Environment Management Council (NEMC)
- Lindi Municipal Council (LMC),
- Ward Development Committee (WDC)
- Mtaa Development Committee (MDC)
- Occupation Safety and Health Authority (OSHA)
- Fire and Rescue Force
- Business Operators Adjacent to the Project Site.
- Tanzania Electricity Supply Company Limited (TANESCO)
- Lindi Urban Water Supply and Authority (LUWASA)
- Project Affected Persons (PAPs)
- Ruvuma and Southern Basin Water Board
- Local Communities Adjacent to the Project Site

Stakeholders raised the following issues;

- The project will add land value to the surveyed plots in the flanking environment.
- Since 70% of the project area is undeveloped, impacts such as air pollution, vibration, and noise will not affect the local people in the project area.
- Vegetation clearing should be done within the proposed building areas, not all of the site.
- The project will increase the spread of diseases like HIV/AIDs, STI/STD's and COVID-19), since there will be gathering of people with different understandings, age and income.
- The project is anticipated to destroy the traditions, norms, and culture of the local society due to the increase in the population from different parts of the country and abroad.

- Presence of the university will increase solid waste and liquid waste production in the Municipality.
- The project will increase business opportunities in the project area, such as the construction of buildings for rent
- The project will increase the economy of the region and the nation as a whole.
- The district commissioner's office is ready to provide any assistance necessary to complete the project on time.
- The fire and rescue force mainly performs three activities in the construction industry: reviewing architectural drawings, testing equipment, etc.
- Local people believe the value of land and their produce will increase.
- The project will advertise the region and attract a number of local and foreign investors.
- Implementation of this project will also alert the locals that the government is still remembering them, as it has been a while since a major project has been implemented in the region.
- Implementation of the University of Dar es Salaam will attract other universities in the region and enhance the per capita of the individual and the region.
- The presence of the farm classes will help the locals learn the best agricultural activities to increase productivity.

Identified issues/concerns by Local Community Members.

The following is the summary of identified issues/concerns raised by the consulted local community members:

- The project will be economically beneficial in terms of employment creation and improved knowledge of agricultural production, and stimulation of local investment.

Recommendations from Stakeholder Representatives

The following are some of the recommendations provided by the consulted Stakeholder Representatives:

- Contractor should submit project drawings for review
- Client should register the project to the OSHA Website (wims.osha.go.tz)
- Medical checkup should be done for workforces for both contractor and consultant to get health status or baseline information before construction works
- Contractor should request for inspection before commencement of the project
- Contractor should prepare and submit OHS policy to OSHA before project commencement
- Contractor should prepare a baseline risk assessment
- Contractor should provide wholesome water for drinking to workforces throughout the project duration
- Contractor should provide adequate PPEs to the workforce
- Contractor should keep a record of accidences incidence throughout the project duration

Project alternatives

The following project alternatives were considered for this project based on the techno-economic, environmental and social criteria:

- “No Project Alternative”; VS “Project Alternative”-The project Alternative was selected in favour of the: No Project Alternative” due to its long-term social and economic benefits
- Labour Intensive VS Machine Intensive Construction Methods “Labour Intensive Method” and “Machine Intensive Method” were considered to be useful but with more emphasis on labour-intensive due to their ability to create temporary employment with less environmental, health, and safety risks than the “Machine Intensive Method.

- The septic tank system alternative was selected in favour of other wastewater treatment systems due to the lack of potential area for Constructed Wetland and WSPs.

Potential Environmental and Social Impacts

The following are the identified beneficial (positive) and adverse (negative) environmental and social impacts that are likely to occur during the construction and operation phase: Chapter 6 of the ESIA Report provides details on enhancement measures for the identified positive impacts and mitigation measures for the identified negative impacts.

Positive Environmental Impacts

- Increased economic value of land
- Improved land planning, use and management
- Improved aesthetic value of the surrounding environment

Negative Environmental Impacts

- Creation of air pollution due to dust emission from construction activities.
- Creation of noise nuisance due to construction activities.
- Landscape degradation and loss of aesthetic value of the surrounding environment due to accumulation of construction/demolished solid wastes.
- Loss of ecological functions and landscape quality due to removal of existing vegetation/ trees.
- Increased solid waste and liquid waste production in the Municipality.
- Generation of hazardous waste

Positive Social Impacts

- Increase income generation opportunities of the local people
- The project will advertise the region and led to attract number of local and foreign investors
- Creation of employment opportunities for local people due to recruitment of construction workers.
-
- Increased enrolment of students and revenue for the UDSM due to availability of space after construction of lecture rooms and hostel at CoAF at Ngongo Campus.
- Increased revenue for infrastructure/ utility service providers due to increased demand for power and water supply.

Negative Social Impact

- Destruction of tradition, norms and culture of the local society due to an increase in population from different parts of the country and abroad.
- Increased prevalence of HIV/AIDS and STIs transmission
- Risk of construction related accidents
- Creation of occupational health and safety risks due to handling /operation of hazardous construction materials /equipment.
- Emergence of GBV/SEA and SH
- Loss of temporary employment opportunities

Environmental and Social Management Plan

The options to minimize or prevent the identified adverse social and environmental impacts as well as an Environmental and Social Monitoring Plan (ESMP**)** have been suggested in this report. Environmental and Social Management Plan (ESMP) has been developed to identify the environmental and social management and mitigation actions required to implement the project in accordance with the requirements of the World Bank Safeguard Policies and applicable Tanzania national policies and legislation. The ESMP outlines the performance

standards based on the National Policies/Legislations, World Bank Safeguard Policies/Guidelines, and International Conventions/Treaties/Agreements. The total cost for implementation of mitigation measures amount to Tanzania Shillings **(TZS 103,400,000.00).**. The ESPM also defines the roles and responsibilities of different actors in the plan.

The contractor shall implement components relevant to the actual construction and operation phases. The mentioned proponent shall be responsible for the overall implementation of the ESMP in collaboration with their contractor. ESMP is an estimate cost of the measures so that the project proponent can budget the necessary funds. Appropriate bills of quantities should clearly give the actual figures. In any case, the consultant used informed judgment to come up with these figures.

The project shall ensure that the activities that are causing impacts on the environment are managed in a comprehensive, systematic, planned, and documented manner. The proponent shall communicate the environmental and social management plan and environmental and social monitoring plan to its employees and its contractors to ensure that implementation is done accordingly.

Furthermore, the proponent shall ensure the availability of resources which are required for the implementation of its environmental management plan. The plan shall also be monitored to ensure that environmental objectives are well met. The project proponent shall carry out routine auditing to ensure the continued sustainability of the environmental management system.

Demobilization Plan

The demobilization activities will involve the removal of all mobilized items and the cleaning up of the construction site. It will include the removal of all temporary safety signs, temporary fencing, construction debris including crushed stone aggregates, pieces of wood, construction stakes, and other construction-related refuse, as well as temporary facilities or works. The restoration of surfaces to an equal or better than the existing condition shall be considered to be part of demobilization. Site reclamation includes reclamation of areas disturbed during construction, other than access and staging areas, to pre-project conditions or better.

Decommissioning Plan

The Project Proponents might consider renovating or demolishing his building as the case may be depending on the condition of the building at that time let say after about 99 years projected life of the structure. In case the demolition is considered, specific conditions for mitigation are generally inherently uncertain. The conditions include methods of demolition, material handling, proposed sequences, protective measures, traffic management, occupational health and safety and environmental management, and the estimated cost of conducting the decommissioning.

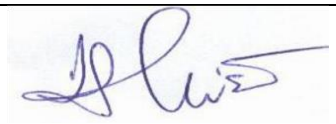
Conclusion

The project is expected to have both beneficial (positive) and adverse (negative) impacts. However, most of the beneficial (positive) impacts will be long-term and will occur during the operation phase, and most of the negative impacts will be short-term and will occur during the construction phase. Therefore, it can be concluded that the project benefits (positive) will outweigh its adverse (negative) impacts because most of the negative impacts will be short-term and their mitigation measure can be easily implemented through design and good engineering practices. Moreover, the environmental management plan has been formulated to ensure the implementation of outlined mitigation measures. The project benefits will be maximized through the enhancement of the beneficial (positive) impacts. UDSM holds the responsibility for ensuring the overall implementation of the Environmental and Social

Management Plan (ESMP) and Environmental and Social Monitoring Plan (ESMoP) outlined in this report.

This Environmental and Social Impact Assessment (ESIA) report recommends that the proposed project can proceed, provided that the proponent adheres to the ESMP as specified in the report and any additional conditions imposed by regulatory bodies such as the National Environment Management Council (NEMC), World Bank ESF and ESSs, and other relevant authorities.

THE ESIA TEAM

NAME[1]	SIGNATURES
Mr. Akonaay M.L. Ako (Environmental Expert / Team Leader)	
Eng. Samwel Maguya (Assistant Environmental Expert)	
Mr. Huruma Kisaka (Sociologist / Resettlement Expert)	
Mr. Haruna Maulid (Environmental Expert)	
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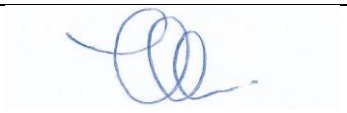
Dr. Yasinta John (Ph.D) (Environmental Expert)	
Esther Mnzava (Sociologist / Resettlement Expert)	

[1] All the listed Experts are Registered as EIA Expert by the National Environment Management Council (NEMC) of Tanzania

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ACKNOWLEDGEMENT

The Project Proponent would like to acknowledge the contribution made by various stakeholders during the ESIA study and, finally, during the preparation of this ESIA report. The assistance provided by the local authorities during the field work is highly appreciated. Apart from providing access to useful documents they were able to assist the Consultant during the field work. The support provided by the management of Lindi Municipality is also highly appreciated, as they allowed the Consultant to access the site and collect the necessary baseline information.

We would also like to express our sincere appreciation to the World Bank and the Ministry of Education, Science and Technology (MoEST) for their support and collaboration in implementing the HEET project. This project aims to improve and transform higher education in Tanzania by strengthening the learning environment and labour market alignment of priority programs.

The cooperation from the infrastructure/utility authorities is also highly appreciated. The utility authorities helped the Consultant identify the location of infrastructure/utilities that are likely to be affected during construction. Finally, but not least, the Project Proponent appreciates the opinions/concerns from various stakeholders. All relevant issues /concerns raised during stakeholder consultations have been considered and incorporated into the ESIA Report and ultimately reflected in the Design Report.

ABBREVIATION AND ACRONYMS

AIDS : Acquired Immunodeficiency Syndrome
BS : British Standards
CBD : Central Business District
CBOs : Community Based Organisations
CEEST : Centre for Energy, Environment, Science and Technology
C-ESMP: Contractor's ESMP
COPD : Chronic Obstructive Pulmonary Disease
DOE-VPO : Division of Environment in the Vice President's Office
EHSO : Environmental, Health and Safety Officer
EIA : Environmental Impact Assessment
EMA Cap 191 : Environmental Management Act Cap 191
EMA : Environmental Management Act
EMOs : Environmental Management Officers
ESH&S Environmental, Social, Health, and Safety
ESIA : Environmental and Social Impact Assessment
ESMP : Environmental and Social Management Plan
ESU : Environmental and Social Unit
GBV : Gender-Based Violence
GN : Government Notice
GOT : Government of the United Republic of Tanzania
GRM : Grievances Redress Mechanism
GRP : Grievance Redress Plan
HAVS : Hand Arm Vibration Syndrome
HEET : Higher Education for Economic Transformation
HIV : Human Immunodeficiency Virus
HSMP : Health and Safety Management Plan
IBRD : International Bank for Reconstruction and Development
kN : kilo Newton
LAA : Local Assessment Area
LGAs : Local Government Authorities
LHS : Left Hand Side
LMC : Lindi Municipal Council
LUWASA- Lindi Urban water Supply and sanitation authority
LTD : Limited
MoEST Ministry of Education Science and Technology
NEMC : National Environment Management Council
NEP : National Environmental Policy
NGOs: Non-Governmental Organisations
OSHA : Occupation Safety and Health Authority
PAPs : Project Affected Personnel
PDA : Project Development Area
PAD Project Appraisal Document
POM…..Project operation Manual
P-ESMP : Project ESMP
PM_{10} : Particulate Matter with diameters that are generally 10 micrometres and smaller.
$PM_{2.5}$: Particulate Matter with diameters that are generally 2.5 micrometres and small
RUWASA : Rural and Urban Water Supply Authority
RAA : Regional Assessment Area
RAP : Resettlement Action Plan
SEA : Sexual Exploitation and Abuse
SEU : Safety and Environment Unit
SGO : Social / Gender Officer
SH : Sexual Harassment
SIA : Social Impact Assessment
STIs : Sexually Transmitted Infections
TAC : Technical Advisory Committee
TARURA : Tanzania Rural and Urban Roads Agency
TFS : Tanzania Forest Services
TFV : Ten Percent Fines Value
TOR : Terms of Reference
UDSM : University of Dar es Salaam
UEA : University of East Africa
UNECE : United Nations Economic Commission for Europe
UTM : Universal Transverse Mercator
VECs : Valued Environmental Components
WB : World Bank
WHO : World Health Organisation

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

The University of Dar Es Salaam (UDSM) is the oldest public University in Tanzania. It was established in 1961 as an affiliate College of the University of London. In 1963, It became an affiliate of the University of East Africa (UEA) after independence, before becoming independent in 1970 after the split of UEA. UDSM is currently located in Ubungo Municipal Council, Ubungo District, Dar Es Salaam region.

Among other things, the UDSM is also responsible for infrastructure development, including learning equipment, upgrading curriculum, and introducing innovative pedagogical methodology; promoting applied research and innovation capacity; building function linkage with the industry; strengthening the use of digital technology; promoting self-generated income; and building the capacity of both academic staff and university leadership.

Through the continuation of developing and delivering the higher education services to the location where the services is not available, the UDSM has received financial support from the World Bank (WB) through the Ministry of Education, Science and Technology (MoEST) under the project named Higher Education for Economic Transformation (HEET-P166415). The Project Development Objective (PDO) of the HEET Project is to strengthening the learning environment and labour market alignment of priority programmes at beneficiary higher education institutions and improving the management of the higher education system.

From the received financial support, sufficient resources have been allocated including a dedicated Project Implementation Unity, Office and conducive environment for managing and administering the HEET project. Under HEET project, this project covers the Ngongo university campus in Lindi Municipal Council, Lindi Region Campus; IMS-Buyu, Zanzibar Site; and Likunja Site - Ruangwa).

The Environmental Management Act of 2004 of Tanzania requires project developers to carry out an Environmental and Social Impact assessment (ESIA) prior to project implementation. In accordance with the categories identified in the Third Schedule to Environmental Management Act, Cap 191 and First Schedule to Environmental Impact Assessment and Audit (Amendment) Regulations, 2018, the nature of this project is subject to full EIA study.

Similarly, the World Bank provides Environmental and Social Framework (ESF), Environmental and Social Safeguarding Policies (ESSP) and relevant Environmental and Social Standards (ESSs), which aim to offset the anticipated social and environmental risks and impacts. The ESS1 for example, sets out the requirements for Borrowers relating to the identification and assessment of environmental and social risks and impacts and development of mitigation measures.

Therefore, Environmental Management Act, Cap 191, the Environmental Impact Assessment and Audit (Amendment) Regulations, 2018, World Bank Environment and Social Framework (ESF), Environmental and Social Standards as well as the HEET Project's Environmental and Social Management Framework (ESMF) were observed in the study.

1.2 Project Rationale

Tanzania has made significant improvements in basic education in recent years (EMSF 2021). The enrolment in primary education has increased by 24.5% from 8,116,488 in 2015 to

10,111,671 pupils in 2018 and 10,601,616 in 2019. In 2013/14. The enrollment trend in secondary education also showed a positive increase in the number of students. Students demand for higher education is expected to surge by 2030, so the tertiary education system (public and private) must expand and be of better quality to accommodate these additional students (PAD, 2021).

It is obvious that, the overall outcome of the successful performance in basic education demands subsequent levels of education, especially higher education. The main challenge is the inability of the system to absorb the expanding number of graduates in basic education inspired and capable of joining the higher education subsector. Of immediate need is the expansion of investment in infrastructure, facilities and quality assurance systems in Engineering (agro-processing, mechanized agriculture, railway, hydropower, aeronautic, etc.), Medical Science and Technology, Agriculture and Allied Sciences, Energy and Minerals, Forestry and Natural Resource Management. Another concern is on the gender issues.

HEET Project Appraisal document (PAD, 2021) points out a number of challenges in the current higher education system. These include:

- University graduates struggle to find jobs, due to skills mismatches with the job market
- Gender inequality in lower levels of education (especially upper secondary) that persists up to the university level, although the gender parity index in higher education has improved from by 10 percent from 2013 to 2018;
- Shortage of well-trained lecturers, and the majority of academic staff use traditional teaching methodologies
- The global pandemic has reinforced the need for higher education institutions to develop thoughtful resiliency plans.
- Most of higher education institutions are not currently able to access or use modern technologies to deliver training; and
- Demand-side considerations underscore the need for greater numbers of students in disciplines and programs sought after by employers, such as engineering, agribusiness, tourism, and climate change. The overall quality of post-secondary academic programs is low and does not prepare university graduates adequately for current and future formal jobs or self-employment;

A more strategic mix of education, skills and technology will help Tanzania develop its productive sectors and create jobs for the growing number of youths entering the labour market (PAD, 2021).

The Higher Education for Economic Transformation (HEET) Project will finance the development of infrastructure, faculties, and quality assurance systems in higher education to facilitate rapid economic transformation in the country. Through the HEET project, the Government of the United Republic of Tanzania seeks to build requisite operational capacity for public universities to empower them to be dependable drivers for economic transformation by building on their respective institutional visions, missions, objectives and core values.

1.3 Objectives of the HEET Project

The main objective of the project is to support the learning environment and labour market alignment of priority programs at beneficiary higher education institutions and improve the management of the higher education system (PAD 2021). The stipulated objective is in line with UDSM Rolling Five Years Strategic Plan 2020/21 – 2024/25 and UDSM Vision 2061, which focuses on expanding infrastructures to match the increase in student enrolment. This calls for the need to expand facilities, including infrastructures, so as to create a supportive environment towards achieving its goal.

Environmental and Social Impact Assessment is required by World Bank and Tanzanian laws to protect the environment and lives of people before the construction of a project. The ESIA study shall be conducted in accordance with World Bank Environmental and Social Framework as well as Tanzania's National Environmental Management Act, Cap 191 and its subsequent Environmental Management (Environmental Impact Assessment and Audit) (Amendment) Regulation of 2018.

To comply with the World Bank's ESF and national legislations, the project beneficiary UDSM, through a consultancy service, has prepared this ESIA report to identify potential environmental and social risks/impacts and propose appropriate mitigation measures.

1.4 Proposed Activities for UDSM HEET Project at Ngongo area

The project activities involve the construction of campus of UDSM at Ngongo area, Kiduni Street, Jamhuri ward in Lindi Municipal Council, Lindi Region. The total construction cost of the project is estimated to be Tanzania Shillings (TZS) 6,996,990,000.00.

1.5 The Objectives and Scope of the Assignment

The ESIA study objective is to identify potential environmental and social effects/impacts of the proposed project activities before their actual implementation. Therefore, the study addressed the social, economic and environmental issues associated with the project activities. The study also provided a relevant Environmental and Social Management Plan (ESMP) as well as a Health and Safety Management Plan (HSMP) in order to prevent or minimize adverse impacts and devise how they can be incorporated into project design and implementation plans, identify organizational capacity and competence needed and monitor the plan's effectiveness.

The main objective of the consultancy services is to prepare ESIA and develop the Environmental and Social Management Plan (ESMP) as well as the Health and Safety Management Plan (HSMP) for the proposed construction activities in various campuses of the University of Dar Es Salaam.

Specifically, the objectives of the assignment are as follows:

- To carry out environmental screening and scoping study to identify social and environmental issues in the project site and nearby environment;
- To identify, analyse and assess the environmental and social impacts of the proposed construction project;
- To describe the pertinent regulations and standards governing environmental quality, health and safety, protection of sensitive areas, protection of endangered species and land use control at international, national, regional and local levels;
- To recommend cost-effective measures for minimizing or eliminating adverse impacts of the proposed construction, operation and maintenance of the project; and
- To prepare an Environmental and Social Management Plan and Health and Safety Management Plan for the construction, operation and maintenance phases of the Project.

According to the Terms of Reference (TOR), the ESIA should comply with the environmental regulations of Tanzania as per the provisions of the Environmental Management Act Cap 191, Environmental Management (Environmental Impact Assessment and Audit) Regulations (2005), and Environmental Management (Environmental Impact Assessment and Audit) (Amendment) Regulations (2018). In addition, the ESIA study must comply with the World Bank Environmental and Social Framework and with Environmental and Social Standards (ESSs).

The Consultant was required to assess the environmental and social impacts that the projects might cause during and after construction and thereafter recommend mitigation measures to prevent or minimize adverse impacts. The consultant also developed ESMP and HSMP, whose recommendations will inform the design of the proposed project.

According to the Terms of Reference, the Consultant shall carry out the consultancy in accordance with the applicable National Legislations and World Bank Environmental and Social Framework requirements. In addition, the preparation of the ESIA Report has taken into account the requirements of the Environmental and Social Framework. The Terms of Reference provide details on the scope of the assignment. In addition, the ESIA Study was conducted in accordance with the approved Terms of Reference by the National Environment Management Council (NEMC).

1.6 Methodology of the ESIA Study

Key methods used in this study include (i) a literature review of both secondary data, policies, laws, regulations, and Development Plans, (ii) conducting a meetings for open discussions and focus group discussions, (iii) Field visits, (iv) other methods such as the use of assessment tools such as checklists and matrices. The information collected was the main baseline information, which was also used as a basis for the analysis of impacts. The ESIA team also used a participatory approach in order to involve key players in this study.

1.6.1 Desk Study

The EIA team reviewed relevant documents related to the proposed projects. Such documents include Maps, building designs, existing land uses of the areas, climatic and ecological data, relevant policies, laws, regulations, strategies at the national level, District Development Plans, Socio-economic Profiles, etc, related to environmental and social issues. Literature review aimed at acquiring relevant information on issues that are important and could be related to the project implementation, identification of stakeholders that might be affected by the project, and collection of relevant secondary information that might provide insights into the impacts and benefits of the project.

1.6.2 Fieldwork

The ESIA team visited the site and made observations and assessments of the biophysical conditions, social, economic and environmental characteristics of the project area, proposed sites and layout, as well as key areas of the projects. The survey also included conducting interviews with local people encountered flanking the project area. The collection of baseline data on physical and biological environment were conducted during this detailed EIA study. Furthermore, information on socio-economic condition of the local people was collected and used to determine the poverty levels, hence their vulnerability due to labour influx into the project area.

The information on Gender-Based Violence (GBV), Sexual Exploitation and Sexual Harassment was collected through face-to-face interviews with representatives of government agencies, local government authorities and local NGOs/CBOs. The collected baseline information was used to assess the risk of GBV/SEA and SH due to the prevalence of different forms of violence. The details on the required baseline data, source and methodology for data collection is provided in **Table 1.6-1.**

Table 1.6-1: Source and methodology for baseline data collection

Required Baseline Data	Source and Methodology
Physical Environment	• Measurement of air quality and noise levels at the selected sampling sites within the project area.

	• Acquisition of climatic and meteorological data from Tanzania Meteorological Agency (TMA) and Internet Websites. • Acquisition and Review of existing literature from internet websites. • Acquisition and Review of traffic study reports from engineering design reports
Biological Environment	• Vegetation and natural habitats mapping at the project area. • Taxonomic survey of flora and fauna in the project area. • Acquisition and Review of existing literature from internet website.
Socio-economic and Cultural Environment	• Socio-economic baseline survey at the project area. • Conducting face-to-face interviews with municipal council officials and local community (Ward and Mtaa) community leaders. • Municipal socioeconomic profile
Gender-Based Violence, Sexual Exploitation and Abuse, and Sexual Harassment	• Conducting interviews with Police Gender Desk Officers and local NGOs/CBOs dealing with GBV/SEA and SH Issues. • Acquisition and review existing reports on GBV/SEA and SH from internet websites. • Interviews with local community leaders of all Wards and Mtaa being traversed by the road corridors and those Wards / Mtaa within the project area.

1.6.3 Measurement of Baseline

1.6.3.1 Selection of measured air quality, noise and vibration stations

The measured three (3) stations were established/selected based on the norms prescribed by local standards (Environmental Management (Air Quality Standard) Regulations, 2007) and international guidelines **(Table 1.6-1).** The norms include: predominant wind direction (leeward and windward) at the area during the study, direction to the nearest local communities as possible receptors, size of the area to be covered, the areas where generated air pollutants, noise and vibrations were expected, as well as areas that pollutants from proposed project are likely to disperse to.

Table 1.6-1: Established air quality, noise and vibrations

Station Code	Location Name	GPS Readings	
		Latitudes	Longitudes
AQMS1	Playground far from old male dormitory	-10.041222	39.624347
AQMS2	Female Dormitory	-10.040803	39.624792
AQMS3	Proposed hostel near classes	-10.041864	39.628689

1.6.3.2 Measured ambient air quality, noise and vibrations

The measured parameters include: (i) Dust as particulate matter in terms of TSP, PM10 and PM2.5; (ii) Ambient pollutant gases i.e., Sulphur dioxide (SO_2), Nitrogen dioxide (NO_2), Carbon

monoxide (CO), Hydrogen Sulphide (H_2S) and Volatile Organic Compounds (VOCs); (iii) ambient noise, and (iv) ground vibrations.

(a) Dust as particulate matter in terms of TSP, PM10 and PM2.5

Dust levels were measured by using Aeroqual series 500 monitor (S-500). Particulate matter (TSP, PM_{10} and $PM_{2.5}$) were measured in accordance with manufactured procedure that meets ISO 9835:1993 and ISO 9835:1993 Protocols for TSP, PM10 and PM2.5. During measurements, the device was fixed at a breathing height of about 1.5 meters from the ground, which is assumed to be the breathing zone of people at their respective locality or working environment. Dust levels were measured at each station during the daytime and night-time hours. The recorded data at each station were then averaged and compared with National Environmental (TBS) and WHO/IFC guidelines to check for their compliance.

(b) Ambient pollutant gases

Ambient gases concentrations (i.e. CO, NO_2, SO_2, H_2S, and VOC) were measured using "Aeroqual series 500 monitors (S-500)" at three stations. The ambient gases were measured in accordance with the manufacturer's procedure that meets ISO 9001:2008 protocol. The device was elevated at a height of 1.5 meters above the ground; once the device is switched ON, it performs an automatic calibration for three minutes by pumping in fresh air into the sensors so as set the toxic sensors to zero. Ambient pollutant gases were measured at each station during the day and night hours. The measured gases levels were then compared with their respective TBS-NES limits and World Health Organization (WHO) guidelines to check their compliance.

(c) Noise levels

Baseline noise data were recorded at each established station during the daytime (Lday) and night-time (Lnight) in accordance to ISO 1996 -1:2003 using a digital sound level meter. On taking measurements, the meter was set to the "A" weighed measurement scale, which enables the meter to respond in the same manner as the human ear. The meter was held approximately 1.5 m above the ground and at least 0.5 m away from hard reflecting surfaces such as walls. Periodic measurements were taken to grasp the mean daytime and night-time hours noise values for each station. The averaged Lday and Lnight values were calculated and compared with their respective local standards and international guidelines.

(d) Ground vibrations

Ground vibrations were measured using a vibrometer data logger, which is designed to measure ground vibrations according to European standard EN 14253:2003. On taking measurements, the accelerometer transducer was mounted on the ground vibrations to record vibrations. To produce accurate results, the transducer was secured in direct contact with the ground. The levels of vibrations were recorded in terms of Peak Particle Velocity (PPV) in millimetres per second in the vertical direction to secure data associated with proposed project. At each station, periodic measurements were taken during the day and night hours. The mean value of all recorded data at each station was calculated and used to represent that particular station. The average value for each station was then compared with National Environmental (TBS), Human detection level for vibration, British vibration standard and WHO/IFC guidelines to check for their compliance.

1.6.4 Collection of Socio-Economic Data

To determine the cultural and social factors associated with the construction and operation of the proposed project, members of the communities in the general vicinity of the project were interviewed and a review of economic and social literature was conducted. Further, rapid field appraisal techniques in conjunction with desk research were employed to investigate the

socio-economic considerations within the project area. These were undertaken to ascertain information to satisfy the following factors as outlined in the terms of reference provided:
Population and settlement characteristics

- Land uses and livelihoods
- Community structure, employment and income
- Developments underway
- Infrastructure in place
- Water supply and other utilities
- Waste management practices
- Recreational activities
- Energy supply
- Public health and safety
- Access to and delivery of health, education and social services

1.7 Stakeholder Consultation and Public Engagement Programme

The objectives of stakeholder consultation and public engagement programme are to inform interested and affected parties about the Project, to assist in the identification of key issues and concerns in respect of the Project, to obtain information that may assist in carrying out baseline or predictive studies for the EIA; to collect information in respect of the current use of land and resources for traditional purposes by local people; and to ensure that sufficient information in respect of the Project is available to stakeholders and the general public.

1.8 Identification and Assessment of Impacts

The identified potential environmental impacts are based on the interaction between the Project Related Activities and Selected Valued Environmental Components (VECs). The selection of VECs was based on the existing project environment (environmental baseline conditions), opinions/views obtained from stakeholder consultations, and the consultant's professional judgement. For this project, the selected VECs include Atmospheric Environment, Acoustic Environment, Terrestrial Environment, Public Health and Safety, Labour and Economy, and Community / Public Services Infrastructure / Utilities.

The identified impacts have been assessed by using the Environmental Impact Assessment Matrix. The EIA Matrix helped to determine the significance of impacts based on the following criteria:

- ***Importance*** – whether important to national, regional, or international interest or site-specific.
- ***Magnitude*** *of Change* – whether Positive or Negative
- ***Permanence*** – whether the condition is permanent or temporary.
- ***Reversibility***- reversible or irreversible.
- Whether ***Cumulative / Synergistic*** **f**or positive and negative impacts, respectively.

The significance of impacts also took into consideration existing by-laws, national and international environmental standards, legislation, treaties, and conventions that may affect the significance of identified impacts.

These techniques have been used in order to have a logical and systematic way of identifying, assessing, and analysing environmental impacts. The techniques also allowed subjective judgments to be quantitatively recorded and, therefore, make the assessment of impacts more objective.

1.9 The Report Format

The report is presented according to the format given in Section 18 (1 and 2) of the Environment Impact Assessment and Audit (Amendment) Regulations, 2018. It is presented as follows:

(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

CHAPTER TWO

2.0 PROJECT DESCRIPTION

2.1 Location

The proposed University of Dar Es Salaam (UDSM) Ngongo Campus is located in Jamuhuri Ward, Lindi Municipal Council, and Lindi Region. The Lindi Region forms boundaries with the Morogoro Region to the south-west, the Pwani Region to the north, the Indian ocean to the east, the Mtwara Region to the south, and the Ruvuma Region to the west. The map showing the location of Lindi Region is provided in **Figure 2.1-1.**

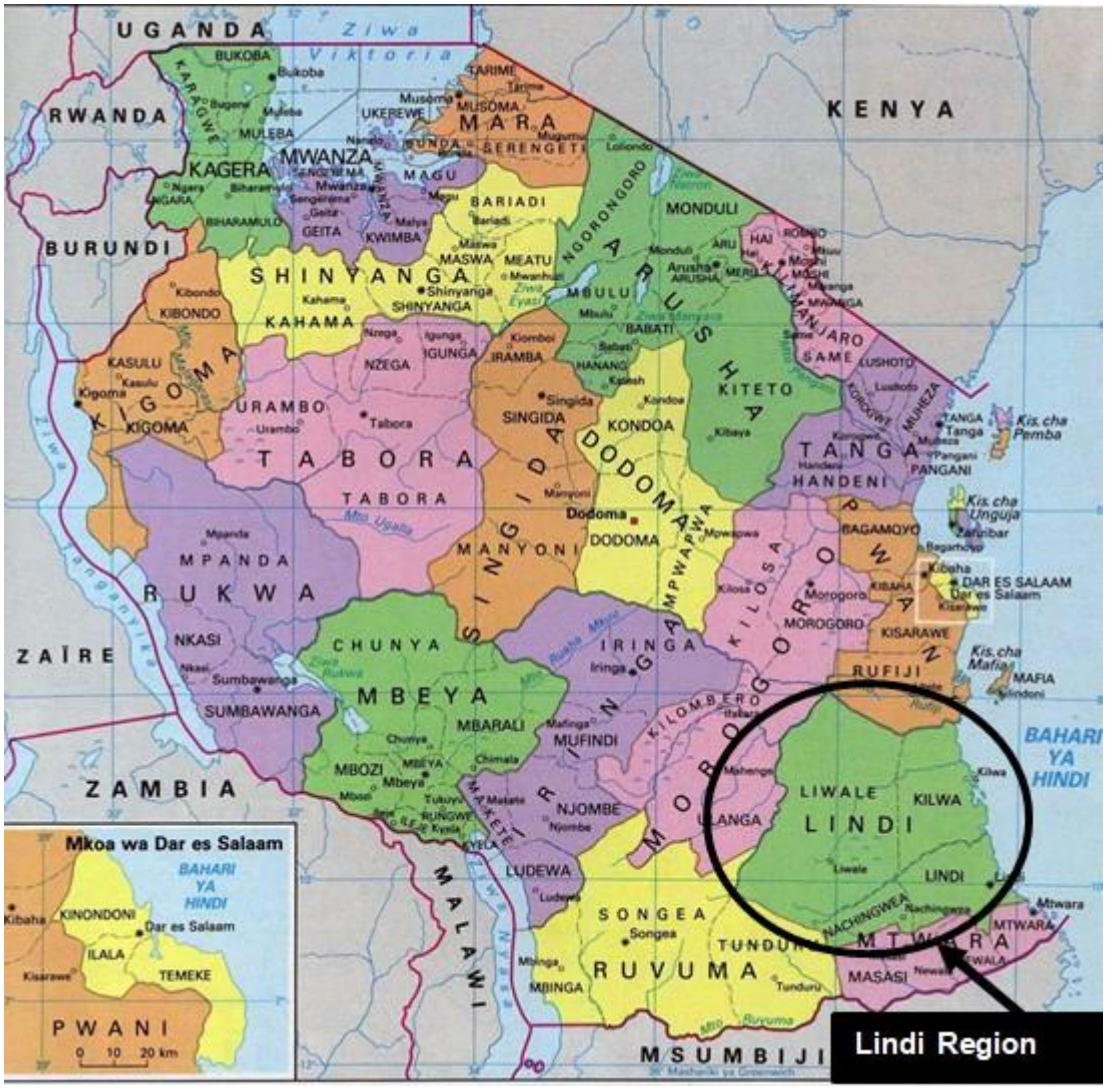


Figure 2.1-1: Location of Lindi Region.
Source:https://sw.wikipedia.org/wiki/Picha:Tanzania,_administrative_divisions_-_sw_-_colored.svg

Figure 2.1-2: Location of Lindi Municipal Council.

Source: 2012 Population and Housing Census[2]

[2] The United Republic of Tanzania. 2012 POPULATION AND HOUSING CENSUS. Population Distribution by Administrative Areas. National Bureau of Statistics Ministry of Finance Dar Es Salaam and Office of Chief Government Statistician President's Office, FinanceEconomy and Development Planning Zanzibar. March, 2013.

Figure 2.1-3: Location of Jamhuri Ward.
Source: https://www.citypopulation.de/en/tanzania/coastal/admin/0806__lindi_municipal/

2.2 Description of the Project Site

2.2.1 Location

The proposed project site is located at Ngongo Area, Kiduni Street ("Mtaa"), Jamuhuri Ward, in Lindi Municipal Council, Lindi Region. It is about 16 km from the centre of Lindi Municipality. The site forms boundaries with street road to the south and south-west, Ngongo River to the north, north-west, and north-east, and Mtwara-Mingoyo Road to the east.

The proposed project is located about 4.5 Km from the Indian Ocean and forms boundaries with the Ngongo stream (seasonal stream) to the west and north. The total length of the stream is about 4.37 Km and this has been used as the permanent border between the project site and the local individual plots. Within the project are there is also a small catchment which collects water and joins with Ngongo Stream, the small stream also forming a swamp about 300 m from Mtwara-Mingoyo Road.

2.2.2 Layout

The site layout indicates that the proposed Ngongo UDSM campus **(Figure 2.3-1)** will be comprised of three colleges, namely the College of Agriculture and Fisheries (CoAF), College of Engineering and Technology (CoET), and College of Business Schools (CoBS). However, the project will currently involve building and associated infrastructure.

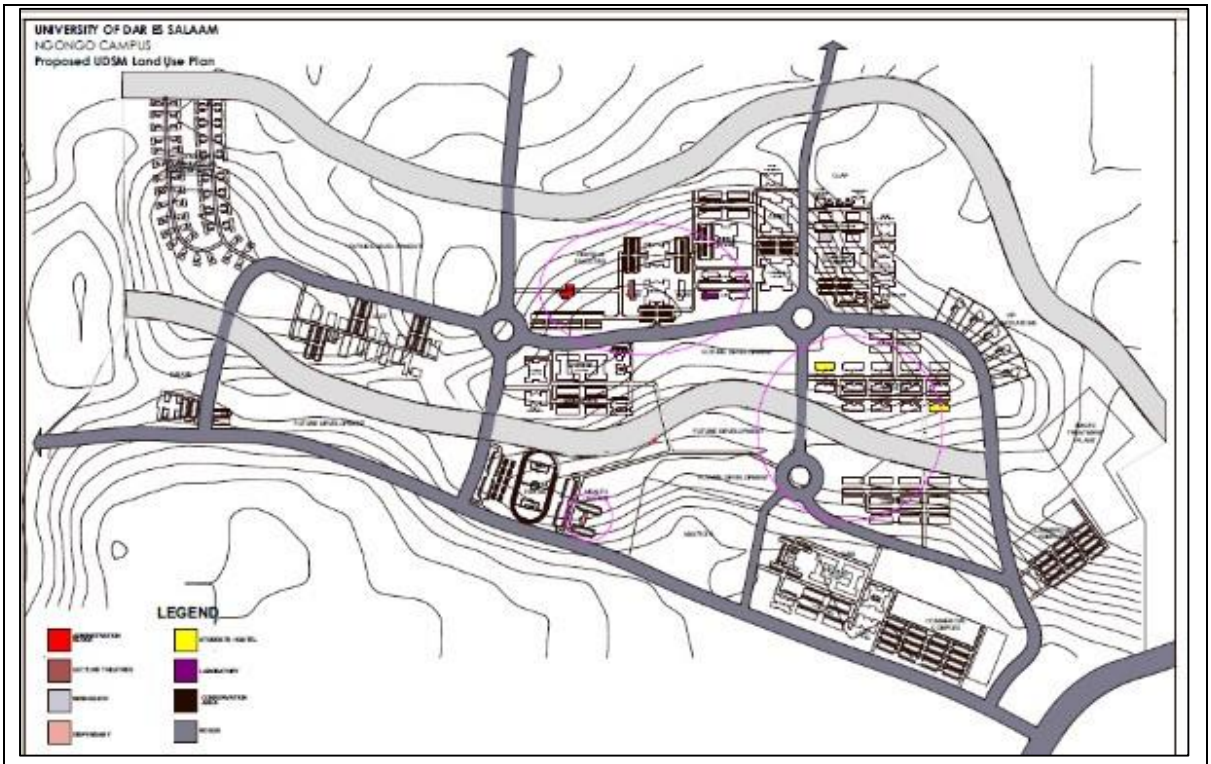


Figure 2.3-1: The Layout of Proposed Ngongo Campus.
Source: BICO, Architectural Drawings

2.2.3 Land ownership and requirements

The proposed Ngongo Campus site occupies a total area of about 113 Hectares and has been divided into Five (5) Surveyed Plots, namely Plot No. 1, Plot No. 2, Plot No. 3, Plot No. 4 and Plot No. 5. All pots, except Plot No. 4 have been issued with title deeds as shown in **APPENDIX 1.** The total area occupied by the mentioned plots is estimated to be about 454,565 SQM, whereby Plot No. 1 occupies about 135,000 SQM, Plot No. 2 about 147,000 SQM, Plot No. 3 about 38,565 SQM, and Plot No. 5 about 134,000 SQM.

The total land requirement for the construction of buildings is estimated to be about 4,484.45 SQM, which is about 1% of the total area occupied by the mentioned plots and distributed as follows:

• Administration Building	892.541 m^2
• Lecture Hall Building	594.863 m^2
• Laboratory Building.	395.546 m^2
• Workshop Building	540.00 m^2
• Dispensary Building	285.753 m^2
• Cafeteria Building	605.492 m^2
• Male and Female Hostel Buildings	1,170.255 m^2
Total:	**4,484.450 m^2**

2.2.4 Current Land Use and Important Features

2.2.4.1 Flora and Fauna

The project site is comprised of natural trees, mainly cashew nut ***(Anacardium occidentale)*** **(Plate No. 2.2-1)** and mango ***(Mangifera indica),*** and coconut trees ***(Cocos nucifera).*** The

natural vegetation is dominated by grass **(Plate No. 2.2-2)** with scattered baobab trees ***(Adansonia digitata).*** There is no important wildlife habitat or endangered, rare or unique species of wildlife in the project area.

Plate No. 2.2- 1: Cashew =nut tree (.

Plate No. 2.2- 2: Open grassland rea.

2.2.4.2 Accessibility

The project site can be accessed through an earth road (0.73 Km). The road traverses the undulating terrain towards NSS before reaching the UDSM area. Due to the nature of the project area, the road materials are eroded during the rainy season. The project site forms boundaries with street roads to the south and south-west; Ngongo River to the north, north-west and northeast; and Mtwara-Mingoyo Road to the east.

2.2.4.3 Infrastructure/Utilities

The project is supplied with electricity and water from TANESCO and LUWASA, respectively.

2.3 Project Design

The University of Dar es Salaam is planning to construct six (6) buildings at CoAF Ngongo Campus. These include Administration; Lecture Rooms B to accommodate 360 students; Laboratory, Workshop; Hostels to accommodate 512 students; and a Dispensary. Buildings are constantly subject to several climatic and environmental elements (wind, sunlight, temperature, rain, earthquakes, and other factors). Before the commencement of the project, UDSM involved experts to assess, understand and integrate risk management in the development planning of the proposed project as per Environmental and Social Standards (ESS1: Assessment and Management of Environmental and Social Risks and Impacts). Geotechnical investigation, topographical surveys and environmental and social impacts assessment Numerous studies were conducted during the preparatory phase of the project, as part of Risk Hazard Assessment (RHA). Also, climate change risks, disaster risk management, gender, and occupation health and safety were included in the project design.

2.3.1 Climate Change Risks Mitigation and Adaptation

Low energy use, rainwater harvesting, stormwater management systems, adequate natural ventilation and lighting, and green space infrastructures shall be accommodated in the design of the UDSM CoAF Ngongo Campus in order to mitigate and adapt the climate change risks (e.g., heat, drought, water scarcity, etc) as described below;

Park and open space: Trees will be planted in the park and public open spaces to maximize the canopy cover and shade provided by trees in the area, thereby providing more ecosystem services. Native trees will be given first priority to maintain the natural ecosystem.

Greenery walkways: The design maximizes pedestrian movement and minimizes motorized transport within the site in order to reduce air emissions (greenhouse gasses (GHGs)) and maximizing Carbon sequestration. Walkways are provided to restrict free movement that causes vegetation destruction on the site, and reducing land cover is important for carbon sequestration. Trees are proposed to be planted along the vehicular access road and footpaths to improve the landscape and reduce the effects of sun radiation during the day.

Green areas: Green areas are distributed in every zone/ block to allow fresh air to cross into the buildings. Due to the topographical nature and natural vegetation cover, green belts and conservation zones intend to preserve the ecosystem and control land degradation. Trees and grasses will reduce soil erosion in sloping plains and all areas prone to erosion.

The building with low energy use; Provisions for adequate openings for cross ventilation that will ensure easy flow of clean air and reduce energy use (thus reducing emissions); provisions for motion sensors in public areas to enable auto switch ON/OFF of lights; installation of presence sensors in offices, classrooms, laboratories and workshop areas; proper orientation to reduce indoor discomfort and capture natural air as much as possible and minimization of the sun effects (installation of fans; and provisions for solar lights along the pathways for sun shading); maximizing the potential of utilization of renewable energy options such as solar and wind; Utilization of biogas from the wastewater treatment plant for cooking; buildings to be oriented and constructed to take advantage of natural lighting and cross ventilation as a means of minimizing energy consumption during operation;

The buildings with low footprint. This increases green spaces, accommodation of rainwater harvesting, stormwater and waste management systems and embracing water-efficient processes.

2.3.2 Disaster Risk Management

The proposed project shall have provisions for fire prevention and firefighting facilities. Also, the buildings shall have provisions for solid waste and liquid waste management for disease prevention. In addition, possible access roads shall be used to ensure easy walkability and vehicular access to and from the building to avoid car accidents. The roads shall be safely connected to the parking area, which is huge enough to accommodate cars. CoAF Ngongo Campus shall have an emergency management plan that assigns the responsibilities for various emergency tasks, specifically to WHO does, WHAT, WHEN AND HOW.

2.3.3 Gender Inclusivity

The University structures shall be designed to be intelligent and inclusive of all genders, with special attention to accommodating individuals with special needs (e.g., physical, learning impairment, emotional, and behavioural). These include provisions for lamps, toilets, etc.

2.3.4 Occupational Health and Safety (OHS)

Table 2.3-1 Occupational Health and Safety (OHS) at Different Project Phases

Project phase	Action to be taken
Pre-construction phase	The structural elements of a project will be designed and constructed by competent professionals, and certified or approved by competent authorities or professionals. Where the project includes new buildings and structures that members of the public will access, the UDSM will consider the incremental risks of the public's potential exposure to operational accidents or natural hazards, including extreme weather events. Where technically and financially feasible, UDSM will also apply the concept of universal access to the design and construction of such new buildings and structures.

Project phase	Action to be taken
Construction phase	UDSM, with support from the supervision consultant, will ensure regular training to permanent and temporary workers (including community workers) on occupational health and safety to workers and information relevant to health risks, including cholera, HIV/AIDS, COVID-19, and impacts of dust on workers health will be provided to workers. During the construction period, the contractor shall provide, equip, and maintain adequate personal protective equipment, first-aid stations, and signboards directing where these services are situated and transport them in case of emergency. Appropriate protective gear, including, but not limited to, helmets, heavy-duty gloves, safety vests and boots, shall be provided to site workers and visitors. Training related to hazards and hazard management will be provided to workers and particularly as stipulated in the general IFC general EHS guidelines during construction, the contractor will be required to put emphasis on training related to specific hazards such as working at height, ergonomics, slips and falls, dust and moving machinery and any other relevant hazard that will be identified during construction.
Operation phase	All the emergency situations associated with building operations will be included as part of the design aspects, including the allocation of the emergency assembly points. Emergency plans and procedures will be developed to prevent and mitigate likely consequences associated with each incident. The document that details potential emergencies and responses to such situations and how to prevent and mitigate the environmental aspects will be in place. Occupational Health and Safety hazards related to the daily operations like exposure to eruption disease, risks of fire explosion and security, will be given due consideration. Fire extinguishers of powder foam type and fire hose reel will be placed in several strategic areas at the site and serviced on time.
Decommissioning phase	If decommissioning has to happen, it is anticipated that the project will have hazards resulting from noise and vibration that may be caused by the operation of pile drivers, earth moving and excavation equipment, concrete mixers, cranes and the transportation of equipment, materials and people. According to IFC Guidelines, specifically the general Environmental Health and Safety guidelines, slips and falls on higher elevations associated with poor housekeeping, such as excessive waste debris, loose decommissioning materials, liquid spills, and uncontrolled use of electrical cords and ropes on the ground, are also among the most frequent cause of lost time accidents at decommissioning site. To control these challenges during the decommissioning phase, the contractor shall be required to have a clear understanding of the historical use of the land with regard to the potential presence of hazardous materials or oil prior to initiation of decommissioning activities, preparing plans and procedures to respond to the discovery of contaminated media to minimize or reduce the risk to health, safety, and the environment but equally important to provide adequate and the right PPEs for the anticipated hazards during decommissioning.

2.3.5 Buildings Design Criteria

The building rules and regulations will be in accordance with Tanzania government specifications and the planning regulations of Lindi Municipal Council and specific conditions as provided by a certificate of occupancy from the Ministry of Lands, Housing and Human Settlements Development.

The following are the design criteria that have been followed during the design of the building;

- Easy vehicular access to and from the building,
- Short internal walking distances

- Ensure easy flow of clean air
- Aesthetic values added
- Proper orientation to reduce indoor discomfort and minimize the effect of the sun
- Ensure coherence, diversity compatible uses and scale in the context
- Wastewater disposal facilities are part of the design whereby stormwater is directed into the highway storm drains.

The expansion of the CoAF Ngongo Campus was characterized by two main factors, one of which was to fulfil the objectives and requirements of the HEET project. HEET is coordinated by the Ministry of Education, Science and Technology (MoEST) and will be implemented in almost all regional public higher learning institutions. The second factor was the stipulated objectives that are in line with UDSM Rolling Five Years Strategic Plan 2020/21 – 2024/25 and UDSM Vision 2061, which focuses on expanding buildings, research facilities and other infrastructures to match the increase in the student's enrolment.

2.3.5.1 Administration Building

The proposed administration building is comprised of ground and first floor **(Figure 2.3-1** with a total floor area of about 892.541 Square metres (SQM). The details of the administration building are as provided in **Table 2.3-2**. The total area occupied by the building structure is estimated to be about 1,029.8 Square metres (SQM), whereby 464.6 are on the Ground Floor and 565.2 SQM are on the First Floor.

Table 2.3-2: Details of the Administration Building.

S/n	Description	Surface area (m2)	Description	Surface area (m2)
Ground Floor			First Floor	
1.	Conference Room	79	Staff Offices (five rooms)	102
2.	Accountant Office	22	Lobby	163
3.	Registry	9.2	Staff Pantry (Two rooms)	37
4.	Reception	1.5	Store	5
5.	Lobby & Waiting Area	165	Corridor	163
6.	Academic Office (two rooms)	72	Principal Office	50
7.	Normal Office	8.5	Principal Office Reception	16.2
8	ICT Manager Office	12.4	Principal Office Toilet	9
9.	Sever Room	5.8	Male Toilet with 2 WC, 2 UR & 2 HW	10
10.	Staff Room	14	Female Toilets with 2 WC & 2 HW	10
11.	Pantry	4.4	Total:	565.2
12.	Store	4		
13.	Toilets for Disabled	3.8		
14.	Male Toilets with 2 WC, 2 HW & 3 UR	12		
15.	Female Toilets with 3 WC & 2 HW	13		
16.	Corridor	38		
	Total:	**464.6**	**Overall Total:**	**1,029.8**

Figure 2.3-2: The 3D Model of Administration Building.

Source: BICO, Architectural Drawings3

2.3.5.2 Lecture Hall Building

The proposed lecture hall will be comprised of Ground and Frist Floors. **(Figure 2.3-4)** with a total floor area of about 594.863 Square metres (SQM). The total area occupied by the built-up facilities inside the lecture hall building is estimated to be about 814.8 Square metres (SQM). The details of the lecture hall are as provided in **Table 2.3-3**: The lecture hall building will have a capacity to accommodate 60 students.

Table 2.3-3: Details of the Lecture Hall Building

S/n	Description	Surface area (M2)	Description	Surface area (M2)
Ground Floor			First Floor	
1.	Three lecture rooms	215.5	Three lecture rooms	215.5
2.	Entrance porch	56.5	Entrance porch	56.5
3.	Lobby	18.8	Lobby	18.8
4.	Corridor	50.8	corridor	50.8
5.	Ramp	7	Ramp	7
6.	Store	2	Store	2
7.	Male toilet	13.4	Male toilet	13.4
8.	Female toilet	13.4	Female toilet	13.4
9.	Disabled	7.3	Disabled	7.3
10.	Stair	22.7	Stair	22.7
	Total:	**407.4**	**Total:**	**407.4**

Source: Architectural Drawings, 2023

[3] Proposed design of Administration Block for the College of Agriculture and Fisheries to be Built at University of Dar es Salaam Lindi Campus, BICO, 2023

Figure 2.3- 3: The 3 D Model of the Lecture Hall Building.

2.3.5.3 Laboratory Building

The proposed laboratory will be provided with a parking area outside the building with a total floor area of about 395.546 Square metres (SQM). The lab building will be comprised of five lab rooms, reception, corridor, waiting area, pantry area, and janitor room, toilet rooms and storage room.

The total area occupied by the built-up facilities inside the laboratory building is estimated to be about 251.3 Square metres (SQM). The details of the lab building are as provided in **Table 2.3-4.**

Table 2.3-4: Details of the Laboratory Building.

S/n	Description	Surface area (M2)
Ground Floor		
1.	Five lab rooms	187.5
2.	Reception & Waiting area	25.2
3.	Pantry	3.8
4.	Janitor room	3.8
5.	Unsex toilet with 1 WC	5
6.	Male toilet with 1 WC, 1 HW and 2 UR	7
7.	Female toilet with 4 HW and 2 WC	10.5
8.	Store	8.5
	Total:	**251.3**

Source: Architectural Drawings, 2023

2.3.5.4 Workshop Building

The proposed workshop building will be comprised of Ground Floor and First Floor **(Figure 2.3-3)** with a total floor area of about 540 Square meters (SQM). The total area occupied by the built-up facilities inside the workshop building is estimated to be about 751 Square metres (SQM), whereby 559 SQM are on the Ground Floor and 192 SQM are on the First Floor. The details of the workshop building are as provided in **Table 2.3-5:**

Table 2.3-5: Details of the Workshop Building

S/n	Description	Surface area (m2)	Description	Surface area (m2)
Ground Floor			First Floor	
1.	Workshop	254	Lab Technician Room	34
2.	Entrance Ramp	53	store	8
3.	Lobby	8	Stair case lobby	24
4.	Meeting Room	25	Reception	12
5.	Office I	34	Workshop manager Office	12
6.	Store 1	17	Office II	23
7.	Store 2	23	Pantry	11
8.	Toilets includes male, female, disabled and changing rooms	29	Toilets includes male, female, disabled and changing rooms	29
9.	Car parking (two cars only)	34	Office III	17
10.	Stair case lobby	24	Office IV	11
11.	Corridor	58	Office V	11
	Total:	**559**	**Total:**	**192**
			Overall Total:	**751**

Source: Architectural Drawings, 2023

Figure 2.3-4: The 3 D Model of Workshop Building

Source: Architectural Drawings, 2023

2.3.5.5 Dispensary Building

The proposed dispensary building **(Figure 2.3-4)** will have a total floor area of about 285.753 Square metres (SQM). The built-up facilities inside the dispensary building will occupy about 158.4 Square metres (SQM). The details of the building are as provided in **Table 2.3-6.**

Table 2.3-6: Details of the Dispensary Building.

S/n	Description	Surface area (m2)
Ground Floor		
1.	Two entrance ramps	11.6
2.	Waiting area	23.4
3.	Reception	8.3
4.	Examination room	7.4
5.	Kitchenette room	5.8
6.	Pharmacy	6.7
7.	Store room	6.7
8.	Laboratory	8
9.	Male changing room with 1 WC, Bath tap, 2 HWB	9
10.	Female changing room with 1 WC, Bath tap, 2 HWB	9
11.	Dressing room	5.8
12.	Consultation room 1	6.7
13.	Consultation room 2	6.7
14.	Nurse station	6.7
15.	Mother and Child room	6.7
16.	Rest room	6.7
17.	Office	6.7
18.	Four toilets including for disabled with 4 WC, 5HWB	16.5
	Total:	**158.4**

Figure 2.3-5: The 3 D Model of the Dispensary Building.

Source: Architectural Drawings, 2023

2.3.5.6 Cafeteria Building

The proposed cafeteria building **(Figure 2.3-5)** will have a total floor area of about 605.492 Square metres (SQM). The built-up facilities inside the cafeteria building will occupy total area of about 500.310 Square metres (SQM). The canteen is designed to accommodate 122 students at once. The details of the cafeteria building are as provided in **Table 2.3-7.**

Table 2.3-7: Details of the Cafeteria Building.

S/n	Description	Surface area (M2)
1.	Canteen	213.86
2.	Serving Area	18.4
3.	Kitchen	55.62
4.	Chief men and female toilet with 2 WC and 2 HWB	12.09
5.	Lockers	10.36
6.	Office	5.99
7.	Kitchen Store	10.69
8.	Public toilets including female, male and disabled	44.01
9.	Lobby	13.31
10.	Kiosk	14.84
11.	Kiosk store	14.84
12.	Mothers' rooms	16.60
13.	Entrance foyer	69.70
	Total:	**500.31**

Source: Architectural Drawings, 2023

Figure 2.3-6: The 3 D Model of the Cafeteria Building.

Source: Architectural Drawings, 2023

2.3.5.7 Hostel Buildings

The typical hostel buildings have been proposed for both men and female students at UDSM Ngongo Campus. The proposed female hostel buildings have three storeys **(Figure 2.3-6)** with a total floor area of about 581.070 Square metres (SQM) and male hostel has three storeys with a total floor area of about 589.185 Square metres (SQM). According to the design, one storey has the capacity to accommodate 512-students. Therefore, the total number of students to be accommodated at male and female buildings is estimated to be 3,072 students.

The built-up facilities inside female and male hostel building will occupy about 820.1 Square metres (SQM). The details of the built-up facilities inside male and female hostel are as provided in **Table 2.3-8.**

Table 2.3-8: Details of the Hostel Building.

S/n	Description	Surface area (M2)
Ground Floor		
1.	Laundry	31.7
2.	Warden office	13.5
3.	TV Room	32.4
4.	Wash room with 4WC, 2UR, 2HWB	19.8
5.	Room with special need contain 1 WC	14.3
6.	5 Bedrooms	74
7.	Lactating room	9.1
8.	Stationary	18.2
9.	Study area	28.6
10.	Janitor	5.7
11.	Store	23.8
12.	2 Ramps	32.6
13.	Stars at three locations	43.6
14.	Lift	2.7
Typical floors (1st, 2nd and 3rd)		
15.	18 bedrooms	295.2 (98.4@floor)
16.	Wash room with 4WC, 2UR, 2HWB	59.4 (19.8@floor)
17.	Corridor	112.8 (37.6@floor)
18.	Lift	2.7
	Total:	**820.1**

Figure 2.3-7: The 3 D Model of the Hostel Building.

Source: Architectural Drawings, 2023

2.4 Utility Requirements

2.4.1 Energy

The proposed site for the CoAF Ngongo Campus is connected to the National grid of TANESCO. The transmission line of TANESCO has passed across the proposed project site, thus making easy for connection. Based on the power use, the average electricity Demand for the CoAF Ngongo Campus is 1150 kw/hour per day and 550kVA. It is expected that the power consumption of the Campus will increase during operation.

Due to unreliable power supply from TANESCO, there will be a standby generator with a capacity of about 550KVA for administrative and academic purpose only. The Campus will also look into feasibility of installing solar panels on the buildings in the proposed CoAF Ngongo Campus and running the beamers and laptops.

2.4.2 Water

The CoAF Ngongo Campus and nearby villages are supplied with water by LUWASA. Sources of water are pipe schemes, boreholes, shallow wells, springs, and rain water harvesting. The CoAF Ngongo Campus is within the water scheme catchment area. Water will be used for construction activities and for domestic purposes (flushing of toilets) and cleaning activities during construction and operation phases of the project.

Water consumption during construction phase

The potential source of potable water during construction will be obtained from LUWASA source. The bottled drinking water for construction workers will be obtained from local suppliers in Lindi Town. The mentioned sources are available very close to the proposed construction site.

The amount of water consumption for sanitary purpose during construction is estimated to be about 9,000 Litres per day, based on consumption rate of 75 Litres Per Capita Per Day (LPCD), and assuming that the project is expected to employ a maximum of 120 people during construction phase.

Water consumption during operation Phase

The potential source of potable water during construction will be obtained from LUWASA source. The maximum water consumption based on 80-100 LPCD[4] and number of students to be accommodated at male and female hostel is 3,072 students. Therefore, the maximum amount of water consumption during operation phase at Ngongo Campus is estimated to be 307,200 Litres/day.

2.5 Wastewater Management

The wastewater generation during construction and operation can be calculated based on the fact that 80% of the consumed water will be converted into wastewater. Therefore, amount of wastewater generated during construction is estimated to be 4,800 Litres[5], and during operation is estimated to be 245,760 Litres[6]. The wastewater will be treated by using Waste Stabilization Pond (WSP), and thereafter discharged into natural drainage or stream.

2.6 Project Activities

The University of Dar Es Salaam is planning to construct six (6) buildings at CoAF Ngongo Campus. These include Administration, Lecture Rooms B to accommodate 360 students,

[4] The United Republic od Tanzania. Ministry of Water. Design Construction, Supervision, operation & Maintenace (DCOM) Manual. Volume I. Design of Water Supply Projects. Edited by Ninatubu Lema, Mengiseny Kaseva and William Sabaya. Project Preparation, Coordination and Delivery Unit (PCDU).
[5] 80% x 6,000 Litres/day during construction phase.
[6] 80% x 307,200 Litres/day during operation phase.

Laboratory, Workshop, Hostels, Cafeteria, and Dispensary. The undertaking involves various phases, from the planning phase to the construction and operation phase. Each specific phase has its own activities and, as a result, different waste fractions. Waste types and generation vary depending on implementation phases, as elaborated in these sections. The sections identify expected waste generation, storage, options for pollution prevention, necessary treatment, and disposal infrastructure. It involved the following:

- Gathering information about project activities and processes, description of waste streams by type, quantities, and potential environmentally friendly methods for handling the wastes;
- Establishment of priorities based on potential Environmental Health and Safety risks risk anticipated by the waste streams and the available infrastructure to manage the waste in an environmentally sound manner;
- Identification of options for waste reduction at the generation point but equally important, the possibility for reuse and recycling;
- Identification and proposal of procedures and operational controls for onsite storage, treatment, and final disposal of wastes.

2.6.1 Mobilization Phase

The mobilization phase is the initial stage of the project cycle, during which the Contractor will start to mobilize equipment and workforce for the project. For this project the following are some of the major activities to be carried out by the Contractor:

- Topographical survey and geotechnical investigations.
- Establishment of Contractor's Site Office / Camp Site and Materials Storage Yard.
- Recruitment of construction workers and administrative staff.
- Mobilization and transportation of construction equipment/machinery to the site.
- Transportation of construction materials (e.g., stone aggregates, sand, cement, gravel, etc.) to the site.
- Installation of safety/security fence around the camp site and construction site.
- Removal of existing vegetation from the proposed project area.
- Identification and relocation of public services infrastructure and utilities such as, water supply pipelines, sewer pipelines, and electricity power poles, and telephone cables if any.
- Installation of temporary safety sign boards.
- Demolition of existing building structures at the proposed site if any.
- Excavation and transportation of construction related solid wastes / spoil materials and demolition wastes to the dumping sites.

2.6.2 Construction Phase

The second stage is construction phase, overlaps with mobilization phase, whereby some of the activities from mobilization phase will continue during the construction phase. During construction the following activities will be performed;

- Earth works including vegetation clearance, removal of top soils, excavation of foundation for the proposed facilities and storm water drainages system.
- Filling of parking facility bed with gravel / base course materials, compaction and laying of concrete pavements.
- Transportation of construction materials, machinery, and equipment to new construction sites
- Collection and transportation of soil/spoilt materials and demolition wastes to the dumping site.
- Transportation of construction materials such as gravel, sand, aggregates, cement bags, reinforcement bars to the materials storage yards.

- Fabrication of concrete slabs, curb stones, and concrete lining of storm water drainages,
- Installation of permanent road and safety signs, security lights, and traffic lights.
- Installation of CCTV camera for security purpose
- Construction of the proposed facilities for CoAF.
- Painting of the Campus facilities
- Rehabilitation of the access road
- Construction waste water collection and disposal facilities
- Construction of solid waste collection facilities

2.6.3 Demobilization Phase

This is the third stage of the project cycle, which involves restoration of the project site at least to its original conditions. The following are some of the major activities to be carried out by the Contractor during demobilisation phase:

- Removal of temporary infrastructure, and equipment from the campsite;
- Disposal of contaminated Materials including used oil, sewage, solid wastes (plastics, wood, metal, papers etc.) to the authorized dumping place;
- Disassembling and transportation of construction equipment/machinery from the construction sites.
- Landscaping of the open areas.

2.6.4 Operation Phase

The operation phase is the fourth stage in the project cycle, which involves operation of the constructed infrastructure. The following are some of the major activities to be carried out during the operation phase:

- Operation of Bank and mobile money services
- Operation of campus hostel
- Periodic maintenance of the Campus infrastructures,
- Preparations of farms for researches
- Operation cafeteria
- Operation of labs and offices
- Landscaping of the open areas

2.7 Material Requirements

2.7.1 Gravel/Fill Materials

The Mnazi Mmoja borrow pit, is the only source available for gravel close the project area. The source is used for maintenance of gravel roads flanking the project area. The Mnazi Mmoja source is enough for the desired work and the good thing is located close to the project site compared with other gravel sources which located along the existing highway (T7). The estimated quantities for the identified source are 400,000 m^3. The contractor is advices to find other sources of gravel materials when need is arises.

2.7.2 Crushed Stone Aggregates

The requirements for crushed stone aggregates will be highly significant because the foundation, beams, columns including parking facilities will be constructed with concrete. The potential source of crushed stones aggregates is located at Chipite village along Masasi tarmac road. There are two (2) quarry sites for production of aggregate known as Shibeshi and Toomark. The source has fine grained weathered granite rock, and has been used to supply crushed aggregates and base course materials for construction of a number of roads and building projects in Lindi and Mtwara region. The source is estimated to yield more than 90,000 m3 of crushed aggregates.

The aggregates from the source meet the required properties for crushed rock base course and concrete works in accordance with Tanzania Pavement and Materials Design Manual of 1999 (PMDM, 1999). In addition, the source meets requirements for surface dressing and asphalt concrete. The rock type is granite with the following properties:

- TFVdry (kN) = 200
- TFVwet (kN) = 170
- Ratio TFV wet/dry (%) = 85

2.7.3 Sand Materials

Kiwalala sand source is the only sand source that have been identified close to the project area. Chemical and grading analyses should be done to observe if the materials will be qualified for the use in concrete and mortar. However potential quantities in the investigated source are adequate for project implementation.

2.7.4 Construction Water and Energy

As discussed earlier, the project site has four sources of water such as supply from LUWASA, Ngongo stream, rain water harvest from building roofs and borehole. Water from LUWASA and rain water is used for domestic use at NSS while from borehole water is for other uses such as toilets and etc. The source of water supply and energy during construction is provided in **Table 2.7-1.**

Contractor is advised to investigate which source is the best for him in terms of the quality and availability. Parameters to be tested include for water quality, inter alia, contents of Chloride, Sulphates, pH, total dissolved solids and electrical conductivity. These parameters are used to assess chemical aggressiveness to hardened concrete, reinforcement and thin bituminous seals.

Table 2.7-1: Water and Energy Requirement.

Requirement	type	Source	Quantity
Water	Supply by using pipes	Boreholes and LUWASA	45,000/day will be used for construction.
Energy	Electricity + Generator	TANESCO and Standby generator	1150kwhr per day and 550kVA

2.7.5 Manufactured Materials

The manufactured materials like cement, lime, bitumen, and steel bars will be required in the construction works. All these materials are available in bulk quantities from various dealers in the country.

2.7.6 Equipment

The type of equipment to be required will depend on the prevailing conditions on the site. However, the most common equipment for construction works includes lorry tippers, bulldozers, concrete plant, rollers and plate compactors, wheeled loaders, hydraulic excavators, vibrators, concrete mixers, fuel and water tankers (bowsers), graders, pokers, vehicles, trucks, dewatering pumps, site dumper, hydraulic cranes, etc. The type and number of required equipment during construction is provided in **Table 2.7-2.**

Table 2.7-2: Number of Equipment during Construction.

Requirement	Type	Source	Number
Equipment	Concrete mixer	Contractor	2

	Tippers	Contractor	2
	Grader	Contractor	1
	Bulldozer	Contractor	1
	Oil tank	Contractor	1
	Water bowser	Contractor	1

2.7.7 Labour Force

The proposed project is expected to temporarily deploy about 120 people during construction phase. Employment during construction phase will be under contractor and will be in the form of managers, skilled as well as unskilled labourers, considering all gender types The estimated 8 skilled labour will be deployed from both Contractor and supervision Consultant, while 27 semiskilled and 85 unskilled will be employed by the Contractor. The actual number of the labours to be deployed during the project execution will be provided in detailed ESIA report. The expected working hours for the workforces is 8 hrs from the starting hours including lunch time. Overtime payments will be practised in the extra working hours. Employment priority for semiskilled and unskilled/casual labour will be given to the local people. This will contribute to reducing unemployment rates and fostering economic growth in the surrounding communities. help to minimize the number of new comers into the project area, and therefore reduce incidence of HIV/AIDS transmission due to interaction between workers and local people.

2.8 Waste Management

2.8.1 Mobilization Phase

The most common types of solid wastes to be generated during mobilization phase will be mainly soil materials and debris from site excavations. The amount and type of solid wastes will depend on the depth of the area to be excavated and number of buildings to be demolished from site.

The Contractor's office is expected to generate sanitary wastes, mainly wastewater from kitchen, bath rooms, and toilets. Types of solid wastes to be generated include food residues, waste papers, plastic bottles, food cans, etc. The amount of waste water and solid wastes will depend on the number of people occupying the Contractor's Office. Other type of wastes will be generated from construction activities and operation of construction machinery/equipment. These include cement bags, pieces of bricks/blocks, wood, and metals, oils, grease and paint containers.

Some of the solid wastes like cement bags, paint containers, waste oils, pieces of bricks and wood can be re-used during construction or handed over to local people. Non-re-usable wastes will be disposed into approved site by the Resident Engineer.

2.8.2 Construction Phase

During construction phase the operation of Contractor's Office is expected to generate wastewater from kitchen, bathrooms and toilets. The type of solid wastes to be generated from camp site will be comprised of food residues, plastic bottles, plastic papers, food cans, broken glass and waste papers, etc. The construction activities will result into generation of soil materials from excavations, cement bags, metals, waste oils, paint containers, pieces of bricks and wood.

However, the quantities of solid wastes and wastewater to be generated during construction phase is not expected to be significant compared to similar types of wastes being generated in the municipality. The waste oils and other hazardous wastes will be collected by authorized dealers. The non-reusable solid wastes will be disposed of as prescribed by the Resident Engineer. The estimated quantities of various types of wastes likely to be generated during construction phase is provided in **Table 2.8-1**

Vehicle and construction equipment's emissions which are carbon dioxide CO2, small amount of noxious gases such as sulphur dioxides SOx, nitrogen oxides (NOx), hydrocarbons and particulate matters (PM) associated with transport, excavation and construction and also exhaust fumes from construction plant, machinery and vehicle. These Green House Gases (GHGs) are known to interfere with temperature regime and cause climate change effects. Regular maintenance of vehicles and construction equipment and deploying of the qualified drivers and construction equipment operators will help to combat the impacts.

The construction works are also expected to generate hazardous wastes such as Asbestos, Chemicals, Acidic Batteries, Fluorescent Tubes, Solvents, Pesticides, Oils and grease. The following methods will help to reduce the magnitude of the anticipated impact; Prevention, if possible, Reuse, Recycling, Recovery, and Disposal.

Vehicle and construction equipment emissions and hazardous waste are significant in construction phase but short term while throughout the mobilization and demolition phases the impact is insignificant and short term.

Table 2.8-1: Quantity of Wastes to be Generated during Construction Phase.

Waste	Types	Amount	Treatment Disposal
Solid Waste (Degradable)	General garbage (food remains, cardboards and papers etc)	30 kg/day (based on generation rate of 0.25 kg/day/person and 120 workers)	to be collected in skip bucket then disposed at the Machore dump site
	Vegetation	Approximately 65-70% of the area where building will be sited vegetation clearance will be done	Tree logs will be given to local people for fire wood
	Pieces of timber	Variable	Will be collected and stored ready to be sold to recyclers
Solid Waste (Non-Degradable)	Plastics	Variable	Will be collected and stored ready to be sold to recyclers
	Tins, glasses	Variable	To be collected and stored ready to be sold to recyclers
Hazardous Wastes	Scrap metals, materials packaging, paint buckets, corrugated iron sheets, oil filters and etc.)	Variable	To be collected and sold by the authorized recyclers or to be disposed by the registered firm by the NEMC and VPO
Liquid waste	Sewage	6,000 Litres /day (Based on 120 people, water consumption rate of 50 LPCD and wastewater discharge factor of 80%)	To be collected in onsite sanitation
	Oils and greases	3-5l/day	To be collected and sold by the authorized recyclers or to be disposed by the registered firm by the NEMC and VPO

2.8.3 Demobilization Phase

The waste to be generated includes pieces of bricks, concrete rubbles, pieces of wood, scrap metals. All these wastes will be disposed into the Machore dump site. However, the re-usable

materials can be handed over to the local people. Machore dumpsite is the authorised area for dumping solid wastes within the municipality jurisdiction.

2.8.4 Operation Phase

The types of solid and liquid wastes to be generated during operation include food remnants from cafeterias, wastewater from toilets and baths; papers; and plastic. Wastewater will be treated in onsite sanitation systems; solid wastes will be collected and transported to the Machore dumpsite, about 12 km from the proposed site. Food wastes will be vended to livestock keepers nearby the project area. Plastic waste will be collected and sold to recyclers for recycling and send back to the market for the same or different use.

2.9 Project boundaries

2.9.1 Spatial Boundaries

The spatial boundaries of the project environment have been divided into Project Development Area (PDA), Local Assessment Area (LAA), and Regional Assessment Area (RAA). The spatial boundaries of the project environment are illustrated in **Figure 2.8-1.**

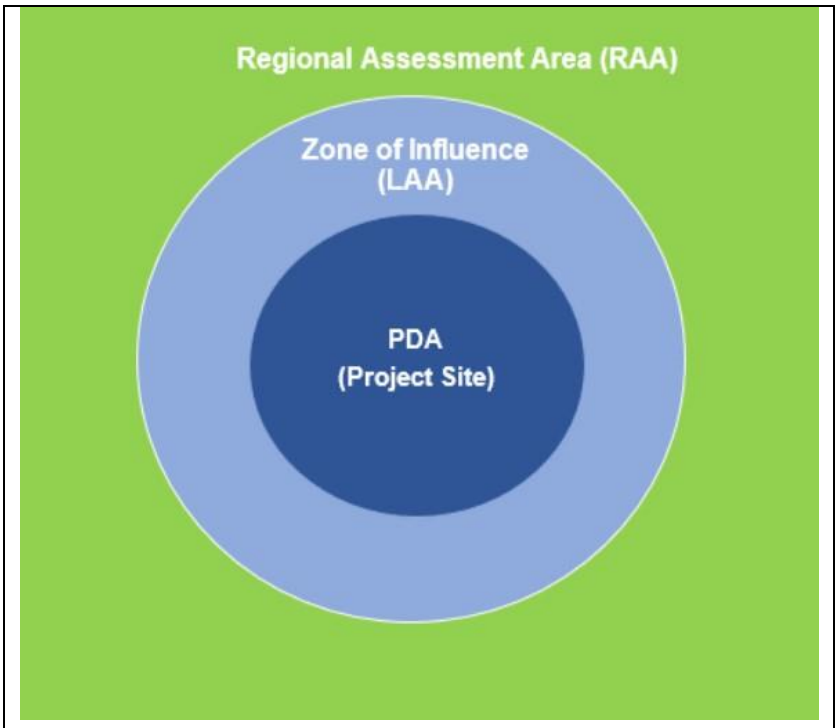


Figure 2.8-1: Spatial boundaries of the Project Environment.

2.9.1.1 Project Development Area (PDA)

The Project Development Area (PDA) is the most basic and immediate are of the Project. The PDA is limited to the anticipated area of the physical disturbance associated with the Construction and Operation of the Project. For this Project, the PDA consists of the areas that the building structures will cover. Project implementation will be done in phases, so not all the 300 acres will be developed at once.

2.9.1.2 Local Assessment Area (LAA)

The Local Assessment Area (LAA) is the maximum area within which Project-related environmental effects can be predicted or measured with a reasonable degree of accuracy and confidence. The LAA is commonly referred to as the “Zone of Influence” of the Project and

may include areas that could experience Project environmental effects that arise beyond the area of physical disturbance by the Project.

The LAA includes the PDA and any flanking areas to the project site, where Project-related environmental effects may reasonably be expected to occur. The definition of LAA varies from one VEC to another, depending on the local conditions, biological characteristics, socio-economic factors, cultural values and other factors.

2.9.1.3 Regional Assessment Area

The Regional Assessment Area (RAA) is the area within which the Project's environmental effects may overlap or accumulate with the environmental effects of other projects or activities that have been or will be carried out such that cumulative environmental effects may potentially occur. The RAA are defined for each VEC depending on the physical and biological conditions and the type of and location of other past, present, or reasonably foreseeable projects or activities that have been or will be carried out.

2.9.2 Temporal Boundaries

The temporal boundaries of the project refer to the timing and duration of the Project. They consist of the durations for the mobilization, construction, and demobilisation phases of the project. In addition, the temporal boundaries are the design periods of the road pavement and its associated bridges and other drainage structures.

The following are the temporal boundaries of the project during the mobilization, construction, and demobilisation phases:

Activities	Duration
Mobilization phase:	1 months
Construction phase:	16 months
Demobilization phase:	1 Month
Defect liability period:	12 Months
Operation phase:	50 years and more (Life span of the project or design period).

The Decommissioning Phase of the project is not expected to occur so long as the need for university facilities and services is operational. Instead, the building will continue to undergo regular maintenance and improvement depending on future requirements.

2.9.3 Institutional Boundaries

These refer to those administrative and institutional boundaries in which the project lies or interacts. These can be determined from the legislations, ministries/departmental mandates. Identifying institutional boundaries helps reduce institutional conflicts and enhance collaboration among various institutions or sectors. The institutional boundaries for conducting the environmental and social impact t of the HEET project are comprised of the World Bank (WB), the Ministry of Education Science and Technology (MoEST), the Vice President's Office (VPO), and the National Environmental Management Council (NEMC).

CHAPTER THREE

3.0 POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

Preamble

This Chapter provides the description of relevant National Policies, Legislations and World Bank Environmental and Social Standards, and Institutional Framework for environmental management in the country as well as relevant regulations, strategies, standards, international conventions and/or treaties/agreements. It also considers compliance with relevant National Policies and World Bank Environmental and Social Standards (ESS), legal requirements, and international conventions/agreements/treaties to which the country is a signatory.

3.1 NATIONAL POLICIES

3.1.1 Cross-cutting Policies

3.1.1.1 National Environmental Policy (2021)

The National Environmental Policy (NEP) of 2021[7] is the is the result of the review of NEP of 1997. As it was with NEP (1997) the NEP (2021) is the main policy document governing environmental management in the country. The overall objective of NEP (2021) is to provide a national framework for guiding harmonized and coordinated environmental management for the improvement of the welfare of present and future generations.

The policy provides a broad range of measures and actions responding to key environmental issues and challenges. It provides the framework for an integrated approach to planning and sustainable management of environment in the country. It also recommends strong institutional and governance measures to support the achievement of the desired objectives and goals.

Therefore, the policy addresses the following key environmental issues and challenges:

- land degradation;
- lack of accessible good quality water for urban and rural inhabitants;
- environmental pollution;
- loss of wildlife habitats and biodiversity;
- deterioration of aquatic ecosystems;
- deforestation;
- environmental pollution;
- climate change; and
- safe use of modern biotechnology.

The policy also identifies the following crosscutting issues as challenges facing environmental management in the country:

- Inadequate environmental Good Governance at all levels;
- Inadequate financial resources for Environmental Management; and
- Inadequate Gender consideration in environmental management.

The policy recognises the role and responsibilities of key players for successful achievement and implementation of policy objectives: These include the Ministry Responsible for Environment, Ministry of Finance, Sector Ministries, Government Departments and Agencies, Regional Secretariats, Local Government Authorities (LGAs), National Environment Management Council (NEMC), National Environmental Advisory Committee (NEAC),

[7] The United Republic of Tanzania. Vice President's Office. National Environmental Policy, 2021. October 2021. https://www.vpo.go.tz/uploads/publications/en-1644923087-NATIONAL%20%20ENVIRONMENTAL%20POLICY%202021%20new.pdf

Environmental Appeals Tribunal, Civil Society Organizations, Academic and Research Institutions, Local Communities, Media, Development Partners, Regional and International Bodies,

Relevance / Compliance
The project is being implemented by UDSM under the Ministry of Education, Science and Technology (MoEST), which are recognized by the policy as one of the key players in the implementation of NEP (2021). The project proponent will ensure mainstreaming of the NEP objectives and strategies into the project and will ensure there is collaboration with other stakeholders as required by the policy.

3.1.1.2 National Policy on HIV/AIDS (2001)
The National Policy on HIV/AIDS (2001) was formulated by the Government of Tanzania (GOT) under technical support from the World Health Organization Global Programme on AIDS (WHO-GPA) that led to the establishment of National HIV/AIDS Control Programme (NACP) under the Ministry of Health. The overall goal of the National Policy on HIV/AIDS is to provide for a framework for leadership and coordination of the National multi-sectoral response to the HIV/AIDS epidemic.

The policy outlines several specific objectives, however, the relevant objectives, which focus on sectoral roles and financing are:

- To strengthen the role of all the sectors, public, private, NGOs, faith groups, PLHAs, CBOs and active participation of all stakeholders in HIV/AIDS prevention and control.
- To provide a framework for coordination and collaboration of HIV/AIDS work.
- To influence sectoral policies so as to address HIV/AIDS.

Relevance / Compliance:
The project is likely to lead into HIV/AIDS transmission due to interaction between construction of workers and students or local community members. Therefore, the project proponent will ensure the Contractor develops and implements HIV/AIDS prevention and control programme for construction workers and students.

3.1.1.3 National Human Settlements Development Policy (2000)
The overall goal of the National Human Settlement Development Policy (2000)[8] is to promote development of sustainable human settlement and to facilitate provision of adequate and affordable shelter to all people, including the poor. The policy outlines a number of objectives; however, the relevant objective is to protect the environment within human settlement and natural ecosystem against pollution, degradation, and destruction with the aim of attaining sustainable development.

Relevance / Compliance:
The project is likely to lead to environmental pollution due to dust emission and generation of liquid and solid wastes. The project proponent will ensure dust emission is minimized within densely populated and residential areas. The project proponent will also ensure proper disposal of solid wastes and liquid wastes to avoid pollution of the surrounding environment with residential areas.

[8] National Human Settlements Development Policy (2000). United Republic of Tanzania. Ministry of Lands and Human Settlement Development. Dar Es Salaam, January, 2000.

3.1.1.4 Women and Gender Development Policy (2000)

The objective of Women and Gender Development Policy (2000)[9] is to provide a directive to ensure the planning, strategies, and various activities in each sector and institution take into consideration gender equality. The policy outlines eleven specific objectives, but the most relevant ones for this project include:

- To ensure development plans take into consideration gender equality
- To identify the role of women and men to ensure their participation in development activities for the benefit of society.

In general, the policy aims at establishing strategies on poverty eradication through ensuring that both women and men get access to existing resources for their development. It values the role played by women in bringing about development in the society.

Relevance / Compliance

The project has the potential to create employment of people during construction. The project proponent will ensure the Contractor provides equal employment opportunity between women and men; and will avoid any kind of discrimination at the workplace.

3.1.1.5 National Employment Policy (2008)

The overall objective of the National Employment Policy (2008)[10] is to stimulate national productivity, to attain full, gainful, and freely chosen productive employment, to reduce unemployment, underemployment rates, and enhance labour productivity. The policy outlines several specific objectives but the most relevant ones are:

- To promote equal access to employment opportunities and resources endowments for vulnerable groups of women, youth, and People with Disabilities (PWDs).
- To address cross-cutting issues related to the environment, gender, and HIV/AIDS in employment

Relevance / Compliance

The project has the potential to create employment for youth and women and to create adverse environmental impacts as well as the prevalence of HIV/AIDS. The project proponent will ensure the Contractor provides equal employment opportunities for women and men with a focus on vulnerable groups. The project proponent will also ensure the Contractor minimizes HIV/AIDS prevalence through formulation and implementation of HIV/AIDS preventive and control programme.

3.1.1.6 Occupational Health and Safety Policy (2009)

The main objective of the Occupational Health and Safety Policy (2009)[11] is to reduce the number of work-related accidents and diseases in Tanzania. The policy outlines eight specific objectives, but the most relevant ones are:

- To improve the occupational health and safety skills and resources in the public and private sectors.
- To enhance education and training on occupational health and safety at all levels.
- To mainstream cross-cutting and cross-sectoral issues at workplaces.

Relevance / Compliance

[9] Jamhuri ya Muungano wa Tanzania. Sera ya Maendeleo ya Wanawake na Jinsia. Wizara ya Menedeleo ya Jamii, Wanawake and Watoto. S. L.P. 3448, Dar Es Salaam, TANZANIA. Mwaka 2000.
[10] The United Republic of Tanzania. Ministry of Labour, Employment and Youth Development. National Employment Policy 2008. Dar Es Salaam, Tanzania 2008.
[11] The United Republic of Tanzania. Ministry of Labour, Employment and Youth Development. National Occupational Health and Safety Policy. 2009.

The project has the potential to create occupational health and safety risks during implementation. The project proponent will ensure the provision of Personal Protection Equipment (PPE) to the construction workers and regular training on OHS issues to the construction workers.

3.1.1.7 National Health Policy (2009)

The National Health Policy (2009)[12] outlines several objectives but the most relevant one is to reduce the burden of disease, maternal and infant mortality and increase life expectancy through the provision of adequate and equitable maternal and child health services, facilitate the promotion of environmental health and sanitation, promotion of adequate nutrition, control of communicable diseases and treatment of common conditions.

Relevance/Compliance

The project has the potential to spread of communicable diseases due to interaction between the construction workers and local community members. The project proponent will ensure deploying the local labors and provide education to labors and locals on how to stay safe throughout the project duration

3.1.1.8 National Plan of Action to End Violence against Women and Children

The National Plan of Action to End Violence against Women and Children (NPA-VAWC, 2017/18-2021/22)[13] emphasizes the actions needed for both preventing and responding to violence and recognizes that investing in violence prevention initiatives has a positive impact on inclusive growth.

Thus, the strengthening of the impact of the diverse investments being made by government, development partners and stakeholders on the lives of women, children, and families, and subsequently on communities and Tanzania as a whole is of paramount importance.

The NPA-VAWC is grounded in the Tanzanian context and envisages improved coordination, delivery of quality services, implementation of viable prevention and response measures and application of innovative solutions to end all forms of violence against women and children.

Relevance / Compliance

The project is likely to result into the risk of emergence of Gender Based Violence (GBV), Sexual Exploitation and Abuse (SEA), and Sexual Harassment (SH) due to interpersonal and social interactions among the construction workers. The project proponent will ensure the Contractor prevents emergence of GBV/SEA and SH. This will include awareness creation on GBV/SEA and SH for construction workers.

3.1.1.9 National Disability Policy (2004)

The policy was drafted by the ministry of labour, Youth Development and sports. It set the objective of the policy which are;

- Encourage the development of the people with disabilities
- Empower families of people with disabilities
- Review /amend legislations that are not disability friendly
- Improve service delivery
- To allow the participation of people with disability in decision making and implementation of important disability friendly activities

[12] The United Republic of Tanzania. Ministry of Health, National Health Policy, Ministry of Health, October 2003.
[13] NATIONAL PLAN OF ACTION TO END VIOLENCE AGAINST WOMEN AND CHILDREN IN TANZANIA. December, 2016. file:///E:/DOCS/BRT%20PHASE%204%20PROJECT/LITERATURE/NATIONAL%20PLAN%20OF%20ACTION%20TO%20END%20VIOLENCE.pdf

- To enable families of people with disabilities and society at large to participate in decision making and implementation of important disability friendly activities.

Relevance / Compliance:
The project will observe this act in order to provide accessible infrastructure to people with disabilities.

3.1.1.10 Education and Training Policy,1995
The aim and objectives of education and training policy in Tanzania is to guide and promote the development and improvement of the personalities of the citizens of Tanzania their human resource and effective utilization of those resource in bringing about individual and national development. To promote the acquisition and appreciation of culture, customs and traditions of people of Tanzania. To promote the acquisition and appropriate use of literary social scientific, vocational technological, professional and other form.

Relevance / Compliance:
The project will observe this act so as to quality education that addresses the stipulated objectives in the policy.

3.1.1.11 The National Gender Policy (2002)
The key objective of this policy is to provide guidelines that will ensure that gender-sensitive plans and strategies are developed in all sectors and institutions. While the policy aims at establishing strategies to eradicate poverty, it is relevant to the project as it emphasises gender quality and equal opportunity for both men and women to participate in development undertakings and to value the role played by each member of society. It also requires that women and men are given equal employment opportunities in the project whenever possible. This project shall ensure that women will be adequately involved at all project planning and implementation levels.

3.1.1.12 Urban Planning and Space Standards Policy 2012
The policy guides the continuing delivery of a high-quality pedestrian and other people-friendly public realm within the city centres to support the city centres' economic, social, cultural and environmental attractiveness to businesses, residents and visitors. The policy explains more as space management is a key foundation of the asset management strategy. Also, providing appropriate space is becoming even more important as institutions increasingly compete in urban areas.

3.1.2 Sectoral Policies
3.1.2.1 Construction Industry Policy (2003)
The vision of the Construction Industry Policy (2003)[14] is: To have a dynamic, efficient, and competitive local construction industry that is able to undertake construction projects of any magnitude and participate effectively in providing its services in the regional and global market place.

The mission is to create an enabling environment for the development of a vibrant, efficient, and sustainable local industry that meets the demand for its services to support sustainable economic and social development objectives.

[14] Construction Industry Policy (2003). The United Republic of Tanzania. Ministry of Works. November, 2003.

The policy outlines several objectives; however, the relevant policy objective is to improve the capacity and competitiveness of the local construction enterprises (contractors, consultants, and informal sector).

Relevance / Compliance:

The project proponent has involved the service of local consultant in the design, preparation of bidding document and supervision. During construction priority will be given to local contractors or joint venture/associations between the local and firms from abroad, local people, as well as, the use of locally available materials, as emphasized in the policy.

3.1.2.2 National Land Policy (1995)

The overall aim of a National Land Policy (1995)[15] is to promote and ensure a secure land tenure system, to encourage the optimal use of land resources, and to facilitate broad-based social and economic development without upsetting or endangering the ecological balance of the environment.

The policy outlines several specific objectives; however, the most relevant policy objective to this project is to protect land resources from degradation for sustainable development.

Relevance / Compliance

The project has the potential to create land degradation through soil excavations, and accumulation of construction solid wastes into the surrounding environment. The project proponent will ensure proper disposal of construction solid wastes and restoration of landscape after construction. The construction activities will be confined within the permitted areas by the Engineer in order to minimize land degradation.

3.1.2.3 National Energy Policy (2015)

The Vision of the National Energy Policy (2015)[16] is to have a vibrant Energy Sector that contributes significantly to economic growth and improved quality of life of Tanzanians. The Mission is to provide reliable, affordable, safe, efficient and environment friendly modern energy services to all while ensuring effective participation of Tanzanians in the sector.

The main objective of the policy is to provide guidance for sustainable development and utilization of energy resources to ensure optimal benefits to Tanzanians and contribute towards transformation of the national economy. The policy outlines sector specific issues, statements, and objectives. With regards to energy efficiency and conservation, the policy objective is to promote energy efficiency and conservation in all sectors of the economy. The relevant issues to this project are energy efficiency in transport sector and in residential and commercial sectors.

Relevance / Compliance:

The project falls under the buildings construction sector which is recognized by the policy as one of the energy consuming sectors. The design and construction of buildings will be carried out in such a way as to optimize energy efficiency.

3.1.2.4 National Mineral Policy (2009)

The National Mineral Policy also addresses that mining activities should be undertaken in a sustainable manner. Reclamation of lands after mining activities is recommended. As far as this project is concerned, mining activities are directed to quarrying activities for obtaining

[15] National Land Policy (1997). The United Republic of Tanzania. Ministry of Lands and Human Settlements Development, Dar Es Salaam, Tanzania. Second Edition 1997.
[16] National Energy Policy (2015). The United Republic of Tanzania. Dar Es Salaam. December, 20015.

stones and aggregates. Fine and coarse aggregates for the proposed project will be strictly purchased from authorised vendors.

3.1.2.5 National Health Policy (2003)

The National Health Policy (2003)[17] outlines several objectives but the most relevant one is to reduce the burden of disease, maternal and infant mortality and increase life expectancy through the provision of adequate and equitable maternal and child health services, facilitate the promotion of environmental health and sanitation, promotion of adequate nutrition, control of communicable diseases and treatment of common conditions.

Relevance/Compliance

The project has the potential to create a spread of communicable diseases due to interaction between the construction workers and local community members. The project proponent will ensure provision of sanitary facilities for construction workers.

3.1.2.6 Education and Training Policy,1995

The aim and objectives of the education and training policy in Tanzania is to guide and promote the development and improvement of the personalities of the citizens of Tanzania their human resource and the effective utilization of those resource in bringing about individual and national development. The policy is set to promote the acquisition and appreciation of culture, customs and traditions of people of Tanzania. Also, the policy promotes the acquisition and appropriate use of literary social scientific, vocational technological, professional and other form.

Relevance / Compliance:

The project will observe this act to provide quality education that addresses the stipulated objectives in the policy.

3.1.2.7 National Water Policy (2002)

The main objective of the National Water Policy (2002)[18] is to develop a comprehensive framework for sustainable development and management of the Nation's water resources. The policy recognizes the importance of water quality management and pollution control. In this case the policy objective is to have water resources with acceptable quality by avoiding pollution from point and non-point sources.

The policy seeks to protect water sources from encroachment of land around water source areas. It recognizes the problem of water pollution due to due to the disposal of untreated and/or inadequately treated domestic and industrial wastewater, agrochemicals, and high turbidity caused by sediments due to soil erosion.

Relevance/Compliance

The project will involve abstraction of water from existing natural water sources, which are the important source of water for the local communities in the project area. In this regard, the abstraction of water will be carried out carefully to avoid pollution of this water sources. This will include the use of water pump and hose pipe at a distance of not less than 50m from the water sources and avoiding washing of vehicles in the natural water sources.

3.2 LEGAL FRAMEWORK

3.2.1 Cross-sectoral Legislation

3.2.1.1 The Environmental Management Act Cap 191

[17] The United Republic of Tanzania. Ministry of Health, National Health Policy, Ministry of Health, October 2003.
[18] National Water Policy (2002). The United Republic of Tanzania. Ministry of Water and Livestock Development. July 2002.

The Environmental Management Act Cap 191 (EMA Cap 191)[19] is an Act to provide for legal and institutional framework for sustainable management of environment; to outline principles for management, impact and risk assessments, prevention and control of pollution, waste management, environmental quality standards, public participation, compliance and enforcement; to provide basis for implementation of international instruments on environment; to provide for implementation of the National Environment Policy; to repeal the National Environment Management Act, 1983 and provide for continued existence of the National Environment Management Council; to provide for establishment of National Environmental Trust Fund and to provide for other related matters.

Sub-section 81(1) requires any developer of a project to undertake Environmental Impact Assessment study at his/her own cost Sub-section 81(2) requires Environmental Impacts Assessment to be carried out prior to the commencement or financing of a project or undertaking.

Relevance / Compliance
The project falls under those projects that require EIA to be carried out prior to commencement of construction works. This EIA is an indicator of compliance with the requirements of the EMA Cap 191.

3.2.1.2 The Environmental Impact Assessment and Audit Regulations (2005)

The Environmental Impact Assessment and Audit Regulations (2005)[20] are made under Environmental Management Act No. 20 of 2004. The regulations provide basis for undertaking Environmental Impact Assessment (EIA) and Environmental Audit for various development projects with significant environmental impacts in the country. These regulations provide the procedures for carrying out Environmental Impact Assessment, Environmental Monitoring and Environmental Audits. Regulation 4 prohibits any developer or proponent from implementing a project which is likely to have a negative environmental impact without conducting Environmental Impact Assessment study.

Relevance / Compliance
The project falls under those projects that require Environmental Impact Assessment (EIA) study. The Project Proponent will adhere to the procedures for conducting EIA study as prescribed in these regulations.

3.2.1.3 The Environmental Management (Environmental Impact Assessment and Audit) (Amendment) Regulations (2018)

The Environmental Management (Environmental Impact Assessment and Audit) (Amendment) Regulations, 2018 is read as one with the Environment Impact Assessment and Audit Regulations (2005)/ These provides some amendments to the EIA and Audit Regulations (2005) and classifies projects into Four (4) Categories based on the magnitude of impacts on the environment. These include Category “A”; Category “B1”; Category “B2” and “Special Category”. The regulations provide the procedures for registration of each category of project.

Relevance / Compliance
The project falls under Category A in accordance with the classification provided in the amendment regulations. The Project Proponent already complied with project registration procedures as prescribed in these regulations.

[19] Environmental Management Act No. 20 of 2004. The United Republic of Tanzania. Vice President’s Office. 11th November 2004.
[20] Environmental Impact Assessment and Audit Regulations (2005). The United Republic of Tanzania.

3.2.1.4 The Occupational Health and Safety Act (2003)

The Occupational Health and Safety Act No. 5 of 2003[21] is an Act to repeal the Factories Ordinance; to make provisions for the safety, health, and welfare of persons at work in factories and other places of work; to provide for the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with activities of persons at work; and to provide for connected matters

Relevance / Compliance:

The project involves construction activities that are likely to create occupational health and safety risks. The project proponent will follow the provisions given in the Act to safeguard health and safety of workers. This will include ensuring that the contractor conduct risk assessment including provides Personal Protective Equipment (PPE) to construction workers. The contractor will also develop occupational health and safety management plan.

3.2.1.5 The Public Health Act (2009)

The Public Health Act No. 1 of 2009[22] is an Act to provide for the promotion, preservation, and maintenance of public health with a view to ensuring the provisions of comprehensive, functional, and sustainable public health services to the general public and to provide for other related matters.

Section 32(1) requires the occupier or owner of any premises shall cause any drainage system to be properly protected or inspected to the satisfaction of an authorized officer in order to prevent the ingress of mosquitoes, vermin, and other disease-causing agents. According to Sub-section 32(2), any person who contravenes the provisions of this section commits an offence and on conviction is liable to a fine not exceeding one hundred thousand shillings.

Section 101(2) deals with connection of private drain or sewer with public sewer. It prohibits direct or indirect discharge of any matter from a manufacturing process or factory other than domestic or storm water into public sewer without a written agreement with the Authority.

Relevance/Commitment:

The operation of ICT Buildings is expected to generate sanitary wastewater from toilets and washrooms. The wastewater treatment system and sewer pipelines will be designed in such a way that waste water will be directed into soak way pit.

3.2.1.6 The HIV and AIDS (Prevention and Control) Act (2008)

The HIV and AIDS (Prevention and Control) Act No. 28 of 2008[23] is an Act to provide for prevention, treatment, care, support and control of HIV and AIDS, for promotion of public health in relation to HIV and AIDS; to provide for appropriate treatment, care and support using available resources to people living with or at risk of HIV and AIDS and to provide for related matters. Section 6(3) requires project proponent to design and implement HIV/AIDS prevention and control programme and to submit it to TACAIDS before implementation for coordination and advice.

Relevance / Compliance:

The project is likely to create increased transmission of HIV/AIDS due to interaction between construction and the flanking local community members. Thus, the project proponent will

[21] Occupational Health and Safety Act (2003). The United Republic of Tanzania. Ministry of Labour. 13th February 2003.
[22] The Public Health Act No. 1 of 2009.
[23] HIV and AIDS (Prevention and Control) Act (2208). The United Republic of Tanzania. Ministry of Health and Social Welfare. 1st February 2008.

ensure the contractor formulates and implements HIV/AIDS prevention and control programme.

3.2.1.7 The Employment and Labour Relations Act of 2004

The Employment and Labour Relations Act No. 6 of 2004[24] is an Act to provide for core labour rights to establish basic employment standards; to provide a framework for collective bargaining; to provide for the prevention and settlement of disputes and to provide for related matters.

Relevance / Compliance:

The project involves employment of construction workers and other staff, who are covered by the provisions of the Act. The project proponent will comply with the provisions of the Act by ensuring the contractor avoids child labour, discrimination at work place directly or indirectly, and pays minimum wages to the construction workers as prescribed by the Labour Laws.

3.2.1.8 The Worker's Compensation Act (Cap. 263 RE 2025)

The Workers' Compensation Act (Cap. 263 RE 2025) [25] is an Act to provide for compensation to employees for disablement of death caused by or resulting from injuries or diseases sustained or contracted in the course of employment; to establish the Fund for administration and regulation of workers' compensation and to provide for related matter.
Section 34(1) requires an employer to, within seven days after receiving a notice of an accident from the employee or having learned in some other way that an accident has occurred, report the accident to the Director- General in a prescribed form.

Sub-section 34(2) requires an employer; at the request of an employee or the dependant of an employee furnish the employee or dependent with a copy of the notice of the accident furnished by the employer to the Director-General in respect of a claim for compensation by the employee or dependant.

Section 71(1) requires an employer carrying on business in Tanzania shall within the prescribed period and in the prescribed form register himself to the Director-General and furnish the Director-General with-
(a) the prescribed particulars of the employer's business; and
(b) any additional particulars he/she may require.

Section 72(1) requires an employer to keep a register or other record of the earnings and other prescribed particulars of all employees and to produce the register or record or a satisfactory reproduction on demand to an authorized person for inspection.

Relevance/Commitment:

The project proponent will adhere to the objectives of the Act. This will include submission employees' records of earnings and monthly contributions.

3.2.1.9 The Contractors Registration Act (1997)

The Contractors Registration Act No. 17 of 1997[26] is an Act to provide for the registration of contractors and to establish a Board to regulate the conduct of contractors and for the related matters.

[24] Employment and Labour Relations Act (2004). The United Republic of Tanzania. Ministry of Labour. 14th April 2004.
[25] The United Republic of Tanzania. Chapter 263. The Workers' Compensation Fund Act. (Principal Legislation). Revised Edition of 2015.
[26] Contractors Registration Act No. 17 of 1997. United Republic of Tanzania.

Section 12(l) prohibits non-citizen of the United Republic from forming a local contracting firm unless the majority of its shares are owned by the citizens of United Republic of Tanzania. Otherwise, it will be registered as a foreign firm or company.

Section 23(1) prohibits any body of persons, whether corporate or unincorporated, from carrying out the business of contractors, unless at least one of the partners or directors who shall also be a shareholder has, as prescribed by the Board the required technical qualifications, skills, and experience.

Relevance / Compliance

The project will engage the services of contractors during construction. Therefore, the project proponent will ensure only qualified and registered contractor is engaged in the execution of the project.

3.2.1.10 The Contractors Registration (Amendment) Act (2008)

The Contractors Registration (Amendment) Act No. 15 of 2008[27] is an Act to amend the Contractors Registration Act, with a view to providing provisions for effective regulation of activities and maintenance of professional conduct and integrity of contractors and for related matters. The Act shall be read as one with the Contractors Registration Act, hereinafter referred to as the "principal Act."

Sub-section 22(4) prohibits an employer or developer from engaging an unregistered firms or persons. If found guilty is liable to a fine of not exceeding ten per cent of the contract sum or project value but not less than one per cent of such contract sum or project value or five million shillings whichever amount is greater or to imprisonment for a term of not less than three years or to both.

Relevance /Commitment

The project will require engagement of contractor during construction. The project proponent will comply with the requirement of the Act by employing only a qualified and registered contractor.

3.2.1.11 The Engineers Registration Act (1997)

The Engineers Registration Act No, 15 of 1997[28] is an Act to repeal and re-enact with modifications the Engineers (Registration) Act of 1968, to establish a Board to regulate the conduct of engineers, to provide for their registration and for related matters. Section 12(1) prohibits any person or body of persons who are not citizen of the United Republic from being registered as a local consultant or consulting firms unless:

- in the case of a natural person, he is a citizen of the United Republic;
- in the case of a company, it is incorporated in Tanzania and the firms.

Relevance /Commitment

The project involves consultancy services during contract supervision. In this regard, the project proponent will engage only a qualified and registered engineering consultancy firm.

3.2.1.12 The Engineers Registration (Amendments) Act (2007)

The Engineers Registration (Amendment) Act No. 25 of 2007[29] is an Act to amend the Engineers Registration Act of 1997 and shall be read as one with the Engineers Registration Act, hereinafter referred to as the "principal Act"

[27] Contractors Registration (Amendment) Act No. 15 of 2008. United Republic of Tanzania.
[28] Engineers Registration Act No. 15 of 1997. United Republic of Tanzania.
[29] Engineers Registration (Amendments) Act No. 25 of 2007. United Republic of Tanzania.

Sub-section (1) any person from employing as an engineer any person who is not a professional engineer or consulting engineer, or causing to undertake engineering works or services without employing the services of a professional engineer or consulting engineer.

Sub-section (2) prohibits any person from taking up or continuing in any employment as an engineer, or carrying out engineering works or services, unless he is a professional engineer or consulting engineer.

Relevance /Commitment
The project will require services of engineers during construction. In this regard, the project proponent will ensure only qualified professional engineers are employed.

3.2.2 Sector Legislations

3.2.2.1 The Land Act (1999)

The Land Act No. 4 of 1999 is an Act to provide for the basic law in relation to land other than the village land, the management of land, settlement of disputes and related matters. Section 156 of the Land Act 1999 requires compensation to be paid to any person for the use of land of which he / she is in lawful or actual occupation as a communal right of way and with respect to a way leave. These include: any damage suffered in respect of trees, crops, and buildings as result of creation of way leave; and damage due to surveying or determining the route of that way leave. It is the responsibility of the government department of Ministry, Local Government authority or corporate body that applied for right of way to pay compensation.

Relevance / Compliance
So far, the project will involve building a new campus on UDSM/government land. On the other hand, the proponent is required to instruct the contractor to compensate any damage that the ongoing works on the adjacent lands will cause.

3.2.2.2 The Land Use Planning Act (2007)

The Land Use Planning Act No. 6 of 2007 [30] provides for procedures for preparing, administering, and enforcing land use plans, repeals the Land Use Planning Commission, and provides for related matters.
The Act has distinctive authorities of land use planning in Tanzania and establishes land use planning authorities. It outlines their functions and powers conferred upon. The authorities established under the Act include:

- Village Councils – that are responsible for planning and managing village lands.
- District Councils – that are responsible for planning and managing all lands in the district and assist Village Councils to plan and manage their areas of jurisdiction.
- Land Use Planning Commission—which prepares the national land use planning framework plan and assists the lower echelon in preparing plans and managing their lands.

Relevance / Compliance:
The project proponent will make a consultation with the district land use planning authorities before implementing the project in the areas of jurisdiction. The project proponent will implement the project in accordance with the current land use plans in the project area to avoid any possible conflicts or incompatibility with current and future land use plans.

3.2.2.3 The Urban Planning Act of 2007

[30] Land Use Planning Act (2007). The United Republic of Tanzania. Act Supplement No. 10 22nd June, 2007. to the Gazette of the United Republic of Tanzania No. 25 Vol. 88, dated 22nd June, 2007.

The Urban Planning Act No. 8 of 2007 regulates land use in the country. It requires the occupier to pay land rent in order to get the Certificate of Occupancy. The Act, among others requires submission of drawings, elevations, and plans to the urban authority. The Act gives the Commissioner for lands absolute discretion to give or withhold building consent.

Relevance / Compliance
The project proponent will comply with the requirements of the Act by submitting drawings to the urban authority.

3.2.2.4 The Education (Amendment) Act, 1995
Act amended the Education Act, of 1978 that establish the Higher Education Accreditation Council, to provide the procedure for accreditation and other related matters. Among other functions, the council accredits higher education institutions; approve admissions into state institutions of higher education, to examine and approve proposals for courses of study and course regulations submitted to it by institutions of higher education; make regulations in respect of admission of persons seeking to enrol in state institutions of higher education and to provide a central admission service to higher education institutions; and make visitations and inspection of higher institutions.

Relevance/Compliance
The project is under the University of Dar es Salaam, therefore will be monitored by Higher Education Accreditation Council.

3.2.2.5 The Standard Act of 2009
The Act aims at the promotion of specifications of commodities and services, re-establish the Bureau of Standards (TBS), the designated national standards authority established under Tanzania the TBS Act 1975 and repealed by this act. TBS is responsible for developing all kinds of national standards, including environmental standards.

Relevance/Compliance
The project will adhere to this Act, through use of the building materials that are approved by the TBS.

3.2.2.6 The Universities Act, 2005
An Act to make provision for the establishment, composition and function of the commission for universities, the coordination and rationalization of the types and categories of universities, the promotion and financing of higher education, establishment and governance of universities and for other related matters.

The amends the Education Act,1978 by repealing the whole of Part IX and amending section 33. repeals the following acts;

(a) The Muhimbili University College of Health Science Act,1991;
(b) The Mzumbe University Act,2001;
(c) The Open University of Tanzania Act,1992;
(d) The Sokoine University of Agriculture Act,1984 and
(e) The University of Dar es Salaam Act,1970

Relevance / Compliance:
The project will deal with construction of university campus in Tanzania mainland and Zanzibar.

3.2.2.7 The University of Dar es salaam Act,1970
The objectives and function of university of Dar es salaam are to preserve, transmit and enhance knowledge for the benefit of the people of Tanzania in accordance with the principles

of socialism accepted by the people of Tanzania. To create a sense of public responsibility in the educated and to promote respect for learning and pursuit of truth. To prepare students to work with the people of Tanzania for the benefit of the nation. To assume responsibility for university education within the united Republic and make provision for places and centres of learning, education, training and research. To co-operate with the Government of the United Republic and the people of Tanzania in the planned and orderly development of education in the United Republic. To stimulate the promotion intellectual and cultural development of the united Republic for the benefit of the people of Tanzania and to conduct examination for, and grant, degrees, diplomas, certificates and other awards of the University.

Relevance/Compliance
The project will observe this act during implementation phase.

3.2.2.8 The Personal with Disabilities Act (2010)

The Persons with Disabilities Act 2010: An Act to make provisions for the health care, social support, accessibility, rehabilitation, education and vocational training, communication, employment or work protection and promotion of basic rights for the persons with disabilities and to provide for related matters. A person with disabilities has the right to:

- be respected, recognized and treated in a way which does not lower his dignity;
- an education through special equipment and participate in social affairs;
- have infrastructure and environment which allow him to go wherever he pleases, use transport facilities and get information;
- use sign languages, written language by the aid of special machines or other methods that are appropriate;
- learn with persons without disabilities; and
- Get a job and contest leadership posts in various sectors.

Section 31(1) “requires employers to hire and maintain the employment of people with disabilities and establishes a work force quota under which every employer with a work force of 20 or more individuals must employ persons with disabilities at a rate of at least 3% of the employer’s total workforce.”

Relevance/Commitment
Incorporating the principles and provisions of the Persons with Disabilities Act into a project demonstrates a commitment to social inclusion, human rights, and sustainable development. We will create an environment where individuals with disabilities can fully participate, contribute, and benefit from the opportunities provided by the project.

3.2.2.9 Social Security Act No. 135, 2018

The general objective of the Act is to ensure that every citizen is protected against economic and social distress resulting from substantial loss in income due to various contingencies. The Act outlines the legal framework for the establishment, operation, and regulation of social security schemes and programs also the act is a kind of collective measures or activities designed to ensure that members of society meet their basic needs and are protected from the contingencies to enable them maintain a standard of living consistent with social norms.

Relevance/Commitment
As the project is involve the aspect related to social welfare, labour rights, and employee benefits. Integrating the provisions of the act into project planning and implementation can lead to better compliance with legal requirements, improved social protection, and more equitable outcomes so the project will provide social security to the workers and people involved.

3.2.2.10 Marriage Act 2015

Sections 10(2), 13(1) and 15 of Tanzania's Law of Marriage Act, CAP 29 [R: E 2015] allow men to contract polygamous marriages, and permit the marriage of 15-year-old girls, while the minimum age of marriage for boys is 18 years. Also, in the act the state the marriage of free will as no marriage shall be contracted except with the consent, freely and voluntarily given, by each of the parties.

Relevance/Commitment

When young girls are forced to marry, they face potentially subjected to state sanctioned rape and are at risk of increased domestic violence, early pregnancy and negative health consequences while being denied education and economic opportunities. As far as project is concerns, It will prevent early and forced marriage by providing education to the community and give the young girl education opportunities.

3.2.2.11 Other Relevant Legislations

The following are other relevant legislations to which the project will comply with during implementation:

- The Environmental Management (Air Quality Standards) Regulations 2007 (GN No. 237/2007)
- The Environmental Management (Water Quality Standards) Regulations, 2007 (GN No. 238/2007);
- The Environmental Management (Soil Quality Standards) regulations 2007 (GN 239/2007)
- The Environmental (Solid Waste Management) Regulations, 2009 (GN No. 263/2009)
- The Environmental Management (Quality Standards for Control of Noise and Vibration Pollution) Regulations, 2015.

1.1.1 International Conventions

3.2.2.12 ILO Conventions

The ILO Conventions cover a wide area of social and labour issues including basic human rights, minimum wages, industrial relations, employment policy, social dialogue, social security, and other issues.

(a) Working Environment (Air Pollution, Noise, and Vibration) Convention, 1977 (No. 148[31])

The Convention got entry into force on 11 Jul 1979, and Tanzania signed the Convention on 30 May 1983 and has accepted the obligation of the convention in respect of air pollution only[32]. According to Article 3: the term air pollution covers all air contaminated by substances, whatever their physical state, which is harmful to health or otherwise dangerous; the term noise covers all sound which can result in hearing impairment or be harmful to health or otherwise dangerous; The term vibration covers any vibration which is transmitted to the human body through solid structures and is harmful to health or otherwise dangerous.

Article 4 requires national laws or regulations to prescribe measures to be taken for the prevention and control of, and protection against, occupational hazards in the working environment due to air pollution, noise, and vibration and to have provisions concerning the practical implementation of the measures so prescribed may be adopted through technical standards, codes of practice and other appropriate methods.

Relevance / Compliance:

[31] https://en.wikipedia.org/wiki/Working_Environment_(Air_Pollution,_Noise_and_Vibration)_Convention,_1977
[32] https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:11300:0::NO::P11300_INSTRUMENT_ID:312293

The project has the potential to create occupational health and safety risks due to the handling of hazardous construction materials and equipment. The propjet proponent will ensure the Contractor provides relevant PPE to construction workers.

(b) Worst Forms of Child Labour Convention, 1999 (No. 182)[33]

The Convention concerning the Prohibition and Immediate Action for the Elimination of the Worst Forms of Child Labour, known in short as the Worst Forms of Child Labour Convention, was adopted by the International Labour Organization (ILO) in 1999 as ILO Convention No 182. It is one of eight ILO fundamental conventions. Tanzania signed the Convention on 12 September 2001.

By ratifying this Convention No. 182, a country commits itself to take immediate action to prohibit and eliminate the worst forms of child labour. Article 1 requires member countries to take immediate and effective measures to secure the prohibition and elimination of the worst forms of child labour as a matter of urgency.

Relevance / Compliance:

The project has the potential to create employment, and children may try to seek employment during construction. The project proponent will ensure the Contractor does not employ children aged 14 years or below.

(c) Discrimination (Employment and Occupation) Convention, 1958 (No. 111)[34]

The Convention concerning Discrimination in Respect of Employment and Occupation or Discrimination (Employment and Occupation) Convention (ILO Convention No. 111) is an ILO Convention on anti-discrimination. It is one of eight ILO fundamental conventions. The convention requires states to enable legislation that prohibits all discrimination and exclusion on any basis including race or colour, sex, religion, political opinion, national or social origin in employment, and repeal legislation that is not based on equal opportunities.

Article 2 requires each Member Country to declare and pursue a national policy designed to promote, by methods appropriate to national conditions and practice, equality of opportunity and treatment in respect of employment and occupation, to eliminate any discrimination in respect thereof.

Relevance / Compliance:

This project will employ different people of different origins in terms of nationalities, tribe, race religious affiliations, and gender. The Contractor will ensure there is no any kind of discrimination based on nationality, tribe, race, religion, or gender.

3.2.2.13 Workmen's Compensation (Accidents) Convention, 1925 (No. 17) 35

Workmen's Compensation (Accidents) Convention, 1925 is an International Labour Organization (ILO) Convention, which was adopted on June 10, 1925, and came into force on April 1, 1927. Tanzania signed the convention on 30 January 1962.

Article 1 requires each Member Country to ensure that workmen, who suffer personal injury due to an industrial accident, or their dependents, shall be compensated on terms at least equal to those provided by this Convention.

Relevance / Compliance:

[33] https://en.wikipedia.org/wiki/Worst_Forms_of_Child_Labour_Convention
[34] https://en.wikipedia.org/wiki/Discrimination_(Employment_and_Occupation)_Convention
[35] https://en.wikipedia.org/wiki/Workmen%27s_Compensation_(Accidents)_Convention,_1925

This project has the potential to cause accidents or death during construction. The project proponent will ensure the Contractor is registered by the Workers Compensation Fund, which is responsible for the payment of compensation in case of injury or death of any worker in the course of work.

3.2.2.14 United Nations Framework Convention on Climate Change (1992)

The objective of the United Nations Framework Convention on Climatic Change (UNFCCC) is to stabilise the concentration of greenhouse gas (GHG) in the atmosphere, at a level that allows ecosystems to adapt naturally and protects food production and economic development. Article 4 commits parties to develop, periodically update, publish and make available national inventories of anthropogenic emissions of all GHGs not controlled by the Montreal Protocol (by source) and inventories of their removal by sinks, using agreed methodologies. It commits parties to mitigate GHG as far as practicable.

Relevance / Compliance:

Since Tanzania is a Party to the Convention, the country will have to account for all sources of GHG in her future National Communications. Undertaking of this ESIA study will enable the country to identify some of the GHG that will be emitted by the project activities.

The HEET project will abide with the requirements on control and prevention of greenhouse gas emissions by minimizing the use of diesel engine generators in its building.

3.3 World Bank Environmental and Social Framework

The World Bank Environmental and Social Framework (ESF) review has been necessary because the project will receive funding from the World Bank. The ESF ensures that all projects financed by the World Bank are developed and implemented in an environmentally and socially responsible manner. The ESF ensures that environmental and social risks of World Bank-funded projects are properly identified and evaluated, any significant environmental and social risks are reduced or mitigated, and that key information about the project is disclosed and shared with key stakeholders.

There are ten (10) World Bank Environmental and Social Standards (ESS). The ESS set out the requirements for Borrowers relating to E&S risks and impacts associated with projects. The standards are intended to support Borrowers to reduce poverty and sustainably increase prosperity for the benefit of the environment and their citizens. According to the HEET Environmental and Social Standards (ESMF), nine ESSs, namely ESS1, ESS2, ESS3, ESS4, ESS5, ESS6, ESS7, ESS8, ESS9, and ESS10 are applicable to the project.

The review and screening of WB ESS has been carried out to find out which of those ten standards are applicable by this project, are summarized in **Table 3.3-1.** The results indicate the project is expected to apply six out of 10 ESSs, namely the Environmental and Social Standards (ESSs), The purpose of this section is to describe each of the applicable ESS and how the project proponent has complied or will comply with the applicable ESSs.

Table 3.3-1: Applicable WB Environmental and Social Standards

ESSs	Yes/No	Application
ESS1: Assessment and Management of Environmental and Social Risks and Impacts	Yes	The site-specific environmental and social impacts will be managed through this report. The report has been prepared to recommend E&S measures to be incorporated into designs and implementation of the proposed project.

ESSs	Yes/No	Application
ESS 2: Labor and Working Conditions	Yes	Workers will be contracted for the construction works and operation of the project. In order, to ensure fair treatment of workers, the project will ensure that terms and conditions of employment (hours, rest periods, annual leave, non-discrimination, equal opportunities and workers organizations) are aligned with the requirements of Tanzania law and ESS2. To protect workers appropriate Occupational Health and Safety (OHS) shall be applied to avoid the risk of ill health, accidents and injuries.
ESS 3: Resource Efficiency and Pollution Prevention and Management	Yes	The project activities will involve construction works which will generate dust, pollutant gases, noise, vibration erosion waste (solid and liquid) that will be properly managed via ESMP and EMop more less similar impacts are likely to be experienced during operation phases and will be managed by the same tools as well as operation and maintenance plans.
ESS 4: Community Health and Safety	Yes	The project is likely to create health and safety risks for the local community members. For example, it is likely to create construction-related risks of accidents due to unauthorized people trespassing into the construction site.
ESS5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	No	The project will not result into land acquisition or resettlement of people. The construction site is located within the plots owned by UDSM.
ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	No	The construction site is located in plots without IUCN or CITES species; hence no important critical habitat in the area.
ESS7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities	No	There is no Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities in the project area as defined in paragraph 8 and 9 of ESS.
ESS 8: Cultural Heritage	Yes	This standard is applicable in the proposed project because the construction phase of the project will involves demolishing and excavation of the soil or causes changes in physical environment therefore the chance of finds is likely.
ESS 9: Financial Intermediaries	No	There is no international waterway involved in the project area.
ESS10: Stakeholder Engagement and Information Disclosure	Yes	This ESS will be applicable because the project is likely to affect various stakeholders directly or indirectly and positively or negatively. Therefore, stakeholder engagement and consultation will be necessary at all stages of the project implementation.

3.4 INSTITUTIONAL FRAMEWORK

3.4.1 At National and Local Authority Level

The Institutional framework for environmental management in Tanzania is well established from local government to national level. The organisational structure for implementing environmental management matters from national to local government authorities is provided in **Figure 3.4-1.**

The institutional responsibilities for implementing environmental management matters from national to local authority level are outlined in **Table 3.4-1.**

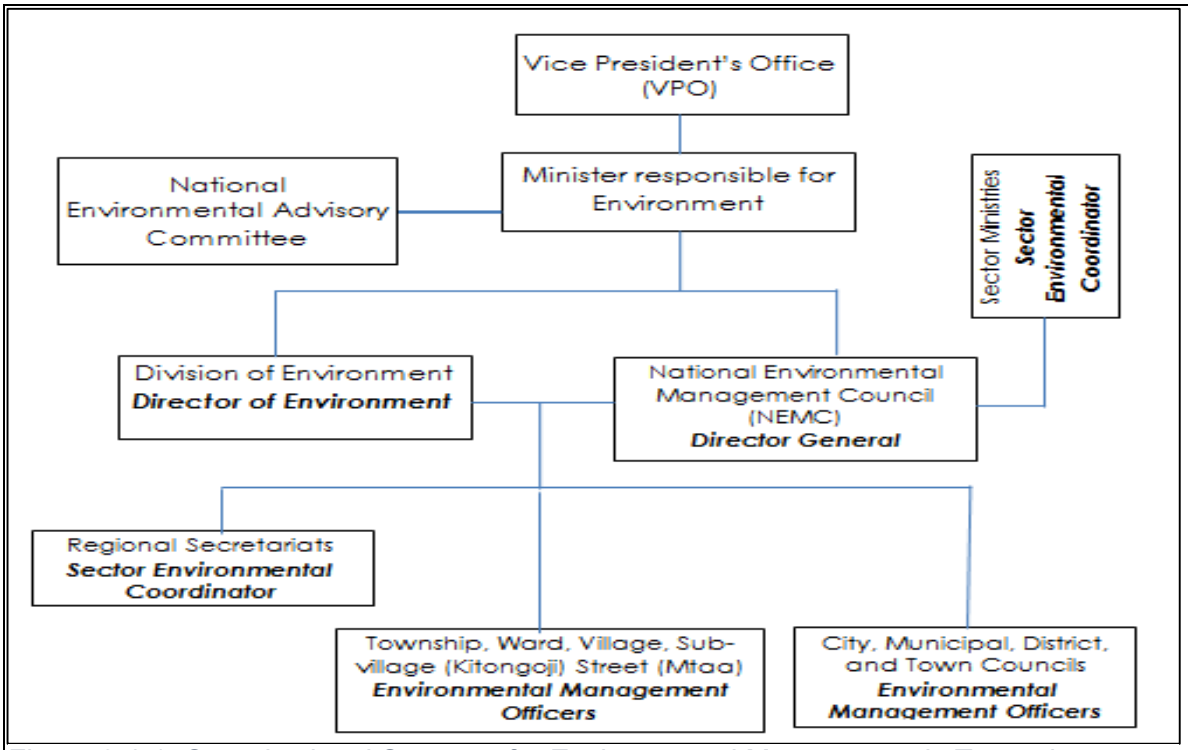


Figure 3.4-1: Organizational Structure for Environmental Management in Tanzania.

Table 3.4-1: Institutional Responsibilities from National to Local Authority Level.

Institution	Roles and responsibilities	Relevant Legislations
A. National level		
A1. Ministry of Education, Science and Technology (MoEST)	• Policy formulation at sectorial level and overseeing implementation of national environment policy within the sector ministry and collaborates with the national environmental agencies. • The ministry through its Sector Environmental Coordinator is responsible for:	▪ Section 30 Environmental Management Act Cap. 191 - which establishes Sector Environment Section within Sector Ministry. ▪ Section 31 of the EMA Act Cap 191-which stipulates the functions of the Sector Environment Section.

Institution	Roles and responsibilities	Relevant Legislations
	- Ensuring the line ministry's compliance with Environmental Management Act Cap 191 (EMA Cap. 191); - Ensuring all environmental matters contained in other laws falling under the jurisdiction of the sector ministry are implemented and reported to NEMC; and - Liaising with NEMC on all environmental matters in order to achieve cooperation and shared responsibility for environmental governance.	
A2. University of Dar es Salaam (UDSM)	• Financing and implementation of the project on behalf of the Government of the United Republic of Tanzania (GOT). • Ensuring that environmental and social issues are taken into consideration during project planning, design, construction and operation.	▪ Section 3(1) of the Executive Agencies Act (Cap 245)- which establishes the agency.
A3. Division of Environment (VPO-DOE)	The DOE which is headed by Director of Environment is responsible for: • Formulation of environmental policy. • Coordination and monitoring of environmental issues. • Review and approval of ESIA report and issuance of EIA Certificate	▪ Section 14 of the EMA Act Cap 191-which establishes the position of the Director of Environment. ▪ Section 15 of the EMA Cap. 191-which stipulates the functions of the Director of Environment.
A4. National Environmental Management Council (NEMC)	• Undertaking enforcement, compliance, review and monitoring of environmental impact assessment (EIA), including the facilitation of the public participation process in environmental decision making. • Ensuring that the project is being implemented in an environmentally	▪ Section 16 of the EMA Cap. 191-which establishes NEMC. ▪ Section 17 of the EMA Cap.191-which stipulates the object for establishment of NEMC. ▪ Section 18 of the EMA Cap. 191-which stipulates the function of NEMC.

Institution	Roles and responsibilities	Relevant Legislations
	friendly and socially acceptable manner.	
B. Municipal Council Level		
Lindi Municipal Council	The Municipal Council through the Environmental Management Officer (EMO) is responsible for: • Coordination of environmental management matters at city level. • Land use planning and issuing of development permits within the city. • Monitoring the implementation of environmental mitigation measures by the Contractor	▪ Section 36 of the EMA Cap. 191-which stipulates the functions of the Environmental Management Officers.
C. Ward / Mtaa Level		
D1. Ward and Mtaa Development Committees	The Ward and Mtaa Development Committees are responsible for: • Environmental management issues within their jurisdictional boundaries. • Monitoring the implementation of environmental mitigation measures by the Contractor through their respective Environmental Management Officers (EMOs).	▪ Sub-section 31(1) of the Local Government (District Authorities) Act of 1982-which establishes the Ward Development Committee. ▪ Sub-section 38(1) of the EMA Cap 191-which stipulates the functions of the Ward Development Committee. ▪ Sub-section 38(2) of the EMA Cap 191-which stipulates the functions of the Village Development Committees. ▪ Section 39 of the EMA Cap. 191-which establishes the position of Ward and Village Environment Management Officers. ▪ Section 40 of the EMA Cap 191-which stipulates the Ward and Village Environment Management Officers.

3.4.2 At Project Level

The institutional framework for environmental and social management at project level is comprised of World Bank (WB), Ministry of Education, Science and Technology (MoEST), National Project Implementation Unit (NPIU), Implementing Institution Project Implementation Unit (PIU), Consultant and Contractor. The institutional responsibilities for implementation of environmental and social management issues at project level is provided in **Table 3.4-2.**

The WB is responsible for financing the project and ensuring that the project is carried out in accordance with the ESMF and that environmental and social impacts are managed in accordance with WB Environmental and Social Framework (ESF) and Environmental and Social Standards (ESS1-10).

The MoEST is responsible for environmental and social monitoring and surveillance of all project components investments that will be undertaken by project and reporting the results to the WB.

The Implementing Institution PIU is responsible for coordination of consultant's activities (preparation of ESIA and ESMPs), providing support to the procurement department within the implementing institution and ensuring that the Contractor complies with environmental, social, health and safety requirements, including appointment of a qualified environmental and social experts.

The Consultant through its Environmental and Social Team is responsible for liaising with NPIU, APIU and UPIU in ensuring the environmental and social requirements are met by the project. These include conducting EIA studies, preparation of ESIA reports and corresponding ESMPs, and assisting APIU and UPIU in obtaining relevant permits and certificates for project implementation.

The Contractor through its Environmental and Social Team is responsible for complying with environmental and social requirements, including allocation of adequate budget for preparation and implementation of HSMP and C-ESMP based on project ESMP provided in the Bidding Documents. The Contractor is also responsible for liaising with APIU, UPIU and Supervision Consultant and reporting of any accidents or incidents

Table 3.4-2: Institutional Responsibilities at Project Level.

Institution	Roles and responsibility
World Bank	• The funding organization will have an overarching responsibility to ensure that the project is carried out to the highest environmental standards strictly in accordance with the ESMF and ESIA project report and the mitigation measures set out therein. Additionally, the funding Institution requires that environmental and social impacts are managed in accordance with the World Bank ESF and its ESS.
PS-MoEST	• E&S monitoring and surveillance of all project components investments that will be undertaken by project. • The ministry will report results of this monitoring to the World Bank.
NPIU Environmental and Social Team	• Coordinate different activities to ensure that, the project meets the country legal and World Bank requirements in regard to Environment and Social Framework
Implementing institutions (UDSM-PIU) Environmental and Social Team	• PIU is established by Article 3 (2) (ii) of the Grant Agreement between The Ministry of Education Science and Technology (MoEST) and the University Dar es Salaam, which states that: • Maintaining the PIU chaired by the Deputy Vice Chancellor (Planning, Finance and Administration) and assisted a senior university staff at the level of at least Deputy Vice Chancellor, assisted by a qualified and experienced staff in adequate numbers and under terms of reference as outlined in the Project Operational Manual (POM). • The PIU is vested with the responsibility of the day-to-day implementation of the respective USIP activities including financial management,

Institution	Roles and responsibility
	procurement, environmental and social risk management, governance and anti-corruption, monitoring and evaluation, and reporting; • Coordinate specialist/consultants for any support missions or attend different meetings and provide any guidance in the bid to ascertain that the different challenges identified for each sub-project/activity are duly covered from risk. • Support the procurement officer at UDSM in making sure that the bidding documents clearly cover the health, safety and environmental component with appropriate provisions of the same for the contractors to bid. • Coordinate preparation of ESIA and environmental and social management plans (ESMPs) done by consultant and site-specific ESMPs (SSESMP). • Ensure that contractors have an Environmental Health and Safety Officer (EHS), who are familiar with the compliance requirements, including WB EHS guidelines.
Consultant (Environmental and Social Team)	• Work with the NPIU/APIU/UPIU to understand the requirements of the environmental and social assessment; • Conduct initial site visits with the NPIU/APIU/UPIU to understand the sub-project setting and site-specific requirements; • Prepare the ESIAs and ESMPs based on the procedures described in the ESMF including carrying out an alignment walk, alternatives analysis and baselines studies, identifying the E&S risks and impacts, developing mitigation measures and monitoring plans incorporating EHS requirements; • Cost all the mitigation and management measures proposed in the ESMPs and SSEMPs • Propose a capacity building plan for the implementation of the sub-projects for all actors involved with cost estimates and schedule; • Carry out public consultations; • Conduct trainings as needed; • Assist the APIU/UPIU in preparing documentation to obtain certification from NEMC for the ESIAs and ESMPs.
Contractors (Environmental and Social Team)	• Compliance with relevant environmental and social legislative requirements (project-specific, district- and national level), including allocating adequate budget for implementation of these requirements; • Work within the scope of contractual requirements and other tender conditions; • Prepare CESMPs based on the ESMP in the bidding documents and contracts; • Train workers about EHS (including relevant WBG EHS Guidelines) and the site specific environmental and social measures to be followed;

Institution	Roles and responsibility
	• The EHS officer of the contractor will participate in the joint site inspections with the APIU/UPIU and Environmental Supervision Engineer/consultant; Immediate notification of the NPIU and supervision engineer of any significant social or environmental health and safety incident linked with the project, and indication about the measures taken or that are planned to be taken to address the incident as well as propose any measures to prevent its recurrence. • Carry out any corrective actions instructed by the Supervision Engineer/consultant; • In case of non-compliances/discrepancies, carry out investigation and submit proposals on mitigation measures, and implement remedial measures to reduce environmental impact; • Propose and carry out corrective actions in order to minimize the environmental impacts; • Send weekly reports of non-compliance to the Supervision Engineer/consultant; • Send monthly progress reports to the Supervision Engineer/consultant.

3.4.3 UDSM Project Implementation Unit (PIU)

UDSM Project Implementation Unit (PIU) is comprised of 12 members. These include 1-Environmental Expert; 1-Social Expert; and 1-Gender Expert, locally known as Environmental and Social Safeguard (ESS) Team. Other PIU members include Coordinator, Deputy Coordinator, Infrastructural Development Officer; Capacity Building Officer; Curriculum Development Officer; Finance Officer; ICT Expert; Procurement Officer; Monitoring and Evaluation Officer; Industrial Linkage Officer; and Communication Officer. Most of the PIU members have been appointed based on their expertise and thus their contribution to this project is based on their expertise.

The ESS Team is involved in providing inputs in preparation of TORs and Contracts Documents for procurement of Contractors and Consultants. In addition, the ESS Team has an ESS Office and has developed an operational Grievances Redress Mechanism (GRM). Also, there is a suggestion box at the ESS Office.

CHAPTER FOUR

4.0 ENVIRONMENTAL BASELINE CONDITIONS

4.1 Physical Environment

4.1.1 Topography

The topography of the project area is characterized by undulating terrain with altitude ranging from 17 m mean above sea level (m.a.s.l.) to 45 m (m.a.s.l.). The altitude ranges from 17 m (m.a.s.l.) to 45 m (m.a.s.l.).

4.1.2 Climate

The project area has a tropical climate characterised by hot and humid weather throughout much of the year with an average temperature of 29ºC. In general, the climate is influenced by its close location to the equator and warm Indian Ocean. The hottest season is from October to March during which temperatures can raise up to 35ºC. It is relatively cool between May and August, with temperature around 25ºC.

The area has a tropical wet and dry climate with two distinct rainy seasons. These include the “long rains” between March and May, and "short rains", from October to December. The average rainfall is 1000 mm (lowest 800 mm and highest 1300 mm). Humidity is around 96% in the mornings and 67% in the afternoons.

4.1.3 Climate Change

The evidences of climate change in recent periods in Tanzania[36] indicates the mean monthly maximum temperatures (28.5 °C) for the short period (2012- 2018) were slightly higher than the long term monthly means for 1981-2010 recorded at 28.2 °C which indicates an increasing pattern of temperature over the same shorter period. The data also indicate increased trends of precipitation in recent period. The monthly average rainfall (85.4 mm) observed for the short period of 2012-2018 is slightly higher than the monthly average rainfall (83.3 mm) recorded for the long-term period (1981-2010). In addition, there is a gradual rise of mean sea level from 1,992 mm in 2000 to 2,115 mm in 2019.

Climate change is being contributed by greenhouse Gas (GHG) emissions, namely Carbon Dioxide (CO_2); Methane (CH_4); and Nitrous Oxide (N_2O). The national estimates indicate that, Tanzania has negligible emissions levels of GHGs in terms of total and per capita whereby per capita emissions are estimated at 0.2 tCO2e. The principal source of GHGs emissions in Tanzania is Land Use, Land-Use Change and Forestry (LULUCF). Emissions from LULUCF sector contribute about two-thirds (⅔) of overall emission levels in Tanzania. Other sectors which contribute to greenhouse gas emissions in the country are Agriculture, Energy, Waste and Industrial Process and Product Use.

In the project area, deforestation is one the contributing factors to climate change due to destruction of natural vegetation, which is important for Carbon dioxide reduction form the atmosphere due to sequestration (absorption) effects. In 2010 Lindi Rural District had 428kha of tree cover, extending over 72% of its land area. In 2021, it lost 6.20kha of tree cover, equivalent to 1.83 Mt of CO_2 emissions[37].

Implication for the project

The project is not likely to contribute into climate change effects, because the project site is located on cultivate land, with few isolated trees. However, the project will utilize the climate

[36] https://www.nbs.go.tz/index.php/en/census-surveys/environmental-statistics/593-the-national-climate-change-statistics-report-2019

[37] https://www.globalforestwatch.org/dashboards/country/TZA/10/2/

change information in the design of building structures. The project will also contribute in the reduction of GHG emission by prohibiting the use of ozone depleting substances.

4.1.4 Geology and Soils

The geology of the project area is dominated by continental and lacustrine sedimentary formations[38]. The sub-soil is dominated by marine limestone, mainly comprised of sandy clay and clayey sands. The project area is comprised of Mesozoic rocks, limestone, sandstone, shales and mark.

4.1.5 Ground and Surface Water Resource

4.1.5.1 Ground Water Quality

The project site is within the Coastal Sedimentary Aquifer, which is typically five to 30 meters thick, with a water depth of 10 to 35 meters below ground. Water quality varies, with periodic nitrate and salinity issues and better productivity from limestone and sandstone, compared with shale and marl[39].

4.1.5.2 Surface Water Quality

The proposed project is implemented close to the Ngongo stream northern side of the project area. The closest location of the Ngongo stream from the NSS is 300 m. The stream and other tributaries in the project area are form the swamp with 434 m perimeter. The river is highly contaminated due to the use of manure in the close farms and the colour of water is due to the nature of the soil in the project area.

4.1.6 Ambient Air Quality

4.1.6.1 Dust Level Measurements

The highest daily average concentrations of 0.022 mg/m^3 for TSP, 0.015 mg/m^3 for PM_{10} and 0.009 mg/m^3 for $PM_{2.5}$ were measured at AQMS2 *(Appendix 2a).* However, dust emission levels at all stations were found to be lower than the prescribed TBS limits and/or WHO guideline criteria for dust concentrations.

4.1.6.2 Ambient Pollutant Gases

The measured Sulphur dioxide (SO_2), Volatile Organic Compounds (VOCs), and Nitrogen dioxide (NO_2) concentrations were found to be lower than the prescribed TBS and WHO/IFC limits at all stations (Appendix 2b). Similarly, the recorded CO concentrations were found to be lower than the prescribed TBS limit of 15 mg/m^3 and WHO/IFC guideline value of 30 mg/m^3. The Hydrogen sulphide (H_2S) concentrations ranged from 0.11 mg/m^3 to 0.27 mg/m^3, with highest values (0.27 mg/m^3) being recorded at AQMS1 (Playground far from old male dormitory) and lowest values (0.11 mg/m^3)) at AQMS3 (Proposed hostel near classes). The highest levels at station AQMS1 can be attributed to presence of H_2S emission sources around the measurement station (e.g. sewage chambers, inspection manhole, etc). However, there is no any prescribed Tanzania Standards or International Standards for H_2S. Nevertheless, according to literature[40]., the World Health Organization (WHO) has an air quality guideline of 150 µg/m^3 (10.6 ppb) hydrogen sulphide, averaged over a 24-hour period, which is equal to 0.15 mg/m^3. Therefore, based on the literature, the measured H_2S at AMS1 and AQMS2 has exceeded the prescribed WHO air quality guideline, although the measured values at all stations were found to be lower than prescribed exposure limits by international agencies.

[38] GEOLOGY AND MINERAL MAP OF TANZANIA. Patrice PINNA, Sospeter MUHONGO, Boniface A. MCHARO, Elizabeth LE GOFF, Yves DES CHAMPS, Francis VINA UGER and Jean Pierre MILESH, December 2004
[39] Hydrogeology of Tanzania. http://earthwise.bgs.ac.uk/index.php/Hydrogeology_of_Tanzania
[40] EARTHWORKS™ General Information – **Hydrogen Sulfide** https://earthworks.org/issues/hydrogen-sulfide/

4.1.6.3 Noise Levels

The day time average noise levels were ranging from 45.4 to 47.7 dBA during the daytime and 40.7 to 41.2 dBA during night-time (Appendix 2c). The results indicate the recorded noise levels were acoustically safe for people residing nearby the project site as the measured noise levels were found to be lower than WHO/IFC acceptable noise levels.

4.1.6.4 Ground Vibrations

The recorded vibration levels were 0.001 mm/s PPV at all measured stations (Appendix 2d). The anticipated impact resulting from the measured vibrations is considered insignificant as the measured levels not exceeded 0.15 mm/sec PPV criteria established to evaluate the extent that can easily be detected by human, TBS and British Standard limits. In that regard, the measured ground vibration levels are very minimal and thus is not likely to impact negatively any sensitive receptors.

4.2 Biological Environment

4.2.1 Flora

The project area is within the surveyed area with more than 70% of the plots are undeveloped. Since the area was previous used as agricultural area, most of the existing flora is comprised of the planted trees and natural grass. The dominant trees are mango trees ***(Mangifera indica)***, neem trees ***(Azadirachta indica)***, and cashew nut ***(Anacardium occidantale***). The consultant found only one baobab tree ***(Adansonia digitata)*** within the project area.

4.2.2 Fauna

There is not any important wildlife habitats or fauna species that needs special protection at the project area. In addition, there is no any identified endangered, threatened, unique or rare species. In general, the project area is currently used for livestock grazing as evidenced by presence of bare areas due to frequent trampling by livestock.

4.3 Socio-Economic Environment

4.3.1 Population

According to census of 2022 the population was **174,126** with **84,078** male and **90,048** female. Lindi Municipal council is comprised of 31 wards,117 street, 47 village and 236 hamlets. Population Distribution at Lindi Municipal Council is shown in **Table 4.3-1**

Table 4.3-1 Population Distribution in Lindi Municipal Council.

Total	Male	Female	Sex Ratio	Number of Households	Household Size
174,126	84,078	90,048	93	52,809	3.3

The project area is located at Jamuhuri ward in Lindi Municipal Council has the population of 4,797where male were 2340, and female 2457. The population distribution is Jamuhuri Ward is provided in **Table 4.3-2.**

Table 4.3--2: Population Distribution in Jamuhuri ward.

Total	Male	Female	Sex ratio	Number of households	Household size
4,797	2340	2457	95	31422	3.4

4.3.2 Ethnic group

The ethnic composition to the project area is dominated by Mwera, Makonde,Yao,Ngindo and Matumbi. It was observed that majority of the population is made up of mainly Muslim with a small proportion of the population still practicing traditional African religions

4.3.3 Social economy

About 81.2% of the population in Lindi Municipal council are farmers(self-employment) where as 9.1% of the population are involved in non-agricultural activities and only 5.1% of the population are in formal employment.

4.3.3.1 Education

Primary school

There is only one primary school, Turiani Primary School which is found near the project area. However, at Municipal level, there are 81 primary schools, whereas 6 are private schools which provide nursery and primary education and 75 are the government schools.

Secondary school

There is only one secondary school, Ngongo Secondary School which is near the project area.

However, at Municipal level, there are 19 secondary schools in Lindi Municipal council, 17 are government schools and the remain 2 are private schools. There is only one 1 secondary school which provide advanced level studies. In the project area there is one secondary school called Ngongo located close to the plots planned for the proposed project. The literate rate in Lindi MC is 74.3%, and men have higher literate rates than women.

The reason causes dropout for primary and secondary school such as

- Cultural background of not valuing education. (They value wedding and initiation).
- Insufficient study material.
- Lack of enough teachers
- Pregnancy
- Separation of family
- Low income of the family
- Parent low level of education.

Initiative taken to overcome pupil's dropout

- District council bylaws have been introduced and applied to the parents whose children do not attend school eg Every parent who wants to celebrate jando and unyago must implement it during holidays June and December.
- Parent have been sensitized to make sure their children get lunch at school.
- Agreement is reached between parents and the district government by parents filling up special commitment forms that every child once enrolled to school has to finish schooling.
- Sensitization on the importance of primary education to society.
- Relationship between parents and teachers/school should be Improved

4.3.3.2 On-going Activities and Adjacent Land Use at the project area

The flanking environment in the project area is currently not planned for any project, the only planned activities is for the UDSM plots only. The UDSM plots as described earlier will be used for Construction of administration block, construction of lecture rooms, for undergraduates' type 1 block-6 room, construction of one laboratory and work shop block, construction of one undergraduate student hostel block, construction of dispensary, construction of related infrastructure facilities (including roads, external fence, water distribution network sewage network, power distribution network and fibre optic network. There is a secondary school called Ngongo, houses that are used temporarily as dormitories, teachers houses and nearby there is a slaughtering house.

4.3.3.3 Recreation

The sole tourist attraction in the council is the Indian Ocean. There are good resting beaches but most of available of local people do not have a habit of visiting their beaches. Lindi has attractive sites ranging from beautiful unspoiled beaches to unique ecosystem forests and birding locations. The availability of the Selous game reserve made Lindi a beautiful spot for fishing and diving. In the project area, there is no hotel, bar, or restaurant however the locals expect the project will come with this package to serve lectures, students and the community around the campus.

4.4 Gender Based Violence (GBV)

Gender differences are significant attribute in agriculture from access control and ownership of land to marketing of raw and processed produce. In Tanzania despite constitutional proclamations of gender equality and many laws that promote equal opportunities for both men and women, it remains the case that on both small farms and large plantations men and women carryout different type of work, have different level of access to resources and are unequally rewarded for their contributions to the agricultural system with women typically having less access to lower incomes (RUBIN 2010).

Gender equality in the study area is a problem due to the culture practice, religious norms, lower level of education poverty and limited participation in decision making at all levels.it was noted that women have internalized the patriarchal system by being submissive, by losing their bargaining power and by being totally powerless without rights, influence and resource less.
In the project area there is cases reported and we term them as GBV such as:

- Widows denied inheritance of property based on the tradition mind set and belief that women ought not to inherit.
- Children lack parental love, physical affection, tenderness and being irresponsive,
- Punishment to women i.e divorce for not bearing children.
- Widower/widow they do not get enough care from their children because of their age, sometimes children sell their property and remain with nothing.
- Early marriages and early pregnancies
- Presence of sexism

4.5 Community Safety, Health and Security

4.5.1 HIV/AID Prevalence

Lindi Municipal council has the lowest HIV prevalence of less than 1%. The factor attributed to the spread of HIV/AID infection were stated during consultation meeting, unfaithful among partners income/poverty, ignorance, excessive alcohol taking, careless negligence and unsafe sexes.

4.5.2 Health

Lindi Municipal Council has 53 health facilities which 1 is regional referral hospital, 5 health centre and 47 dispensaries. As shown in the **Table 4.5-1** below.

Table 4.5.-1: Number of health facilities in Ruangwa

Hospital		Health centre		Dispensaries		
Public	**Private**	**Public**	**Private**	**Public**	**Private**	**Military**
1	0	5	0	40	4	3

Below, are ten reported diseases dominated in Lindi Municipal Council:

- *Malaria*
- *ARI*

- *Pneumonia*
- *Eye conditions*
- *Skin diseases*
- *Diarrhoeal disease*
- *Intestinal worms*
- *Minor surgical.*
- *Asthma*
- *Anaemia*

4.6 Transportation Network

Road transportation is the major type of transportation for people and goods within and outside Lindi Municipal Council. The council road network is composed of truck, district, feeder and urban roads.

The Municipality is interconnected through a good road network of 400 whereby 319 km are Municipal roads and 61 km are Truck roads and 19 km are regional roads. Within 319 km Municipal roads 17.1 km are tarmac roads, 152 km are gravel roads and 150 km are earth roads thus giving easy access within and to areas outside. About 50% of Municipal roads are accessible throughout the year, 13.8% of the Municipal roads are of variable quality and have limited accessibility during the rainy season. The highway to the neighbouring District of Lindi District Council is tarmac.

4.7 Infrastructure and Utilities

4.7.1 Water

Lindi Municipal Council has 7 functional boreholes, 34 deep wells with hand pumps and 106 shallow wells for water supply services. In the project area there is availability of clean water through LUWASA, water from LUWASA is mainly used for cleaning at household and cooking.

4.7.2 Energy

Lindi Municipal Council receives reliable supply of gas power from Mnazi Bay electricity plant situated in Mtwara Region although it covers a small area. The electricity supplied by Artumas Company to the district is 1000KWH which is then stepped down to 500V for local consumption. The community in the project area uses electricity and solar for lighting while charcoal and firewood are mainly used for cooking.

CHAPTER FIVE

5.0 STAKEHOLDER ENGAGEMENT

5.1 Stakeholder Identification and Analysis

The identified stakeholders can be categorized into Developers; Decision makers; Interested parties; and Affected parties positively or negatively and directly or indirectly. The stakeholder analysis matrix is provided in **Table 5.1-1.** The identification of stakeholders was based on how they are related to the project, how the project is going to affect them and why should they be consulted.

5.1.1 Developers

The developers in this project are the Ministry of Education, Science and Technology (MoEST) and the University of Dar es Salaam (UDSM) Vice-Chancellor at the National Level. The MoEST is responsible for ensuring the project is implemented in compliance with sectoral and national policy objectives.

The UDSM is responsible to establish new campuses, procure the consultant and contractors, implement the proposed facilities, operate the campus by providing education and doing researches, renovations of the facilities and provide future development.

5.1.2 Decision makers

The decision-making authorities are those institutions dealing with environmental management in the country and therefore they can decide on whether a project should be implemented or should not be implemented. These include the Division of Environment in the Vice President's Office (VPO-DOE) and National Environment Management Council (NEMC). The VPO-DOE is responsible for approval of Environmental Impact Assessment report and issuance of Environmental Impact Assessment (EIA) Certificate. The National Environmental Management Council (NEMC) is responsible for screening and registration of the project, review and approval of scoping report and review of environmental impact assessment report and submission to the VPO-DOE for approval.

5.1.3 Interested parties

The interested parties are those stakeholders who are not directly or indirectly affected by the project but they can influence the success or failure of the project or can provide advice to the project. For this project, the interested parties are Lindi region and Lindi Municipal Council. The Local Government Authority (LGA) is responsible for land use planning and issuance of development permits. Other interested parties are Fire and Rescue Force and OSHA these institutions are responsible for fire hazards and rescue and safety at working place respectively.

Tanzania Electricity Supply Company Limited (TANESCO) and Lindi Urban Water Supply and Sanitation Authority (LUWASA) are just the interested party since the operation of the University will need more service from them compared to now at the project area, but there are no any activities that are going to affect the utilities negatively during mobilization, construction and operation.

5.1.4 Affected Parties

These are those stakeholders who can be directly or indirectly affected, whether positively or negatively by the project.

Local individuals are currently crossing the project area to their residences at anyplace and anytime they want. During operation phase of the campus, we expect people to use the authorised roads to reach their destinations. This will be the new procedure to them and will take a while to get used to it.

Table 5.1-1: Stakeholder Identification and Analysis Matrix

S/n	Stakeholders	Categorization
1.	Ministry of Education, Science and Technology (MoEST)	
2.	University of Dar es Salaam (UDSM)	
3.	Division of Environment in the VPO	
4.	National Environment Management Council (NEMC)	
5.	Lindi Municipal Council (LMC),	
6.	Ward Development Committee (WDC)	
7.	Mtaa Development Committee (MDC)	
8.	Occupation Safety and Health Authority (OSHA)	
9.	Fire and Rescue Force	
10.	Business Operators Adjacent to the Project Site.	
11.	Tanzania Electricity Supply Company Limited (TANESCO)	
12.	Lindi Urban Water Authority (LUWASA)	
13.	Project Affected Persons (PAPs)	
14.	Ruvuma and Southern Basin Water Board	
15.	Local Communities Adjacent to the Project Site	

KEY:

	Developers
	Decision Makers
	Interested Parties
	Affected Parties (Directly Positively)
	Affected Parties (Indirectly Positively)
	Affected Parties (Directly Negatively)
	Affected Parties (Indirectly Negatively)

5.2 Stakeholder Consultation

The stakeholder consultation involved face to face interviews with representatives of relevant government institutions, agencies and local government authorities. These include Lindi Regional Office, OSHA Zonal Office – Mtwara, Fire and Rescue Force - Regional Office, Lindi Municipal Council, Lindi District, Jamhuri ward, and Kiduni Street in the project area.

The consultation with adjacent Local Community Members involved stakeholder consultation meetings. The adjacent local community members are mainly the local residents of Chuo Kikuu Street (“Mtaa”).

5.3 Results of Stakeholder Consultations

5.3.1 Consultation with Stakeholder Representatives / Officials

In general, the stakeholders have raised some issues/concerns and have provided recommendations or mitigation measures. The record of issues / concerns raised during consultation with stakeholder representatives and local government officials is provided in **Table 5.3-1** The issues raised were then analysed to determine the most affected VEC based on the number of issues/concerns raised for each affected component.

Table 5.3-1: Issues/Concerns raised during consultation with stakeholder reps.

Date	Stakeholder Name	Raised Concern
05/04/2023 08/04/2023	Lindi Municipal Council (LMC) (Head of Human resource) (Municipal Engineer) (Planning Officer) (Surveyor) (Municipal Environmental Officer)	• The project will increase the scenic of the Municipality since it will construct modern build, • The project will increase population and led to increase business related to hotel, lodge and hostels, • The project will increase employment opportunities during both mobilization, construction, and operation phases, • Bringing the higher education services in Lindi will public servant to grab opportunity for evening classes for those who failed to get permission to be out of working places for the purpose of getting education, • Provision of education related to agricultural and fishery will increase number of professional in the project area and increases production for economic growth, • Project will provide temporary employment opportunity to local individuals, • Increase in population will change the mindsets of the local especially in economic transformation. • Presence of class farms will help farmers to learn the best agricultural practice for higher crop yield, • University of UDSM since it the giant University in Tanzania, will attract other University to initiate their campus in Lindi Region. • The project will add land value of the surveyed plots in the flanking environment • Since the 70% of the project area is undeveloped the impact like air pollution, vibration and noise will not affect the local people in the project area • Vegetation clearance should be done within the proposed building areas not all the site • The project will increase spread of disease like HIV/AIDs and STI/STD's and COVID-19), since there will be gathering people with different understanding, age and income. • The project is anticipated to destruct tradition, norms and culture of the local society due increase in population from different part of the country and abroad. • Presence of the university will increase solid waste and liquid waste production in the Municipal
05/04/2023	Ngongo Secondary School (NSS) (Head Master)	• The project will increase business opportunity in the project area such as construction of buildings for rent, • Students in O-level and A-level in the project area will be motivated to study hard and join the university level, • NSS has been engaged in every step since the initial stage of initiating the University campus
08/04/2023	District Administrative Secretary	• The project will increase the economy of the region and national as whole • The district commissioner office is ready to provide any assistance for the purpose of completing the project on time • The project is warmly waited by the locals' individuals, districts and regional leaders.

Date	Stakeholder Name	Raised Concern
		• The project will increase local and foreign investors in Lindi Region
08/04/2023	Fire and Rescue Force District Fire Officer-Lindi	The fire and rescue force are doing mainly three activities in the construction industry; • Review of architectural drawings to ensure compliance of the fire combat related systems; • Inspecting contractor during the construction of the fire and rescue related equipment; • Testing of the inspected equipment to check the quality and standard including to provide recommendation for the defect equipment; The district fire and rescue force are responsible to ensure the following in the drawings; • Presence of emergency doors and fire-resistant construction materials • Public doors should be open outside • Presence of adequate fire extinguisher and adequate water for combating fire during emergencies • Doors should be fire rated to exist fumes during fire incident • Fire extinguishers should be provided as per building functions • Presence of fire hydrant • Presence of fire assembly point • Communication systems when Fire disaster happens • Dissemination of education related to fire disasters
08/04/2023	OSHA - Zonal Office - MTWARA Region	• Contractor should submit project drawings for review • Client should register the project to OSHA Website (wims.osha.go.tz) • Medical checkup should be done for workforces for both contractor and consultant to get health status or baseline information before construction works • Contractor should request for inspection before commencement of the project • Contractor should prepare and submit OHS policy to OSHA before project commencement • Contractor should prepare baseline risk assessment • Contractor should provide wholesome water for drinking to workforces throughout the project duration • Contractor should provide adequate PPEs to workforces • Contractor should keep the record of accidences incidence throughout the project duration
08/04/2023	The ward and Street/Mtaa development committee	• The UDSM in collaboration with Lindi municipal council has done conclusive community engagement

Date	Stakeholder Name	Raised Concern
	(Jamhuri Ward)	• Local believes that the implementation of the university in project area will change their live completely through getting jobs and knowledge for increasing the crop and fish productivity • Locals believes the value of land and their produce will increase • The project will advertise the region and led to attract number of local and foreign investors • Implementation of this project will also alert the locals that the government is still remember them since it has been a while since major project has been implemented in the region • Implementation of the university of Dar es salaam will attract other universities in the region and enhance the per capital of the individual and the region • Presence of the farm classes will help the local to learn the best agricultural activities to increase productivity

According to the analysis the consulted stakeholder representatives were more concerned about Labour and Economy (9 Issues), Terrestrial Environment (3 Issues), Public Health, Safety and Security (3 Issues), Atmospheric Environment, Acoustic Environment and Current Land and Resources Use (1 Issue @).

The findings indicate the stakeholders do support the project because it will create employment for the local people and improve the local economy. However, they were concerned about the effects of the project on the environment, health and safety of people.

5.3.2 Consultation with Local Community Members

The stakeholder consultation meeting involved the Jamhuri Ward, whereby the local community members attended the consultation meeting. During the consultation the Mtaa Executive officer (MEO) jolted down the minutes of the consultation meeting. In general, the consulted stakeholders due support the project, but the stakeholders have raised some issues/concerns.

The findings indicate the consulted local community members do believe the project will be economically beneficial in terms of employment creation and improved knowledge on agricultural production and stimulation of local investment.

5.4 Stakeholders Engagement During Implementation

During Project implementation, engagement activities will be undertaken in relation to project activities. At this stage, the study will conduct a number of structured and formal meetings, focus group discussions, community meetings, one to one interview and site visits that will involve a number of stakeholders. The timing for the conducts of the above meetings will be determined by the progress of the project implementation and when seems necessary to invite stakeholders for their comments and observation. However, the sharing of information and progress with stakeholders will be subject to scrutiny with regards to the kind of information to be shared and how the same will be communicated to stakeholders. Furthermore, at this stage, the UDSM will ensure equal and effective participation from project preparation to implementation stages. To ensure stakeholders' views and concerns are well captured, the

SEP will have different methods of collecting and sharing information based on their needs i.e. disadvantaged or vulnerable groups. The summary of stakeholder engagement and means of communication during project implementation is provided in **Table 5.4-1.**

Table 5.4-1: Stakeholder engagement during project implementation.

S/n	Project Phase	Objective	Messages	Means of Communication
1.	Project Preparation Phase	To present the draft SEP (for comment) and final versions of the instruments.	Presentation of the Project and its implementation schedule Present potential environmental and social impacts reports and its enhancement and mitigation plan. Describe Grievance Redress Mechanism Present a list of identified stakeholders and describe an approach of their engagement.	Organized public meetings /Consultations based on Stakeholders needs and circumstances (FGD, one on one meetings etc.) Disclosure on UDSM Website Emailing to respective stakeholders. Email copies of the instruments to Non-State Actors and other institutions. Sharing of executive summaries in hard copy during meetings. For stakeholders who are illiterate, information will be presented verbally during meetings in local language. Disclosure of Project documentation in appropriate and accessible manner. The instruments will be disclosed in Swahili language in project offices and hard copies will be accessible to stakeholders
2.	Project Preparation Phase	ESIA / ESMP Preparation and Disclosure	To inform the preparation of the Environmental Statement/ ESMP etc. and present findings when drafted to all the identified stakeholders	Face to Face Meetings Community Meetings Site Visits based on stakeholders needs and circumstances. Disclosure on UDSM Website. FGD Disclosure of Project documentation in

S/n	Project Phase	Objective	Messages	Means of Communication
				appropriate and accessible manner. The instruments will be disclosed in Swahili language at the University, Lindi Municipal council and in the offices of the identified stakeholders or public meetings
3.	Construction Phase	To conduct a meeting to alert or Inform the stakeholders on the commencement of the project.	Public Meetings Face to Face Meetings Groups Discussions based on stakeholders needs and circumstances.	Meeting to Alert stakeholders to the
4.	Construction Phase	Alert stakeholders of any new activities and Provide updates on project progress (every month)	Inform public about any emerging issues; provide information on risks and impacts. GRM, workers code of conduct etc.	Public Announcements Focus Group Discussions Community Meetings Meetings with Jamuhuri ward
5.	Construction Phase	Contact with the Project Coordination Team	Provide phone number/WhatsApp account and email for stakeholders to submit questions and give out comments	Meetings with Jamuhuri Ward
6.	Throughout the Project Implementation Period.	Information dissemination	General information on CoAF project implementation	Posting on bulletin boards; Information leaflets, banners Outreach activities with Jauhuri communities where presentations, workshops and public meetings will be conducted. Sharing on UDSM social media and website Information accessible at Lindi Municipal council
7.	Throughout the Project Implementation Period.	Contact with the Project Coordination team	Maintain website with contact box, email, social media accounts and phone number	UDSM's Websites UDSM's phone number for HEET activities and concerns will be shared to

S/n	Project Phase	Objective	Messages	Means of Communication
			for people to submit questions, comments and concerns.	project sites and all stakeholders. UDSM's phone number for HEET activities and concerns will also be found at Lindi Municipal council

Note: Face-to-face consultations with stakeholders will strictly follow national and international guidelines on health and hygiene procedures in order to avoid the spread of diseases including COVID-19 and other respiratory diseases.

5.5 Stakeholders Communication Strategies During Implementation

Information disclosure strategies attempt to increase the availability of information on the proposed construction of the UDSM Main Campus and the entire HEET project. The public disclosure of the information will be very useful in motivating and improving the performance of the project. During implementation, when new activities are being developed engagement will be undertaken to inform the development of the specific sub-project and plans. Further engagement on the frameworks will also be undertaken. Depending on the issue at hand, UDSM will be developing agenda so as to ensure that key strategic and risk items can be discussed with all relevant stakeholders in order to foster decision making and address risk factors and develop enhancement measures during project implementation. The summary of stakeholder communication strategy is provided in **Table 5.5-1.**

Thus, depending on the need of each stakeholder, UDSM will use the following methods;

- **Focus Group Meetings/ Discussions** – UDSM will employ FGD when aiming to bring together stakeholders with the same interests or common characteristics into a meeting to discuss specific topics or project components in a focused manner. FGD will be employed to explore issues that are relevant to specific groups or sub-groups of a community – such as youth, the elderly, women, students and people with disabilities. The intention of using this approach is centred upon establishing of similarities and differences among people of the same or different groups.
- **Formal meetings -** These meetings will be focused to identify and discuss specific stakeholder concerns and to disclose project information. Participation in these meetings will be influenced by the issues under consideration and will include adequate representation of women as well as other marginalized and vulnerable people where possible.
- **One-on-one interviews –** The interviews will aim to give chance to individuals to air concerns on project and will involve government officials depending on the issues to be addressed.
- **Distribution of pamphlets –** This is a way of sharing information to a wide range of individuals.
- **Site visits –** These visits are focused on identifying and discussing stakeholder concerns and to disclose project information within communities.

Table 5.5-1: Summary of Stakeholders Communication Strategy.

S/n	Stakeholder Group	Specific Needs	Language	Communication Means
1.	Government Entities and Implementing	i. Inclusion in the decision-making processes and ii. implementation role of the project	Kiswahili	• Correspondence by phone/email • meetings • Roundtable discussions

S/n	Stakeholder Group	Specific Needs	Language	Communication Means
	Institutions and Agencies (TANESCO, LUWASA, FIRE, OSHA)			
2.	Communities and local government authorities of Jamhuri Ward.	i. Sensitization as to the project, its benefits and their role. ii. Information on the Project and approach to managing environmental and social issues.	Kiswahili	• Community meetings • Outreach activities • Flyers • Banners
3	Students, Students government and people with disabilities Jamhuri Ward.	i. Sensitization as to the project, its benefits and their role. ii. Information on the Project and approach to managing environmental and social issues. iii. Consideration of their decision-making processes	Kiswahili	• Meetings • Roundtable discussions • Community meetings • Group discussions • Outreach activities • Flyers • Banners
4	Vulnerable Groups (women, youth, elders and the disabled) at project site surrounding areas	i. Sensitization as to the project, its benefits and their role. ii. Information on the Project and approach to managing	Kiswahili	• Disclosure of Project documentation in a culturally appropriate and accessible manner. • Community meetings. • Group Discussions
5.	Government Entities and Implementing Institutions and Agencies (TANESCO, LUWASA, FIRE, OSHA)	i. Inclusion in the decision-making processes and ii. implementation role of the project	Kiswahili	• Correspondence by phone/email • meetings • Roundtable discussions
6	Communities and local government	i. Sensitization as to the project, its	Kiswahili	• • Community meetings • Outreach activities

S/n	Stakeholder Group	Specific Needs	Language	Communication Means
	authorities of Jamhuri Ward.	benefits and their role. ii. Information on the Project and approach to managing environmental and social issues.		• Flyers • Banners

5.6 Stakeholders' Engagement Plan (SEP)

The engagement plan will be reviewed and updated throughout the project implementation. During this process, the focus and scope of the SEP may change to reflect the varying stages of project implementation and to encompass any changes in project design and lessons learnt from previous phases of the Project. However, it is important to develop a guiding framework that may act as roadmap for stakeholders' engagement as shown in **Table 5.6-1.**

Table 5.6-1: Stakeholders' Engagement Plan.

Target Stakeholders	Objective	Messages/ Agenda	Means of Communication	Schedule/frequency	Responsible person/ group
Project Preparation and Pre-Construction Phase					
Representatives of implementing institutions and agencies (TANESCO, LUWASA, OSHA); Local NSAs; Community groups representatives from Jamhuri area, Students and Student organisation, UDSM staff, service providers and private sector surrounding project site	To disclose finalized ESMF, SEP, LMP and ESCP and ESIA	Email message to advise Stakeholders of disclosure and where to access the disclosed documents. Disclosure of Project documentation in an accessible manner	Organized public Meetings/ Consultations Disclosure of Project documentation Email copies to key individuals and organizations.	At least once per each stage of the project or once when there is changes or revision	
Representatives of implementing institutions and agencies (TANESCO, LUWASA, OSHA); Local NSAs; Community groups representatives from Jamhuri Area, Students and Student organisation, UDSM staff, service providers and private sector surrounding project site	To inform stakeholders of any new activities, unexpected impacts etc. during construction. To Provide updates on project progress	Inform on the new changes and progress	Public Meetings Focus Groups Discussions. Face to Face Meetings	At least once per each stage of the project or once when there is changes or revision	UDSM Monitoring and evaluation team, E&S coordinator
Representatives of implementing institutions and agencies (TANESCO, LUWASA, OSHA); Local NSAs; Community groups representatives from Jamhuri ward,	Inform stakeholders of any new activities, unexpected impacts etc. during construction. Provide updates on project progress	Inform public about any emerging issues Information and education on the risks and impacts, GRM, workers code of conduct	Public Meetings Focus Groups Discussions. Face to Face Meetings	At least once per each stage of the project or once when there is changes or revision	UDSM Monitoring and evaluation team, E&S Coordinators

Target Stakeholders	Objective	Messages/ Agenda	Means of Communication	Schedule/frequency	Responsible person/ group
		etc. Updates on project progress etc.			
Representatives of implementing institutions and agencies (TANESCO, LUWASA, OSHA); Local NSAs; Community groups representatives from Jamhuri ward Students and Student organisation, UDSM staff, service providers and private sector surrounding project site	Inform stakeholders of any new activities, unexpected impacts etc. during construction. Provide updates on project progress	Inform public about any emerging issues Information and education on the risks and impacts, GRM, workers code of conduct etc. Updates on project progress etc.	Public Meetings Focus Groups Discussions. Face to Face Meetings	At least once per each stage of the project or once when there is changes or revision	UDSM Monitoring and evaluation team, E&S Coordinators
Community groups representatives from Jamhuri Ward Students and Student organization, UDSM staff, service providers and private sector surrounding project site	Resolve grievances received	To address grievances related to construction activities Refer persons affected by project related GBV/SEA to services To promote accountability for violations of GBV by project staff.	Face-to-face meetings Confidential and safe face to face referral for GBV survivors Meetings and aggrieved persons	Every time a grievance is received	E&S coordinators, UDSM Monitoring and evaluation team, UDSM Gender Unit and Gender Desk at Lindi council and police station
Representatives of implementing institutions and agencies (TANESCO, LUWASA, FIRE,	Contact with the Environmental and Social Project Experts	Sharing of phone number and WhatsApp number to	Phone number WhatsApp number	At least once per each stage of the project or once when	E&S coordinators

Target Stakeholders	Objective	Messages/ Agenda	Means of Communication	Schedule/frequency	Responsible person/ group
OSHA); Community groups representatives from Jamhuri, Students and Student organization, UDSM staff, service providers and private sector surrounding project site		submit questions and other comments.		there is changes or revision	
Throughout the Project Implementation Period (All Components)					
Representatives of implementing institutions and agencies (TANESCO, LUWASA, OSHA); Community groups representatives from Jamhuri, Students and Student organisation, UDSM staff, service providers and private sector surrounding project	Information dissemination	To share general information on project, activities	Posting on bulletin boards; Information leaflets Community meetings Outreach activities – Focus groups. One to one meeting	At least once per each stage of the project or once when there is changes or revision	E&S Coordinators and PO-RALG Office.
Representatives of implementing institutions and agencies (TANESCO, LUWASA, OSHA); Local NSAs; Community groups representatives from Jamhuri, Students and Student organisation, UDSM staff, service providers and private sector surrounding project site	Contact with the Environmental and Social Project Experts	Sharing of phone number and WhatsApp number to submit questions and other comments.	Phone number WhatsApp number	At least once per each stage of the project or once when there is changes or revision	E&S coordinators

5.7 Disclosure

When the ESIA statement for this project will be approved and the certificate provided, UDSM will disclose the approved project components information (ESIA, ESMP) to the public. The document will be made available in the institutional library, District, ward to inform the stakeholders on the response their concerns and views. A non-technical ESMP will be presented in both Kiswahili and English to make it understandable by the public.

CHAPTER SIX

6.0 ASSESSMENT OF IMPACT AND ANALYSIS OF ALTERNATIVES

6.1 Identification of Impacts

The identification of impacts considers both positive and negative impacts which result from interaction between the Project related activities and Valued Environmental Components (VECs)[41]. For the purpose of this report, the term "environmental effects" will be taken to be synonymous to the term "environmental impacts" as referred to in the EIA and Audit Regulations (2005). As such, the EIA study considers environmental effects and impacts as defined by the national legislation. However, for convenience the term "impact(s)" shall be used throughout this report, unless otherwise specified.

The identified potential environmental impacts are based on the interaction between the Project Related Activities and Selected Valued Environmental Components (VECs)[42]. The selection of VECs was based on existing project environment (environmental baseline conditions), opinions/views obtained from stakeholder consultations, and consultant's professional judgement. For this project the selected VECs include Atmospheric Environment; Acoustic Environment; Wetland Environment; Terrestrial Environment; Public Health and Safety; Labour and Economy; and Public Services Infrastructure / Utilities. The potential interactions between the Project Related Activities and the Selected VECs for each phase of the project implementation are illustrated in **Table 6.1-1.**

Table 6.1-1: Potential Interactions of the Project with VECs.

Valued Environmental Components	Project Phase			
	Mobilization	Construction	Demobilization	Operation
Atmospheric Environment	-	✓	-	-
Acoustic Environment	-	✓	-	-
Water Resources	-	-	-	-
Aquatic Environment	-	-	-	-
Wetland Environment	-	-	-	-
Terrestrial Environment	-	✓	-	-
Public Health and Safety	-	✓	-	✓
Labour and Economy	-	✓	✓	-
Community/Public Services Infrastructure / Utilities	-	-	-	✓
Transportation	-	-	-	-
Current Land and Resources Use	-	-	-	-
Current Use of Land and Resources by Indigenous Peoples[43]	-	-	-	-
Cultural and Historical Heritage Resources	-	-	-	-

[41] Valued Environmental Components can be physical, biological, social, economic, or cultural
[42] Valued Environmental Components can be physical, biological, social, economic, or cultural
[43] Defined as members of those cultures which have historic, ancestral, spiritual, and functional connection to the land on which and from which they live. Distinguished from members of those cultures whose connection to the land on which they live is limited to the historical period.

Legend:
- ✓ No Substantial Interaction
- **-** Possible Interaction

6.2 Assessment of Impacts

The identified impacts have been assessed by using Environmental Impact Assessment Matrix[44] provided in **APPENDIX 4**, The EIA Matrix helped to determine the significance of impacts based on the following criteria:

- ***Importance*** – whether important to national, regional, or international interest or site specific.
- ***Magnitude*** *of Change* – whether Positive or Negative
- ***Permanence*** – whether condition is permanent or temporary.
- ***Reversibility***- reversible or irreversible.
- Whether ***Cumulative / Synergistic*** **f**or positive and negative impacts, respectively.

The significance of impacts also took into consideration existing by-laws, national and international environmental standards, legislation, treaties, and conventions that may affect the significance of identified impacts.

These techniques have been used in order to have a logical and systematic way of identifying, assessing, and analysing environmental impacts. The techniques also allowed subjective judgments to be quantitatively recorded and therefore make the assessment of impacts become more objective. The following sub-sections provides the detailed description of the interaction between the project and VECs at various phases of the project implementation. In addition, the identified impacts are categorized into Environmental and Social Impacts.

6.3 Environmental Impacts

6.3.1 Mobilization Phase

6.3.1.1 Loss of ecological functions and landscape quality of the surrounding environment.

The project will involve site preparation before the commencement of construction works. This requires the removal of vegetation cover/trees from the construction site. The vegetation cover /trees provide some ecological functions and improve the landscape quality of the surrounding environment. The important ecological functions include providing a natural habitat for a variety of organisms, including insects, birds, reptiles, lizards, snakes, etc. The presence of vegetation cover helps to protect the land against soil erosion by surface run-off during rainfalls and wind actions. Therefore, the removal of vegetation cover/trees is likely to result in the loss of ecological functions and landscape quality of the surrounding environment.

The impact has been assessed to be ***direct*** and ***negative*** with ***Medium Significance*** and is expected to be short-term and temporary, permanent, as it will occur during the construction phase. Its effects on the dependent fauna will be reversible due to the short-term loss of natural habitat.

6.3.2 Construction Phase

6.3.2.1 Air pollution due to dust and exhaust emissions

[44]Environmental Impact Assessment Using the Rapid Impact Assessment Matrix (RIAM). Ed. Kurt Jensen. Published by Olsen & Olsen, 1998.

The project will interact with Atmospehric Environment during construction phase thriough excavation and stocpiling of excavated soil mateirals during preparation of construction site. This is likely to result into increased air pollution due to dust emission, especially during dry seasons, hence affecting the the construction workers and nearby people.. Air pollution will also occur due to exhaust emissions from operation of construction equipment/machinery.

The impact has been assessed to be direct and negative with Low Significance. It is expected to be short-term and temporary, occurring only during the construction phase. Its effects on human health will be ***reversible*** if it occurs. The impact is considered to be non-cumulative.

6.3.2.2 Noise nuisance and vibration effects

The project will interact with the Acoustic Environment during the construction phase through the operation of mobile equipment/machinery. This is likely to result in noise nuisance and vibration effects. Due to the high noise emission from construction equipment/machinery, the most affected people will be the construction workers and other people close to the construction site. The impact has been assessed to be ***direct*** and ***negative*** with ***Low Significance***. It is expected to be short-term and temporary, occurring only during the construction phase. If it occurs, its effects on human health will be reversible and non-cumulative.

6.3.2.3 Landscape degradation and loss of aesthetic value of the surrounding environment

The project will interact with Terrestrial Environment during construction phase through excavation and stockpiling of excavated soil materials and demolition materials. This will result into accumulation of construction related solid wastes and demolition wastes into the surrounding environment. The accumulation of excavated soil materials, construction solid wastes and demolition wastes is likely to result into landscape degradation and loss of aesthetic value of the surrounding environment. Loss of ecological and landscape value of the surrounding environment due to removal of existing vegetation /trees. The project will involve site preparation before commencement of construction works. This requires removal of vegetation cover/trees from the construction site.

The impact has been assessed to be ***indirect*** and ***negative*** with ***Very Low Significance***; and is expected to be ***short-term*** and ***temporary*** as it occurs only during the construction phase. Its effects on the surrounding environment are ***Reversible*** because the surrounding environment can be restored to its original condition after removal of the impact or completion of the project. The impact is considered to be ***non-Cumulative*** the impact will occur only within the boundaries of the construction site.

6.4 Social Impacts

6.4.1 Construction Phase

Public Health is a condition of the environment that relates to the physical health and well-being of the public /local community surrounding the Project. The potential for public health concerns includes those associated with chemical emissions, human health factors, potable water supplies, and several types of accidents, malfunctions, and unplanned events.

The project will interact with Public Health and Safety to create the following impacts during construction phase::

- Increased prevalence of HIV/AIDS and STIs due to interaction between the construction workers and local community members.
- Creation of occupational health and safety risks to the construction workers due to handling /operation of hazardous construction materials/equipment.
- Creation of risk of construction related accidents due to trespass by unauthorized people into the construction sites.
- Increased risk of traffic accidents at the junction of access road due to frequent movement of construction vehicles to and from the construction site.
- Increased risk of Covid-19 transmission due to influx of people into the project area.

6.4.1.1 Increased prevalence of HIV/AIDS and STIs

The project is likely to result into increased prevalence of HIV/AIDS and STIs in the project areas due to social interaction between construction workers and local community is likely to result into increased prevalence of HIV/AIDS and STIs among the local community members of the project area.

The impact has been assessed to be ***indirect*** and ***negative*** with ***High Significance***; and is expected to be ***long-term*** and ***permanent*** as it continues to occur even after construction phase. Its effects on human health are Irreversible because there is not yet any known treatment for HIV, apart from Anti-retrovirus (ARV) drugs, which help to increase resistance against HIV. The impact is considered to be ***Cumulative*** because it will be additional to the current situation on HIV/AIDS prevalence in the project area.

6.4.1.2 Occupational health and safety risks

The project will involve construction workers handling and operating hazardous construction materials and equipment. This will likely result in occupational health and safety risks for the workers. These include physical injury from construction equipment like jackhammers, exposure to dusty construction materials like dry cement, sand, and aggregate, and hand injury due to exposure to wet cement.

The impact has been assessed to be ***direct*** and ***negative*** with ***Low Significance***. It is expected to be short-term and temporary as it occurs only during the construction phase. Its effects on human health will be reversible and non-cumulative because they will occur only within the boundaries of the construction site.

6.4.1.3 Construction related risk of accidents.

The project involves the movement of mobile construction equipment, like bulldozers, graders, and heavy-dumper trucks, around the construction site. Therefore, unauthorized people trespassing into the construction site are likely to result in the risk of construction-related accidents. For example, a person may be overrun by backwards-moving mobile construction equipment/machinery, especially if it is not fitted with a sounding alarm device.

The impact has been assessed to be ***indirect*** and ***negative, with Low Significance. It is expected to be short-term and temporary, occurring*** only during the construction phase. Its effects on human health will be reversible and non-cumulative because they will occur only within the boundaries of the construction site.

6.4.1.4 Increased risk of traffic accidents

The project will involve the movement of heavy trucks to and from the construction site during the transportation of construction materials or spoil/soil materials from the construction site to the dumping site. The frequent movement of heavy trucks to and from the construction site is

likely to result in the risk of traffic accidents at the junction between the access roads to the construction site and the local main road. The impact has been assessed to be ***indirect*** and ***negative*** with ***Low Significance*** and is expected to be short-term and temporary as it occurs only during the construction phase. However, its effects on human health may be Irreversible because it may result in fatal injury (death) or non-fatal body injury and irreversible damage to property. The impact is considered to be ***Cumulative*** because it will be additional to the current situation of traffic accidents along the local roads.

6.4.1.5 Increased risk of Covid-19 transmission

The project is likely to induce influx of people into the project site, in terms of job seekers, small business operators, etc. This will result into increased number of people around the project site, hence resulting into increased risk of transmission of Covid-19, if precautions are not taken.

The impact has been assessed to be ***indirect*** and ***negative*** with ***High Significance***; and is expected to be ***long-term*** and ***permanent*** as it continues to occur even after construction phase. Its effects on the human health are ***Irreversible*** because there is not yet any known treatment for Covid-19., apart from Vaccine, which helps to increase resistance against Covid-1p Virus. The impact is considered to be ***Cumulative*** because it will be additional to the current situation on Covid-19 pandemic in the project area.

6.4.1.6 Creation of temporary employment for local people

The project is will involve recruitment of local residents during construction, hence creation of temporary employment to the local people during construction. The project is expected to employ at least 50 people during construction. The employment of local people into the project will also benefit their dependant families. For example, if the project employs 50 people and if each individual has an average of 5 dependants, then the project is likely to benefit about 250 people.

The impact has been assessed to be ***direct*** and ***positive*** with ***Medium Significance***; and is expected to be ***short-term*** and ***temporary*** as it occurs only during construction phase. However, it can have ***Long-term*** effects on the socio-economic conditions of the local people. The impact is considered to be ***Synergistic*** because it is a positive impact, which will be additional to the current situation on employment creation in the project area.

6.4.1.7 Increased income generation opportunity for local people.

The presence of large number of construction workers will result into increased demand for food and other items, hence resulting into increased income generation opportunity for local people.

The impact has been assessed to be ***indirect positive*** with ***Medium Significance***; and is expected to be ***short-term*** and ***temporary*** as it occurs only during construction phase. However, it can have long-term effects on the socio-economic conditions of the local people. The impact is considered to be ***Synergistic*** because it is a positive impact, which will be additional to the current situation on income generation in the project area.

6.4.1.8 Emergence of GBV/SEA and SH among the project employees

The project will involve the movement of heavy trucks to and from the construction site during the transportation of construction materials or spoil/soil materials from the construction site to the dumping site. The frequent movement of heavy trucks to and from the construction site is likely to result in the risk of traffic accidents at the junction between the access roads to the construction site and the local main road. The impact has been assessed to be ***indirect*** and

negative with ***Low Significance*** and is expected to be short-term and temporary as it occurs only during the construction phase. However, its effects on human health may be Irreversible because it may result in fatal injury (death) or non-fatal body injury and irreversible damage to property. The impact is considered to be ***Cumulative*** because it will be additional to the current situation of traffic accidents along the local roads.

6.4.2 Demobilization Phase

6.4.2.1 Loss of Employment by Local People

During demobilization or closure of the project, the construction workers will be retrenched, hence loss of employment. The effect is not likely to be significant due to the fact that the retrenched people will be from within the project area and likely to revert back to their initial economic activities. Nevertheless, if their terminal benefits are not paid the effect is likely to be significant. The impact has been assessed to be ***direct negative*** with ***Low Significance***; and is expected to be ***short-term*** and ***temporary*** as it will occur during construction phase. The impact is considered to be non-***Cumulative*** because will occur within the project area.

6.4.3 Operation Phase

6.4.3.1 Increased revenue for infrastructure/utility service providers s

The project will interact with Community Public Infrastructure/Utilities during the operation phase through increased water and electricity supply demand. This is considered to be a beneficial or positive impact because the increased demand for infrastructure/utility services will result into increased revenue for infrastructure/utility service providers such as TANESCO, LUWASA, TTCL and Mobile Phone Companies.

The impact has been assessed to be ***indirect positive*** with ***High Significance***; and is expected to be ***long-term*** and ***permanent*** as it will continue to occur throughout the project life. The water and power utility will continue to be used so long as the project continues to operate. The impact is considered to be ***Synergistic*** because it will positively contribute to the current situation on revenue collection by infrastructure/utility service providers.

6.4.3.2 Increased enrolment of students and revenue collection.

the project will involve construction of new lecture theatres, laboratory building and associated facilities. This will result into increased revenue due to enrolment of students at Ngongo Campus.

The impacts have been assessed to be ***indirect*** and ***positive*** with ***High Significance***; and are expected to be ***long-term*** and ***permanent*** as it will continue to occur throughout the operation phase. The impact can be considered to be ***Synergistic*** because it will add positively to the current situation on revenue collection at the Ngongo Campus.

6.5 Summary of Identified Significant Impacts

The summary of identified significant impacts in **Table 6.5-1** indicates most of the negative impacts will occur during construction phase and their significance ranges from Low, Medium to High and most of the positive impacts will occur during operation phase and their significance ranges from Medium to High.

Table 6.5-1: Identified Significant Impacts.

Impacts	Significance	MP	CP	DP	OP
Increased air pollution due to dust emission from construction activities.	**Low**	-	✓	-	-

Impacts	Significance	MP	CP	DP	OP
Creation of noise nuisance to the nearby sensitive receptors due to operation of construction equipment/machinery.	**Medium**	-	✓	-	-
Creation of landscape degradation and loss of aesthetic value of the surrounding environment due to accumulation of construction/demolition solid wastes.	**Low**	-	✓	-	-
Loss of ecological and landscape value of the surrounding environment due to removal of existing vegetation /trees	**Medium**	-	✓	-	-
Increased HIV/AIDS and STIs prevalence due to social interaction between the construction workers and local community members.	**High**	-	✓	-	-
Increased occupational health and safety risks due to handling / operation of hazardous construction materials/equipment.	**Low**	-	✓	-	-
Increased risk of exposure to Covid-19 due to influx of people into the construction site.	**High**	-	✓	-	-
Increased risk of construction related of accidents due to trespassing by unauthorized persons into the construction site.	**Low**	-	✓	-	-
Increased risk of traffic accidents due to movement of heavy trucks to and from the construction site.	**Low**	-	✓	-	-
Creation of employment opportunities for local people due to recruitment of construction workers.	**Medium**	-	✓	-	-
Risk of Emergence of Gender Based Violence, Sexual Exploitation and Sexual Harassment due to social interaction among project employees.	**High**	-	✓	-	-
Increased income generation opportunities for local people due to increased demand for food from construction workers.	**Medium**	-	✓	-	-
Loss of temporary employment opportunities for local people due to closure or completion of the project.	**Low**	-	-	✓	-
Increased enrolment of students due to operation of new academic facilities.	**High**	-	-	-	□
Increased revenue for infrastructure and utility service providers due to increased demand for services.	**High**	**0**	**0**	**0**	□

KEY:

	Ver High Positive Impact		Very High Negative Impact
	High Positive Impact		High Negative Impact
	Medium Positive Impact		Medium Negative Impact
	Low Positive Impact		Low Negative Impacts
	Very Low Positive Impact		Very Low Negative Impact

6.6 Impacts of the Environment on the Project

The effects/impacts of environment on the Project are associated with risks of natural hazards and influences of nature on the Project. Typically, these are a function of project or infrastructure design in the context of its receiving environment, and ultimately how the project is affected by nature. These effects/impacts may arise from physical conditions, land forms, and site characteristics or other attributes of the environment which may act on the project such that the project components, schedule, and/or costs could be substantively and adversely changed.

In this report the assessment of the effects of the environment focuses on the environmental attributes that are considered to have a potential effects/impact on the Project. These are based on the regulatory consultation, public and stakeholder input, a review of the known past and existing conditions, and knowledge gained through projections of potential future conditions. For example, potential effects of climate change, severe weather, including: wind; precipitation; floods; electrical storms; seismic activity; and external fires resulting from causes other than the Project. This section provides the summary of the identified environmental effects on the Project. In general, the effects of the environment on the Project during the construction phase have been rated not significant.

6.6.1 Impacts of Climate Change on the Project

The Project area may experience extreme weather conditions during construction and operational life of the Project due to increasing climate change events. To assess the environmental effects of climate on the Project, current climate and climate change must both be considered. Current climate conditions are established by compiling relevant historical data and establishing a climatological background for the project area. The historical and projected extremes in temperature, intense precipitation, or other storm events, are important considerations that must be accounted for in the design of the Project and in all other aspects of construction.

Forecasted changes in climate may affect construction and operation in both positive and negative ways and may vary from nominal to extreme effects. Climate changes that could potentially have residual effects on the project include:

- increased incidence of soil erosion and flooding.
- increased frequency and magnitude of heavy precipitation events;
- increased frequency of extreme storms accompanied by heavy precipitation, thunderstorms, and strong winds; and
- Extreme atmospheric temperatures and weather conditions.

Each of these effects must be considered in terms of how they may adversely affect the Project if they are not planned, engineered, and designed to account for such effects. Such effects could cause:

- reduced visibility and inability to manoeuvre operation equipment;
- delays in shipment of materials, supplies and/or products;
- changes to the ability of workers to access the site (e.g., if a road were to be wash out);
- damage to infrastructure;
- increased structural loading; and/or
- loss of electrical power resulting in potential loss of production.

Mitigation measures

The potential effects of climate on construction will be considered in the planning and design of the building structures, and in the scheduling of construction activities to limit delays, prevent damage to infrastructure and the environment, and to maximize the safety of construction staff. Compliance with design and building codes and standards are expected to

account for weather extremes through built-in factors of safety to prevent undue damage to infrastructure from such events. **Table 6.6-1** provides the general mitigation measures against climate change effects**. Table 6.6-2** outlines the specific mitigation measures against the potential effects/impacts of climate change on the construction of new academic buildings at Ngongo Campus.

The predicted effects of climate change on the project will be carefully taken into account in the planning, design, and construction activities. These include the location of construction site, the selection of materials to be used; and the operating plans for the project to ensure the long-term viability and sustainability of the project. The likely adverse effects on the project during construction and operation will be taken into consideration in the planning and design of the project (or managed adaptively as appropriate as information regarding climate change evolves. As a result, substantive damage to the project or interruption to the project schedules are not anticipated.

Table 6.6-1: General Climate Change Effects and Mitigation Measures.

Event	Effects	Mitigation measures
(a) Extreme temperature variations	Reduced ductility of construction materials and increased susceptibility to brittle factures.	The specification of construction materials must be in compliance with the applicable standards and codes and must maintain structural integrity at the anticipated minimum and maximum ambient temperatures
(b) Rising or increasing sea water levels.	Soil erosion along the shorelines due to rising sea water level that results into shifting of sea shorelines towards the inland and creating damage on the building structure.	Design should consider appropriate distance between the construction site and the shorelines and provision of structure that will protect the building from rising sea water level. The effect is not anticipated because the proposed construction site is about 250 m from the shoreline.
(b) Extreme wind storm and severe precipitation resulting to soil erosion and flooding.	Reduced visibility and inability to manoeuvre construction equipment/machinery.	Make prediction of short delays and make allowance for them to be included in the construction schedule.
	Disruption of construction activities and delays to the construction schedule. Delays in the transportation of construction materials to the site.	Scheduling of tasks that require precise movement of equipment (*e.g.,* positioning steel I-beams in place with cranes) to periods when the weather conditions are favourable.

Table 6.6-2: Potential Climate Effects on the Building and Mitigation Measures.

Climate event	Risks to the Building	Mitigation Measures
(a) Heavy rain for longer periods	The elevation of the project site range between 3-5 m (m.a.s.l.) and that of adjacent marshland range between 1-2 m (m.a.s.l.). The movement of water is therefore towards the marshland area, hence resulting into soil erosion and sedimentation of the marshland area.	The area that is not going to be covered with the building should be provided with grasses and trees to control soil erosion and sedimentation of the marshland area. The foot paths and car parking areas should be paved by using porous interlocking concrete blocks to minimize surface run-off and overloading of the marshland area.

	In the long run sedimentation will result into reduced water retention capacity of the marshland, hence increased flood risk around the building structures	
(b) Storm events (Typhoons, Cyclones) and extreme winds	Possible removal of the roof and other building structures.	Compliance with specifications during depot roof construction and other structural members. Planting of trees around the building to act as wind barriers.

6.6.1.1 Effects/Impacts of Seismic Activity on the Project

The construction site is not located within an area with high seismic hazard[45], and therefore, the likelihood of a major seismic event in the immediate vicinity of the construction site that could cause damage to the building structure or interrupt operations during any project phase is low.

6.6.1.2 Effects/Impacts of External Fires on the Project

In the event that an external fire did occur in close proximity of the Project, there is a potential risk of contact with fuel storage tanks, thereby potentially creating a risk of fire with petroleum products which are by their nature highly flammable.

Mitigation measures

The presence of fence wall established around the materials storage yard will help to reduce the likelihood of an external fire causing substantive damage to the Project. In addition, fire fighting capabilities (including appropriate equipment) on-site will be at a high level of readiness. The safety and security personnel will be in place in collaboration with Fire and Rescue Department to provide for rapid detection and response to any fire threat.

The materials to be used for construction will be inherently fire resistant. For example, the facility structures can be constructed primarily of concrete and steel, which are not typically affected by fire.

6.7 Analysis of Alternatives

The purpose of the project is to undertake construction of construction of College of Agriculture and Fisheries (CoAF) Buildings at the UDSM Ngongo Campus. The CoAF will be comprised of Administration Block, Lecture Rooms, Laboratory, Workshop, Hostel, Cafeteria, Dispensary, and associated infrastructure facilities (roads, external fence, water distribution network, sewer network, power distribution network, and fibre optic network. The justification for the project has been prompted by the need for strengthening of the learning environment and in alignment with labour market at the beneficiary higher education institutions and improving the management of the higher education system.

The three alternatives have been considered in this study based on technical, economic, environmental and social criteria. That means selected alternative must be technically feasible, economically viable, environmentally friendly and socially acceptable. The analysis of alternatives considered the following alternatives:

- No Project Alternatives-which considered whether the project should be implemented or not.

[45]Map updated by U.S. Geological Survey National Earthquake Information Centre. 13 September 2016. https://reliefweb.int/sites/reliefweb.int/files/resources/20160910.pdf

- Project Alternative-which requires the project to be implemented.
- Construction Method Alternatives-which considered what type of construction methods (Labour intensive or Machine-intensive method)

For comparison of these alternatives the multi-Criteria Analysis has been used, based on Technical, Economic (Techno-economic), Environmental and Social Criteria.

6.7.1 No Project Alternative VS Project Alternative

The purpose of the project is to improve the learning environment in line with the requirements of the labour market at the beneficiary higher education institutions and improving the higher education system. This objective will be achieved through construction of Lecture Theatres and Laboratory Building, hence increasing the number of students' enrollment at Ngongo UDSM Campus

Therefore, the "No project" Alternative" means the project should not be implemented at all and we should continue using the existing training facilities, hence continue with the current enrolment level. The comparison of alternatives based on techno-economic, environmental and social criteria is summarized in **Table 6.7-1.**

From techno-economic point of view the "No Project Alternative" will have no or less investment cost, because the existing facilities will only continue to be used. The "No Project Alternative" means the higher learning institution will continue to experience low enrolment of students, low revenue collection from fess and low productivity.

The "Project Alternative" will result into increased revenue due to fee collection from increased student's enrolment, and increased productivity due to operation of modern learning facilities. In addition, the Project Alternative is likely to create temporary employment and income generation opportunities for some local people during construction. Therefore, from techno-economic point of view the "No Project Alternative" should be rejected and the "Project Alternative" should be selected.

From economic point of view the "No Project Alternative" will have long term negative impacts due to continued low students' enrolment level and low productivity due to continued dependence on old learning facilities. The "Project Alternative" will have long term economic benefits due to improved learning facilities, increased revenue from fee collection as a result of increased student's enrolment level, good quality training with increased output of highly qualified professionals.

From environmental point of view the "No Project Alternative" will have less negative impacts than the "Project Alternative". The "Project Alternative" will result into more negative impacts than the "No Project Alternative. However, the construction related impacts will be short-term and temporary as they occur only during construction phase and could be minimized through engineering design and good construction practice. Therefore, from environmental and social point of view the "No Project Alternative" should be rejected and the "Project Alternative" should be selected.

Table 6.7-1: No Project Alternative VS Project Alternative.

Evaluation Criteria	No Project Alternative		Project Alternative	
	High	Low	High	Low
(a) Techno-economic				
- Investment Costs	-	-	-1	-

Evaluation Criteria	No Project Alternative		Project Alternative	
	High	Low	High	Low
- Students' enrolment level	-	-2	+2	-
- Revenue collection for fees	-	-2	+2	-
- Productivity	-	-2	+2	
(b) Environmental and Social				
- Construction related environmental and social impacts.	-	-	-1	-
Total Score:	**0**	**-6**	**+4**	**0**
Overall Net Score:	**-6**		**+4**	
KEY: +1 = Short-term Positive Impact -1 = Short-term Negative Impact +2 = Long-term Positive Impact -2 = Long-term Negative Impact				
Conclusion: The "No Project Alternative" has been found to have an overall score of -6 and the Project Alternative an overall score of +4. Therefore, the "Project Alternative" should be selected and "No Project Alternative should be rejected.				

6.7.2 Labour Intensive Alternative VS Machine Intensive Alternatives

The use of labour-intensive construction method is compared against machine-intensive construction method. The comparison of alternatives based on techno-economic, environmental and social criteria is summarized in **Table 6.7-2.**

From techno-economic point of view the labour-intensive construction method makes use of manual labour and therefore likely to create employment opportunity to a large number of adjacent local residents than machine-intensive method, hence improving the local economy. The employment creation will have multiplier effect as it will also benefit their families, hence socially acceptable. However, the use of mobile equipment / machine is more costly than labour-intensive method, but it is more efficient than labour-intensive method.

From environmental and social point of view the labour-intensive method will have minimum risk of construction related risk of accidents to construction workers and the local community, unlike the use of mobile equipment / machinery during excavation works, Labour-intensive method has less environmental impacts compared to machine-intensive method. For example, the use of mobile equipment / machine is likely to create more dust emission than labour-intensive method.

The use of mobile equipment / machine will also create air pollution and noise nuisance than labour-intensive method. The use of mobile equipment will have will create more landscape degradation than labour-intensive method.

From the analysis it can be seen that the labour-intensive method should be selected and machine-intensive method should be rejected. However, due to the nature of the project and limitations of labour-intensive method, the combination of the two methods should be more favourable.

In this case, the contractor should give priority to labour-intensive method for those activities that could be done manually. For, example, excavation of roadside drainages could be done manually instead of using an excavator.

Table 6.7-2: Labour-Intensive VS Machine-Intensive Methods.

Evaluation Criteria	Labour-intensive method		Machine-intensive method	
	High	Low	High	Low
(c) Techno-economic				
- Cost of hiring equipment / machinery	-	+1	-1	-
- Employment creation	+1	-	-	-1
- Efficiency and time saving	-	-1	+1	
- Work productivity	-	-1	+1	-
(d) Environmental and Social	-	-	-	-
- Dust emission		+1	-1	-
- Exhaust emission	-	-	-1	-
- Landscape degradation		+1	-1	
- Risk of construction related accidents	-	+1	-1	-
- Social acceptability	+1	-	-	-1
Total Score:	**+2**	**(-2) +(+4) = +2**	**(-5) +(+2) = -3**	**-2**
Overall Net Score:	**+4**		**-5**	
KEY: +1 = Positive Impact -1 = Negative Impact				
Conclusion: The "labour-intensive method|" has been found to have an overall score of +4 and machine-intensive method an overall score of -5. The "Labour-Intensive Construction Method" seems to be favourable than "Machine-Intensive Construction Method". However, due to the nature of the project the labour-intensive method has been found to have some limitations, and therefore the combination of the two methods should be considered. However, during construction more emphasis will be given on the labour-intensive method in order to promote employment of the local people. For example, excavation of storm water drainages, relocation of utilities, etc.				

6.7.3 Alternative Site

The option of selecting alternative site was not considered because the existing site is already being owned by the project proponent. Therefore, selecting an alternative location was found to be uneconomical due to cost implication. Moreover, the existing site is compatible with urban land use planning by the Lindi Municipal Council. Also, the site is well located far from the noisy urban centre and free from land use development pressure. The site is easily accessible by road and can be easily connected to electricity power and water supply which runs along the road. Finally, the site is on the raised ground and therefore free from flooding events and soil material is suitable for construction.

6.7.4 Energy Alternative

It is assumed that the project will largely depend on electricity power supply from TANESCO because it is readily available and affordable. However, the power supply from TANESCO is

not reliable as evidenced by frequent power outage. In this regard, there is a need for emergency power source.

In this case two alternatives for emergency power source have been considered. The most common and easily affordable is the use of diesel engine generator. However, the diesel engine generator is not environmentally friendly due to noise, air pollution and greenhouse gas emissions.

The use of solar power could be a preferable option to diesel engine generator. However, the use of solar power is restricted by its high investment cost, especially when it is used for large area. It is therefore recommended that a diesel engine generator should be used temporarily and then replaced by solar power when investment cost becomes affordable.

6.7.5 Waste Water Treatment Alternatives

Alternative 1: Use of Wast Stabilization Ponds (WSP)

This refers to the use of a series of ponds/lagoons which allow several biological processes to take place, before the water is released back to the water body. The project site has adequate land for establishment of WSP. However, the following precautions will be taken:

(a) Proper selection of site with adequate distance from human settlements/college buildings and consideration of wind direction.
(b) Planting of trees around the WSP to act as a wind break and minimize odour nuisance to the nearby receptors.
(c) Fencing off the WSP to prevent people and livestock from entering the site.

Alternative 2: Use of Artificial or Constructed wetland

Constructed wetlands are engineered system designed and constructed to copy natural processes taking place in the natural wetlands. Constructed wetlands remove pollutants in wastewater through the combination of physical, biological and chemical processes. They are either subsurface flow where the flow is below the surface of soil or surface flow where the flow of wastewater is above the soil. The use of constructed CoAF Ngongo Site may not be economical due to absence of suitable area, which can be harnessed for establishment of Constructed Wetland

Alternative 3 Septic Tank System

The septic tank is commonly used as primary treatment in rural areas, schools, low-income urban settings, isolated households, or on sites where soil is not suitable for the installation of sewers. They are built where a constant water supply is available and are used to partially treat domestic wastewater and to digest the settled sludge. It is easy to maintain Septic tanks as they need1- 2 time a year to be cleaned leaving 20% of the mature sludge as inoculum for digestion). Septage (the slurry taken out of septic tanks) is sent to wastewater treatment plants or treated separately. Also, the initial cost of the system is low compared to other systems.

Conclusion: It is therefore recommended that the use of septic tank is preferable as a wastewater treatment option at Ngongo than WSPs and Constructed Wetland

CHAPTER SEVEN

7.0 ENHANCEMENT AND MITIGATION MEASURES

Preamble

In general, the project has been found to have both beneficial (positive) and adverse (negative) effect/impacts. However, the positive impacts have been found to outweigh the negative impacts. Moreover, most of the identified negative impacts are short-term, as they occur only during construction phase, but most of the identified positive impacts are long-term as they continue during the operation phase. The positive impacts will be enhanced in order to maximize the project benefits.

The identified positive impacts include creation of temporary employment and income generation opportunity for local people during construction; increased revenue for infrastructure/utility service providers; and increased enrolment of local and foreign students due to improved learning facilities at the Ngongo UDSM Campus. The employment opportunities can be increased by emphasising on labour-intensive construction methods. The labour-intensive construction methods apart from increasing employment opportunities for local people, it helps them build some skills for future employment and creates some sense of project ownership by the local community.

The identified negative impacts include creation of air pollution due to dust emission from construction activities; creation of noise nuisance due to operation of construction equipment/machinery; overloading of wetland ecosystem due to discharge of raw sewage wastewater from sanitary facilities; landscape degradation and loss of aesthetic value of the surrounding environment due to accumulation of excavated soil materials; loss of ecological functions and landscape quality due to removal of existing vegetation/trees;; increased HIV/AIDS prevalence due to social interaction between construction workers and students/local community members; increased risk of exposure to Covid-19 due to influx of people into the construction site; increased risk of exposure to construction related accidents due to trespassing of unauthorized persons into the construction site; increased exposure to occupational health and safety risks due to handling/operation of hazardous construction materials/equipment; increased risk of traffic accidents due to movement of heavy trucks to and from the construction site; loss of temporary employment by local people due to closure or completion of the project.

The purpose of this Chapter is to outline enhancement and mitigation measures for the identified positive and negative impacts, respectively. In order have easy understanding the information is presented in a tabular form showing the identified impacts (positive or negative) and proposed enhancement or mitigation measures during the project implementation phases (i.e., mobilization, construction, demobilization and operation phase.

7.1 Enhancement Measures for Positive Impacts

7.1.1 Enhancement of Positive Impacts on Labour and Economy

The following enhancement measures will be taken by the Contractor to maximize the project benefits:

- Giving employment priority to the local people during recruitment of construction workers.
- Giving equal employment opportunities to males and females and avoid any kind of discrimination based on gender, race, religion, etc.
- Ensure all workers are served with Employment Contracts which stipulates all workers' rights under the labour laws such as maternity leave, sick leave, etc.
- Ensure workers are paid not less than minimum wage as stipulated by the government.

- Ensure payment of monthly contributions to the National Social Security Fund (NSSF) and Workers Compensation Fund (WCF) as required by the national laws.
- Ensure all workers are made aware, understand and follow the Code of Ethical Conduct.

7.1.2 Increased income generation opportunities for local people

Provide enabling environment for food vendors to sell their food in a clean and hygienic environment by providing shelter and water supply.

7.1.3 Increased enrolment of students and revenue for the institute

The UDSM Vice Chancellor in collaboration with Principal of Ngongo UDSM Campus will promote marketing of the institute at national and international levels.

7.1.4 Increased revenue for infrastructure/ utility service providers

UDSM will maintain regular cooperation and consultation with infrastructure/utility service providers for efficient utilization of services from the infrastructure and utility companies.

7.2 Mitigation Measures for Negative Impacts

7.2.1 Creation of air pollution due to dust and exhaust emission from construction activities.

The following mitigation measures will be taken by the Contractor during construction to minimize air pollution from dust and exhaust emissions:

- Application of water on dusty areas and dusty construction materials.
- Minimize stockpiling of excavated soils within the construction site by immediate removal and transportation to dumping site.
- Trucks hauling excavated soil materials and dusty construction materials must be covered with tarpaulins.
- Carry out regular maintenance of vehicles and avoid the use of old vehicles and mobile construction equipment which emit black smoke.

7.2.2 Creation of noise nuisance and vibration effects

The following mitigation measures will be taken by the Contractor during construction to minimize noise nuisance:

- Limiting noisy construction activities only to day time hours.
- Fencing of the construction site with corrugated irons sheets to minimize transmission of noise to the sensitive receptors.

7.2.3 Landscape degradation and loss of aesthetic value of the surrounding environment

The following mitigation measures will be taken by the Contractor to minimize land degradation:

- All stockpiled soil materials and demolition solid wastes must be immediately removed and transported to the permitted dumping site.
- Useful soil materials can be retained for landscaping purpose, but must be properly stockpiled.

7.2.4 Loss of ecological functions and landscape quality of the surrounding environment

The following mitigation measures will be taken by the Contractor to minimize destruction of vegetation cover/trees:

- Avoid vegetation clearing beyond the boundaries of the construction site, and avoid cutting any tree without permission from the Resident Engineer.

- Ensure proper landscaping by planting grass and trees in open areas around the buildings after construction. However, precaution must be taken to avoid trees species that can cause damage to the building foundations46.

7.2.5 Increased prevalence of HIV/AIDS and STIs

The following mitigation measures will be taken by the Contractor to minimize transmission of HIV and STIs among the construction workers and local community members:

- Formulation and implementation of HIV/AIDS prevention and control programme.
- Giving employment priority to local people to minimize the number of new comers, hence minimizing the likelihood of new HIV transmission.
- Collaboration with local NGOs/CBOs dealing with HIV/AIDS to promote awareness and education campaigns.

7.2.6 Increased risk of Covid-19 transmission

The Contractor will take necessary precautions as stipulated in the ESF/Safeguards Interim Note: Covid-19 Consideration in Construction/Civil Works Projects.

7.2.7 Increased risk of construction related accidents

The following mitigation measures will be taken by the contractor during construction:

- Fitting all mobile construction equipment / machinery and trucks with sounding alarm and signal device to warn people, especially during backward movement.
- Putting a written warning sign boards in Kiswahili and English languages at strategic locations to prohibit or prevent entrance of unauthorized persons into the construction site.
- Restrict operation of mobile construction machinery / equipment to trained personnel only.
- Fencing the construction site to prevent people from entering the construction site. This will include putting a written warning in both English and Kiswahili at a strategic location to prevent unauthorized people from entering the construction site.

7.2.8 Creation of occupational health and safety risks

The following mitigation measures will be taken by the Contractor to minimize exposure of construction workers to health and safety risks:

- Provision of Personal Protective Equipment (PPE) such as reflective vests, hand gloves, welding googles, safety boots, etc.
- Avoid prolonged use of hand-held equipment by workers beyond the prescribed 8 hours in accordance with Tanzania Standards47.

7.2.9 Increased risk of traffic accidents due to movement of heavy trucks

The Contractor will develop and implement traffic management plan. This includes deploying flag persons to guide traffic movement at the junction of the main road and access road to the construction site. The involvement of traffic police will be useful, whenever possible.

7.2.10 Risk of emergence of GBV/SEA and SH among the project employees

The Contractor will take the following mitigation measures against emergence pfg GBV/SEA and SH among the project workers/staff and local community members:

- Ensuring there are codes of conduct in place that forbid and place penalties for GBV/SEA and SH.

[46] This effect has already been noted during the site investigation at CoET Site.
[47]The United Republic of Tanzania. The Environmental Management (Standards for Control of Noise and Vibration Pollution) Regulations (2010). THIRD SCHEDULE (Made Under Regulation 15(1)).

- Disseminating information that raises awareness on the prohibition of GBV/SEA and SH among the construction workers, students/local community members.
- Contractor will develop a code of conduct on ESHS, GBV/SEA and SH that will be attached to the Employment Contractors.
- Grievances Redress Mechanism will be in place to deal with GBV/SEA and SH for construction workers and students/local community members.

7.2.11 Loss of temporary employment opportunities

The following mitigation measures will be taken by the Contractor to minimize the effect of retrenchment after project completion or closure:

- Giving employment priority to local people, because after project closure they will easily revert back to their normal economic activities.
- Ensure that all construction workers are registered with social security funds and are paid their terminal benefits immediately before retrenchment from jobs.
- Remittance of monthly NSSF contributions for all workers and submission of payslips to the Resident Engineer on monthly basis.

CHAPTER EIGHT

8.0 HEALTH AND SAFETY MANAGEMENT PLAN (HSMP)

8.1 The Need for HSMP

The Ngongo UDSM Campus Project will involve construction activities which are likely to create environmental health and safety risk to construction workers, visitors, and adjacent local community members. Thus, during construction phase, the Contractor is required to prepare Health and Safety Management Plan (HSMP) in order to mitigate or minimize health and safety risks associated with the project during construction.

Thus, the purpose of this Health and Safety Management Plan (HSMP) is to guide the Contractor to prepare site specific HSMP to manage health and safety issues at workplace and the construction site. The Contractor's HSMP will provide detailed measures to eliminate or minimize health and safety risks to construction workers, visitors, and safeguard the workers' welfare.

8.2 The Objectives of HSMP

The overall goal of HSMP is to protect employees, the public, the environment and to comply with applicable laws and protect the Company's reputation[48]. HSMP has two general objectives: prevention of incidents or accidents that might result from abnormal operating conditions on the one hand and reduction of adverse effects that result from normal operating conditions on the other hand.

Thus, the Contractor will be required to prepare a project specific HSMP, which details on how the environmental health and safety requirements, will be implemented and managed at the construction site. The Contractor's HSMP will provide details on how the contractor will mitigate construction health and safety impacts/risks and documents the contractor's response to inspection, monitoring, verification, internal auditing and correcting or improving environmental health and safety performance.

Specifically, the objectives of this HSMP are to:

- Provide specific mitigation measures and controls that can be applied on-site to avoid or minimize environmental health and safety risk.
- Describe health and safety management related roles and responsibilities of key personnel in implementing the identified safety measures and corrective actions.
- Outline monitoring regime to check the adequacy of safety measures during construction phase.
- Provide emergency preparedness and response mechanism to during construction phase.

8.3 Organizational Structure and Responsibilities

The organizational structure for implementation of HSMP is provided in **Figure 8.3-1.** The organization structure indicates there will be a forward and back flow of information among the key personnel and site construction team during implementation of HSMP. The responsibilities of key personnel and site construction team are provided in **Table 8.3-1** The key personnel may include the Project Manager; Site Manager; Health and Safety Manager; Materials Engineer; and Site Foreman.

[48] 5 https://en.wikipedia.org/wiki/Environment,_health_and_safety

Table 8.3-1: Responsibilities of Key Personnel

S/n	Key Personnel	Responsibilities
1.	Project Manager	▪ To ensure all works comply with relevant regulatory and Project requirements. ▪ To ensure the requirements of EH&S Management Plan is fully implemented. ▪ To endorse and support the Project environmental health and safety policy. ▪ To liaise with consultant, the health and safety Representative and other government authorities as required. ▪ To participate and provide guidance in the regular review of this EH&S Management plan and supporting documentation. ▪ To provide adequate resources (personnel, financial and technological) to ensure effective development, implementation and maintenance of this plan. ▪ To ensure that all personnel receive appropriate induction training, including details of the environmental health and safety requirements. ▪ To ensure that complaints are investigated and issues raised resolved. ▪ To stop work immediately where there is an actual or potential risk on health and safety.
2.	Site Engineer / Manager	▪ To plan construction works in a manner that avoids or minimizes health risk. ▪ To ensure the requirements of EH&S Management Plan is fully implemented. ▪ Ti Ensure construction personnel manage construction works in accordance with statutory and approval requirements. ▪ • Ensure environmental health and safety management procedures and risk protection measures are implemented. ▪ • Ensure all Project personnel attend an induction prior to commencing works. ▪ • Liaise with consultant, Health and Safety Representative and other government authorities as required. ▪ • Stop work immediately where there is an actual or potential risk on health and safety.
3.	Health and Safety Manager	▪ Overall management of health and safety aspects of the Project. ▪ Development, implementation, monitoring and updating of the Contractor's EH&S Management Plan and Sub plans. ▪ Report to Project Manager on the performance and implementation of the EH&S Management Plan. ▪ Ensure management reviews of the EH&S Management Plan are undertaken annually, documented and actions implemented. ▪ Ensure environmental health and safety risks of the Project are identified and appropriate mitigation measures implemented.

S/n	Key Personnel	Responsibilities
		▪ Identify where health and safety measures are not meeting the set targets and where improvement can be achieved. ▪ Ensure health and safety protocols are in place and managed. ▪ Ensure health and safety compliance. ▪ Obtain and update all safety licenses, approvals and permits as required. ▪ Lead liaison with health and safety Representative and approval authorities. ▪ Manage health and safety document control, reporting, inductions and training. ▪ Manage health and safety reporting within the Project team and to the UDSM and regulatory authorities. ▪ Prepare reports on a monthly basis outlining the Project Works undertaken, achievements and areas where improvements were made. ▪ Oversee site health and safety monitoring, inspections and internal audits. ▪ Manage all subcontractors and consultants with regards to health and safety matters, including assessing their safety capabilities and environmental documents. ▪ Develop and facilitate induction, toolbox talks and other training programs regarding health and safety requirements for all site personnel. ▪ Notify UDSM and relevant authorities in the event of a health and safety incident. ▪ Stop activities where there is actual or potential health risk of harm to prevent health and safety non-conformance and advice the Project Manager, Site Manager and Site Foremen. ▪ Assists the Communication Manager to resolve health and safety- related complaints.
4.	Materials Engineer / Site Foremen	▪ Provide input into the preparation of environmental health and safety planning documents as required. ▪ Ensure instructions and information relating to project health and safety risks are provided to staff. ▪ Ensure that the works are carried out in accordance with the requirements of the plan and supporting documentation, including the implementation of all environmental health and safety controls. ▪ Identify health and safety risks. ▪ Identify resource needs for implementation of the plan requirements and related documents. ▪ Ensure that health and safety related complaints are investigated to ensure effective resolution.

S/n	Key Personnel	Responsibilities
		▪ Take action in the event of a health and safety incident and allocate the required resources to minimize environmental health and safety risk. ▪ Report any activity that has resulted, or has the potential to result in health and safety incident immediately to Health and Safety Manager
5.	Site Construction Team	▪ Comply with the relevant requirements of the plan and other health and safety documentation. ▪ Participate in the Project/site induction program. ▪ Report any health and safety incidents to the foreman immediately or as soon as practicable if reasonable steps can be adopted to control the incident. ▪ Undertake remedial action as required to ensure health and safety controls are maintained in good working order. ▪ Stop activities where there is actual or potential health risk of harm to the environment or to prevent health and safety non-conformance and advice the Project Manager, Site Manager and Site Foremen.

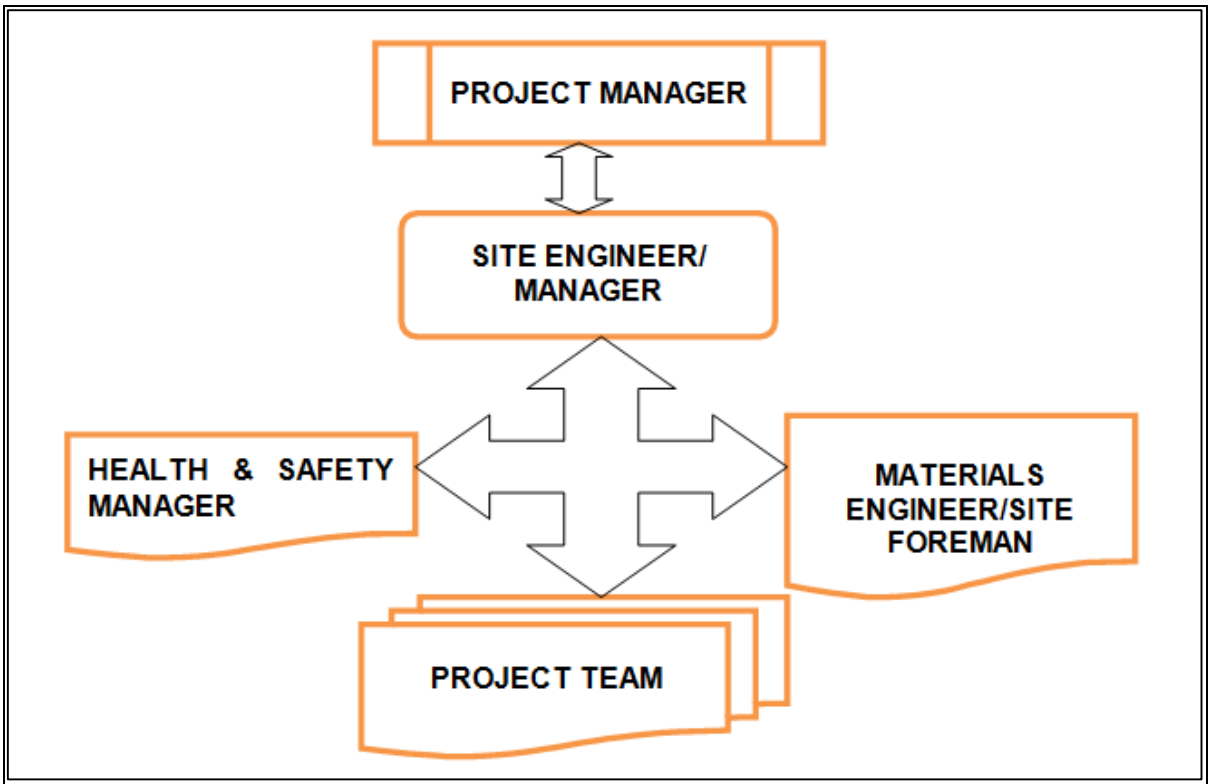


Figure 8.3-1: Organizational Structure for the EH&S Management Plan.

8.4 Health and Safety Management System

The health and safety management system entails implementation of safety training and promotion of health and safety awareness, on the job-training, and toolbox talks

8.4.1 Safety Training and Promotion

The aims of safety training and promotion programs are:

- To update the safety awareness and technical skills of persons in the field of application.
- To orient new employees to working environment.
- To identify and rectify hazards and convey the same to the workforce.
- To prepare the persons to select appropriate safety measure to overcome any unforeseen hazards/emergency situations.

To achieve the above aims, the following types of training shall be conducted at the site level:

(a) Induction training on health and safety: New or re-assigned employees shall be given health & safety introduction training pertaining to health & safety management and general safety rules and procedure, site specific health & safety rules and their responsibility and accountability in safety performance. Health & safety introduction shall be given to all categories of personnel at site by health & safety Manager The Contractor shall prepare health & safety induction form for new employees.

(b) On the Job Training - Based on the trade, individuals are given on the Job training. These trainings shall be focused on the safe ways of working in a particular trade including hazards involved. This shall be conducted by the foremen / supervisors in collaboration with Safety personnel. Trainer's performance after the programme shall be assessed to evaluate the effectiveness of the training. All the Employees shall be explained clearly the procedure to be followed after an accident happens.

(c) Tool Box Talks - In addition to the formal training mentioned above, toolbox talks shall be conducted every day before the commencement of the job. TBT shall be designed to highlight relevant safety and individual health issue to the workforce to raise their level of awareness. Such meeting shall recall the risk assessment report and defects reported on previous performance. These shall be prepared and presented by the Supervisor/Foremen.

(d) Safety Promotion

Safety Promotion schemes shall be developed and implemented at site to promote safety awareness amongst the workforce. Individuals with best safety performance shall be recognized and rewarded. A safety suggestion scheme shall be implemented at site to encourage the workforce to come up with good safety practices and suggestions for improving working condition. The best suggestion shall be selected and the person shall be rewarded.

Health & Safety posters and banners including HIV/AIDS shall be displayed around the worksite to raise the awareness among the workforce. The posters shall be prepared in English and Kiswahili languages, which are commonly being used at site.

It is important that all persons involved in the project possess adequate safety knowledge and have a high degree of safety awareness so that they are able to:

- recognize the importance of safety and assign sufficient resources to handle it;
- give proper consideration to safety during planning and design stages to eliminate/reduce safety problems during later stages of the projects;
- take into account potential safety problems during preparation/vetting of method statements;
- avoid performing unsafe acts;

- avoid creating unsafe conditions;
- identify unsafe acts/conditions and ask for rectification

Training and promotion notes, in the form of posters, booklets or similar may be developed and distributed to engineers, leading hands, foreman and others with a responsibility for managing specific work locations or activities. Notes may also be distributed to the broader workforce at daily pre-start meetings or made available in worker gathering facilities.

The Environmental Health and Safety Representative from the Consultant will review and endorse the training program and monitor its implementation. Various training programs will be carried out as detailed in **Table 8.4-1.**

Table 8.4-1: List of Training Programs

S/n	Name of Programme	Resources
1.	Induction training on Health and Safety	Safeguard Expert OSHA representative
2.	On the job training	Project Manager Site Engineers/ Managers, and Site Foremen
3.	Tool Box Talks	Project Manager Safeguard Expert Site Engineers/ Managers, and Site Foremen
4.	Safety Promotion	Project Manager Safeguard Expert Site Engineers/ Managers, and Site Foremen

8.4.2 Safety Inspection and Follow up Actions

The duty for inspection and follow-up actions is vested to Contractor's Health and Safety Manager in collaboration with Resident Engineer's Environmental Expert. Contractor's Health and Safety Manager shall inspect all project components using a Site Safety Inspection Checklist.

8.4.3 Reporting of Accidents, Incidents and Investigation

Any accident or incident that will occur at site shall be recorded using Incident Record Data Sheet and the same information will be communicated to Chief Inspector of Occupational Safety and Health Authority (OSHA) within 24 hours from the time of incident. The Contractor shall notify the Engineer and Employer as soon as reasonably possible after the occurrence of any accident which has resulted in damage or loss of property, disability or loss of human life.

The types of reported accidents include death; major injuries[49]; over 3 day injuries[50]; work related disease; and dangerous occurrences[51]. The majority of construction accidents or serious near misses must be reported to the Health and Safety Manager so they can be recorded officially and acted upon.

[49] It could be worker injuries or public member injuries.
[50] Employee fails to perform normal duties work for 3 consecutive days.
[51] These are near-miss happenings that are reportable.

All the incidents shall be investigated to find out the root causes and to prevent the recurrences of the same kind. The methodology for the incident investigation shall be “Find out the facts, not the faults”.

A monthly safety performance report of the project shall be included in the Monthly Progress Report after the end of each month. The format of Monthly Safety Performance Report must provide the following information:

The monthly safety performance report must provide the following information:

- Total personnel at site
- Total man hour worked
- No. of near missed
- No. of accidents
- No. of traffic/road accidents
- No. of lost days due to accident
- No. of tool box meeting
- No. of HSE training done
- No. of safety inspection carried out
- No. of statutory inspection
- No. of safety meetings No. of fatal accidents

Man-hours are defined as man-hours worked by all persons employed on site (including site supervisory staff, managerial staff and sub-contractors).

8.4.4 Hazard Identification and Risk Assessment

The purpose of the hazard identification and risk assessment is to identify all potential hazards and associated risks during construction. The contractor shall take relevant measures to control all critical, high and moderate hazards. Low potential hazards will be eliminated

Prior to the commencement of any activity, detailed hazard identification shall be done by the site supervisory staff with the assistance of Health & Safety Manager and the hazards shall be communicated to the whole team deemed to execute the task.

8.4.5 Risk assessment

Assessing the risk includes considering things like:

- the severity of any injury or illness that could occur, for example is it a small isolated hazard that could result in a very minor injury or is it a significant hazard that could have wide ranging and severe affects, and
- the likelihood or chance that someone will suffer an illness or injury, for example, consider the number of people exposed to the hazard.

Severity and likelihood are combined to develop Risk Rating Matrix as shown in Table **8.4-2**.

Table 8.4-2: Risk Rating Matrix

	Likelihood (L)				
Consequences (C)	Rare	Unlikely	Possible	Very Likely	Certain
Catastrophic	Moderate	Moderate	High	Critical	Critical
Major	Low	Moderate	Moderate	High	Critical
Moderate	Low	Moderate	Moderate	Moderate	High
Minor	Very Low	Low	Moderate	Moderate	Moderate
Insignificant	Very Low	Very Low	Low	Low	Moderate

Consequences (C)	How Severely Could Someone be Hurt?
Catastrophic	Death or permanent disability
Major	Serious Injury, hospital treatment required
Moderate	Injury requiring medical treatment and some lost time
Minor	Minor injury, first aid only required
Insignificant	Injury requiring no treatment or first aid
Likelihood (L)	**How Likely Are the Consequences?**
Certain	Expected to occur in most circumstance
Very Likely	Will probably occur in most circumstance
Possible	Will occur occasionally
Unlikely	Could happen some time
Rare	May happen only in exceptional circumstances

8.4.6 Control the risks

The Contractor shall apply the hierarchy of risk control, whereby risks are ranked from the highest level of protection and reliability to the lowest. The first step is to eliminate a hazard, which is the most effective control. If this is not reasonably practicable, then risk will be minimized by substitution, isolation, and engineering controls.

If risk remains, it must be minimized by implementing *administrative controls*, and by using suitable *personal protective equipment*. However, administrative control measures and personal protective equipment rely on human behavior and supervision, and when used on their own, tend to be least effective in minimizing risks. Therefore, review control measures shall be used to be more effective.

8.4.7 Review control measures

Control measures must be reviewed regularly to make sure they remain effective. Controls can be checked by using the same methods as the initial hazard identification process. Common methods include workplace inspection, consultation, testing and analyzing records and data. The entire process of risk identification, assessment and control will be done by contractor's Health and Safety Manager in collaboration with entire construction team.

8.5 Risk Management Plan

8.5.1 Purpose of Risk Management Plan

A risk is an event or condition that, if it occurs, could have a positive or negative effect on a project's objectives. Risk Management is the process of identifying, assessing, responding to, monitoring, and reporting risks. This Risk Management Plan defines how risks associated with the project will be identified, analysed, and managed. It outlines how risk management activities will be performed, recorded, and monitored throughout the construction period of the project and provides templates and practices for recording and prioritizing risks.

The Risk Management Plan is created by the project manager (through Health and Safety Manager) in the Planning Phase of the project and is monitored and updated throughout the project. The intended audience of this document is the project team, project sponsor and management.

8.5.2 Risk Management Procedures

8.5.2.1 Process

The project manager working with the project team and project sponsors will ensure that risks are actively identified, analysed, and managed throughout the construction period. Risks will be identified as early as possible in the project so as to minimize their impact. The steps for

accomplishing this are outlined in the following sections. The Health and Safety Manager will serve as the Risk Manager for this project.

8.5.2.2 Risk Identification

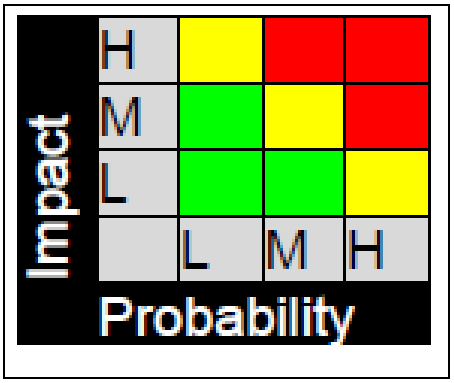
Risk identification will involve the project team, appropriate stakeholders, and will include an evaluation of environmental factors, organizational culture and the project management plan including the project scope. Careful attention will be given to the project deliverables, assumptions, constraints, cost/effort estimates, resource plan, and other key project documents.

8.5.2.3 Risk Analysis

All risks identified will be assessed to identify the range of possible project outcomes. Qualification will be used to determine which risks are the top risks to pursue and respond to and which risks can be ignored.

(a) Qualitative Risk Analysis

The probability and impact of occurrence for each identified risk will be assessed by the project manager, with input from the project team using the following approach:



Probability

High – Greater than <70%> probability of occurrence
Medium – Between <30%> and <70%> probability of occurrence
Low – Below <30%> probability of occurrence

Impact

High – Risk that has the potential to greatly impact project cost, project schedule or performance
Medium – Risk that has the potential to slightly impact project cost, project schedule or performance
Low – Risk that has relatively little impact on cost, schedule or performance
Risks that fall within the **RED** and **YELLOW** zones will have risk response planning which may include both risk mitigation and a risk contingency plan.

(b) Quantitative Risk Analysis

Analysis of risk events that have been prioritized using the qualitative risk analysis process and their effect on project activities will be estimated, a numerical rating applied to each risk based on this analysis, and then documented in this section of the risk management plan.

8.5.2.4 Risk Response Planning

Each major risk (those falling in the Red & Yellow zones) will be assigned to a project team member for monitoring purposes to ensure that the risk will not “fall through the cracks”.
For each major risk, one of the following approaches will be selected to address it:

- **Avoid** – eliminate the threat by eliminating the cause
- **Mitigate** – Identify ways to reduce the probability or the impact of the risk
- **Accept** – Nothing will be done
- **Transfer** – Make another party responsible for the risk (buy insurance, outsourcing, etc.)

For each risk that will be mitigated, the project team will identify ways to prevent the risk from occurring or reduce its impact or probability of occurring. This may include prototyping, adding tasks to the project schedule, adding resources, etc.

For each major risk that is to be mitigated or that is accepted, a course of action will be outlined for the event that the risk does materialize in order to minimize its impact.

8.5.2.5 Risk Monitoring, Controlling, and Reporting

The level of risk on a project will be tracked, monitored and reported throughout the project lifecycle.

A “Top 10 Risk List” will be maintained by the project team and will be reported as a component of the project status reporting process for this project.
All project change requests will be analyzed for their possible impact to the project risks.
Management will be notified of important changes to risk status as a component to the Executive Project Status Report.

8.5.3 Tools and Practices

A Risk Log will be maintained by the project manager and will be reviewed as a standing agenda item for project team meetings.

8.5.4 Closing a risk

A risk will be considered closed when it meets the following criteria:

- • Risk is no longer valid
- • Risk Event has occurred
- • Risk is no longer considered a risk
- • Risk closure at the direction of the Project Manager

8.5.5 Lesson learned

The lessons learned will be captured and recorded in the project reports under Health and Risk Management Plan.

8.6 Industrial health and hygiene

8.6.1 Potential health hazards

Potential hazards to health in a construction industry can arise from the use of materials, substances and process if they are not properly controlled. Some risks are caused by the inhalation of dust, toxic fumes, exposure to high temperature, noise, vibration, radioactive substances, etc.

Contractor shall be responsible for maintaining healthy working conditions for all employees and sub-contractors. If it is not possible to remove the cause of harm then suitable and sufficient Personal Protective Equipment (PPE) shall be provided to those who could be affected.

8.6.2 Sanitary Facilities

Adequate sanitary conveniences will be provided in strategic point of the workplace. Such conveniences are lavatories and washbasins. Such facilities shall be kept clean and in good working condition at all times.

Domestic wastes shall be collected per environmental management plan and Environmental Guidelines.

8.6.3 Food, Drinking Water, and Canteen for Workers

Proper clean and free food (lunch) shall be provided by Contractor to all construction workers. The food shall be prepared by local food vendors. During Construction, provision of food shall also be considered during the evening for construction workers if the construction works will continue beyond 18:00 hours.

The Contractor shall provide a proper cooking and eating place (Canteen) for construction workers with clean drinking water supply and sanitary facility. The Canteen shall be of sufficient size and built up of cement floor with timber and corrugated iron sheets. The Canteen shall have benches and tables and well ventilated to allow fresh air circulation.

8.6.4 Personal Protective Equipment

Personal Protective Equipment (PPE) will be provided to construction workers. Construction workers will be trained on the proper use of PPE. Individuals shall not be allowed to work if they are not equipped with the appropriate PPE. Visible signboards shall be posted at work area indicating potential hazards and PPE that is required to be worn in that area / for that activity, in both English and Kiswahili languages.

8.6.5 First Aid Facilities

All accidents, which involve personal injury, shall be given medical treatment and reported to the concerned Supervisor. A first aid station shall be set up at the Contractor's Camp area and experienced medical personnel will be in charge of the station.

All injury cases, except minor injuries shall be sent to medical centre for treatment. In case of an accident with personal injury, doctors will attend such person in a prescribed hospital sent by Contractor's proper transport immediately after accident. Adequate number of first Aid boxes shall be available at work sites and offices. First aid boxes shall be frequently inspected and updated.

8.6.6 Fire Prevention and Fighting Facilities

Construction sites, offices and camp premises are very prone to fire hazards because of different kind of combustible material used in all the above places. The components of a fire are fuel (combustible substance), heat and oxygen.

Fire hazard evaluation shall be conducted at all the project sites and camp to identify the fire risk at each location. Depending upon the risk factors, fire prevention and fighting system shall be provided and maintained.

8.7 Emergency Preparedness and Response Plan

This section provides general guidance for handling emergency situation on the project site. An emergency is an unplanned event when a project operation loses control, or could lose control, of a situation that may result in risks to human health, property, or the environment, either within the project site or in the local community. Emergencies do not normally include safe work practices for frequent upsets or events that are covered by occupational health and safety. Proper emergency planning and response are important elements of the site.

8.7.1 Responsibilities

- **Project Management:** The management must be committed to the principle of the safe working and ensure that no any person shall ever put himself/.herself to risk.
- **Site Management:** It is the responsibility of the site management to review and ensure awareness of emergency procedure among all the site personnel.
- **Employees:** It is also the responsibility of all employees to continually familiarize themselves with the assembly procedures for their relevant areas of work.

- **General:** Any information being relayed about an emergency shall be clear and precise giving the exact location, the nature of the emergency and the seriousness of the emergency and contact numbers and names.

8.7.2 Emergency Plan

All actions will be coordinated with the overall emergency plan operated by the Engineer. The Project Manager has the overall responsibility of coordinating all emergency procedures along with the Health & Safety Manager.

All emergency telephone numbers and contact names shall be posted at strategic points on site. The following subsequent actions listed below shall be taken during emergency:

- Close all plant and equipment, if safe.
- Stop all work and report to the nearest evacuation area / assembly area and await further instructions.
- Stop all equipment and vehicles safely.
- Contact the Health & Safety Manager and relay message to Engineer / Employer
- Ensure all personnel are aware of the emergency.

(a) Emergency alarms

A combination of red warning lights and siren as appropriate will be used in case of:

- Major fire or an Explosion.
- Major transport accident/spill of flammable liquid.
- Major equipment accident.
- Entrapment of personnel

Emergency alarms shall be placed in all areas with gathering of employees including, camp sites, site offices, borrow pits, crushers and at specific work stations such as bridge sites.

The alarm shall be capable of being perceived above ambient noise or light levels by all employees in the affected portions of the workplace. Tactile devices may be used to alert those employees who would not otherwise be able to recognize the audible or visual alarm.

(b) Assembly Point

In an emergency all personnel are to proceed in an orderly manner to the nearest safe assembly point. Adequate assembly points shall be provided in all areas where indoor works are done to provide a common meeting point in case of emergency. These assembly point shall all have the signs written "*Assembly Point"* and be easily accessed.

(c) Head Count

After all the peoples have gathered at assembly point, supervisors shall take a head count and check all employees are at the assembly point. He / she shall also inform the Engineer/ Employer of the result of the head count.

The Evacuation Supervisor will use Evacuation Headcount Checklist to identify present and missing people and identify action to be taken.

(d) Rescue Team

For missing personnel, a rescue team will be formed in consultation with the Engineer and depending upon the type and status of emergency, all efforts will be made to rescue the missing personnel.

(e) Fire Fighting

In case of a fire, after the alarm has been sounded, all efforts will be made to put off the fire by the proper use of fire extinguishers, fire hydrants, hoses etc. until more professional help come by. Fire extinguishers will be available on site at strategic locations, such workshop/garage; offices; laboratories; and accommodations areas.
Employees shall be aware of the standards for fire safety:

- smoke alarm signals and locations
- how to use fire extinguishers and fire blankets, etc.
- where emergency exits are located
- where fire extinguishers and other fire equipment are located in their work areas
- the purpose of each type of fire extinguisher

(f) All Clear
Normal work will be resumed only after all clear signal is received from the Engineer. As such the supervisors shall make all arrangements to meet the concerned authorities.

CHAPTER NINE

9.0 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

9.1 The Objective and Scope of ESMP

9.1.1 The Objectives of ESMP

The purpose of this Environmental and Social Management Plan (ESMP) is to ensure that the project is being implemented with minimum adverse environmental and social impacts. The ESMP focuses on avoiding, where practical, unacceptable adverse environmental, social and/or economic impacts. In the event that an impact cannot be avoided, then appropriate compensatory and/or mitigation measures have to be implemented.

The objectives of this ESMP are to:

- Describe the measures required to implement construction related management and mitigation commitments made in the ESIA Report;
- Describe specific additional measures required to implement construction related good practice, approval conditions stipulated by Tanzania National Policies/Legislations and World Bank Safeguard Policies;
- Identify the roles and responsibilities of the environmental and social management organisation of the project; and
- Communicate environmental and social expectations and requirements to various stakeholders and relevant institutions, and regulatory agencies.

The measures and procedures outlined in this ESMP are commitments made by project proponent and therefore remain responsible for their implementation. It is recognised that practical implementation of many of the measures may rest with Contractors and Subcontractors and consequently, the project proponent will require the implementation of a robust review/audit programme, as described in this ESMP, to measure and ensure that it is properly executed by the Contractor.

All Contractors and Subcontractors shall comply with implementation of ESMP requirements as applicable to the tasks they are employed to undertake.

9.1.2 The Scope of ESMP

This Environmental and Social Management Plan (ESMP) has been developed to identify the environmental and social management and mitigation actions required to implement the project in accordance with the requirements of the World Bank Safeguard Policies and applicable Tanzania national policies and legislation.

The ESMP will be used by the Contractor for preparation of Contractors' ESMP (C-ESMP) which will address site specific environmental and social issues. In addition, the Contractor will be required to prepare issues specific management plans, which provide details on the environmental and social management procedures, processes and mitigation and monitoring measures required to complete actions identified in the ESIA Report.

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9.2 Institutional Roles and Responsibilities

The important stakeholders / agencies identified in this ESMP include the University of Dar Es Salaam (UDSM); World Bank; Lindi Municipal Council; Fire and Rescue Force, Occupational Safety and Health Authority (OSHA); Ward and Villages Development Committees, and Non-Governmental Organisations (NGOs) / Community Based Organisations (CBOs) dealing with project related environmental and social aspects in the project area.

The responsible institutions for ESMP implantation include the University of Dar Es Salaam (UDSM) on behalf of the Government of the United Republic of Tanzania; the World Bank

(WB); Supervision Consultant; Contractor; Division of Environment in the Vice President's Office (VPO); National Environment Management Council (NEMC) and Local Government Authority (LGA). The organisational structure for implementation of ESMP is provided in **Figure 9.2-1.**

The effective implementation of ESMP also requires that all persons working for the project are aware of the importance of environmental requirements of the project; their roles and responsibilities in the implementation of the ESMP. They should also be aware of the significant actual or potential environmental impacts of their work activities; the benefits of improved performance and the consequence of not complying with environmental requirements.

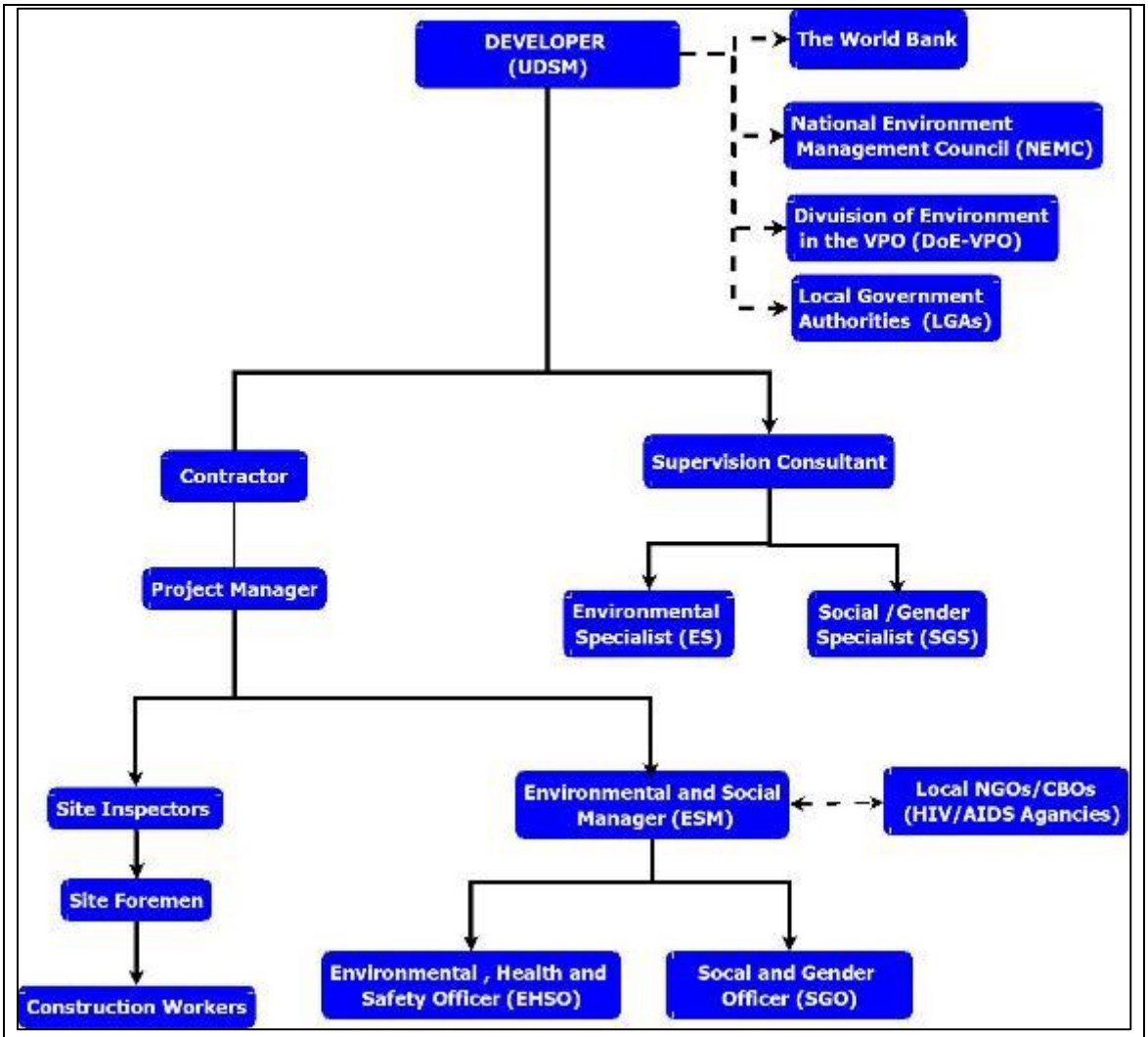

Figure 9.2-1: Organizational Structure for ESMP Implementation.

9.2.1 Financing agency

The project is being financed by University of Dar Es Salaam (UDSM) on behalf of the Government of the United Republic of Tanzania in collaboration with the World Bank (WB). UDSM and the WB shall be responsible for review and approval of Contractor's ESMP (C-ESMP), subsequent Monthly Progress Reports and Monthly Environmental, Social, Health,

and Safety (ESHS) Compliance Reports submitted by the Supervision Consultant and Contractor, respectively.

9.2.2 Implementing Agency

The project is being implemented by UDSM on behalf of the Government of the United Republic of Tanzania. In this regard, UDSM also holds final responsibility for environmental performance of the project.

UDSM is responsible for the environmental and social management of the proposed establishment of Ngongo University Campus. Specifically, the responsibility for environmental and social management in UDSM rests with the Safety and Environment Unit (SEU) under HEET Programme. Therefore, the DSM shall be responsible for overseeing implementation of mitigation measures and compliance monitoring through its Safety and Environment Unit (SEU).

9.2.3 Supervision Consultant

The Supervision Consultant will be appointed by the implementing agency and will be responsible for monitoring and supervision of the construction works including implementation of ESMP. The Supervision Consultant will appoint a Resident Engineer to oversee the construction works and monitor the works undertaken by the Contractor and implementation of ESMP to ensure compliance with contract specification and contractual requirements.

The Supervision Consultant will also appoint Environmental Specialist (ES) and Social/Gender Specialist (SGS) to assist the Resident Engineer. The Environmental Specialist shall be responsible for Environmental, Health, Safety and Security (EHSS) Issues and Social/Gender Specialist (SGS) shall be responsible for Worker's Welfare, Resettlement / Compensations Issues, Grievances Redress Mechanism (GRM), Gender Based Violence (GBV), Sexual Exploitation and Abuse (SEA), and Sexual Harassment (SH).

9.2.4 Contractor

The Contractor shall be responsible for the implementation of construction works and ensure compliance with environmental and social requirements, including implementation of outlined mitigation measures in the ESMP. Therefore, the Contractor will be responsible for preparation and implementation of Contractor's ESMP (C-ESMP) based on this ESMP or Project ESMP (P-ESMP). The Contractor will ensure that the implementation of C-ESMP conforms to the requirements of all local laws, regulations, and contract clauses.

The Contractor shall appoint the Project Manager who will be assisted by ESH&S Team, which will be comprised of Environmental Manager assisted by Environmental, Health and Safety Officer (EHSO) and Social/Gender Officer (SGO).

The Environmental Manager shall be an overall in-charge responsible for overseeing implementation of Environmental, Social, Health, Safety and Security (ESHSS) Issues. However, for effective implementation of the ESMP, the Contractor will be required to appoint an Environmental, Health, and Safety Officer (EHSO) and a Social/Gender Specialist (SGO).

The responsibilities of other experts shall be as follows:

S/n	Title/Position	Responsibility
1.	Environmental Health and Safety Officer (EHSO)	Environmental, Health, Safety and Security Issues
2.	Social/Gender Specialist (SGO)	Social, Gender and Resettlement Issues, including GRM, GBV/SEA and SH.

In order to ensure enforcement of ESHSS issues, the Site Inspectors and Site Foremen, apart from undertaking supervision of construction works, shall also be responsible for overseeing the implementation of outlined mitigation measures in the ESMP, including ESHSS issues.

9.2.5 Local Government Authorities (LGAs)

The Ngongo University Campus is located within the jurisdictional boundaries of Lindi Municipal Council, at Jamhuri ward, Kiduni villages Governments. Lindi Municipal Council and the respective Ward and Villages Governments are considered as the Local Government Authorities (LGAs).

The involvement of the Local Government Authorities (LGAs) is crucial for successful implementation of ESMP because some of the mitigation measures are better undertaken by local communities with the support of the LGAs. It is therefore important that Lindi Municipal Council as should be involved in the implementation of this ESMP.

In order to make the LGAs to be well informed on the contents of the Scoping Report, one copy of this report will be submitted to Lindi Municipal Council. This is to ensure that the LGAs through their Environmental Management Officers are aware of the environmental and social issues regarding this project and therefore shall be able to monitor the Contractor's compliance with mitigation measures.

9.3 Contractor's Environmental Specification

The *Contractor's Environmental Specification* will be incorporated into the Contract Document to provide to ensure the environment is free from the impacts of the Contractor's activities. The Contractor shall follow the guidelines determined in the Contract Document. General environmental problems related to the Contractor's activities include:

- Site management;
- Storage and treatment of fuel and material;
- Dust and noise hazard control;
- Solid Waste Management; and
- Wastewater Management.

9.3.1 Contractor's Environmental Protection Plan

The Contractor shall hold the copy of *Environmental and Social Management Plan (ESMP*, which shall be included in the bidding documents. Before commencement of construction works, the Contactor shall submit an *Environmental Protection Plan* for the construction site to the Supervision Consultant's Resident and PIU for review and approval.

The Plan shall include the general mitigation measures for environmental impacts and the specific mitigation measures for response to emergency accidents, and the general measures shall include the followings, but not be limited to the followings:

- General Rehabilitation Plan, indicating operation area, fuel storage area, fuel supply area, parking area, equipment maintenance area, material storage area and campsite;
- Waste Management Plan;
- Dust Control Plan; and
- Noise Control Plan.

9.3.2 Site Facility

The Contractor's Office and Materials Storage Yard will be secured near the construction site. The Contractor will be required to prepare site plan for review and approval by the Resident

Engineer. This will include drawings showing the layout of the Contractor's Office and Materials Storage Yard.

9.3.3 Recruitment of Construction Workers

The Contractor will always give employment priority to the local people. The Contractor shall publish the required positions for employment in the local media and all signboards. The construction workers and other personnel shall be employed in accordance with the Employment and Labour Relations Act No.6 of 2004. The Contractor shall provide training for the construction workers on environmental protection, GBV / SEA, and occupational health and safety issues.

9.3.4 Requirements for Contractor's Office

Since all construction workers to be recruited will be from the within the urban areas, there will not be any requirements for accommodation for the construction workers. However, the Contractor must provide cloth changing rooms, resting areas and sanitary facilities for the construction workers.

There shall be independent and sound bath facilities (toilets, bathroom) and cloth changing rooms) for male and female workers. The toilets shall have sufficient water and be equipped with soap and toilet paper, etc. All facilities shall be clean and available. The toilet shall be marked indicating separate toilets, bathrooms and cloth changing rooms for "Male" and "Female".

Other facilities shall include:

- Kitchen supplied with clean water, and in favorable sanitary condition.
- Septic Tank-Soak Pit System for treatment of domestic sewage before discharge into the seawater.
- First Aid Kit complete with medicine shall be available at the Contractor's Office managed by a qualified nurse. The nurse shall receive complete emergency rescue training and be capable of properly transferring the injured or patients to local referral hospital on time.

9.3.5 Code of Ethical Conduct

The *Code of Ethical Conduct* shall be established for the construction workers and emphasize appropriate conduct, strict prohibition of drug and alcohol and conformance to relevant laws and regulations to reduce the social impacts. All workers shall be familiar with the *Code of Ethical Conduct*. The local community shall also know the *Code of Ethical Conduct* for construction workers. The workers who fail to follow the *Code of Ethical Conduct* shall be punished. The *Code of Ethical Conduct* shall include, but not be limited to the following measures:

- All workers shall abide by national laws and regulations.
- Dangerous goods and weapon are strictly forbidden at the construction site.
- Obscene goods and gambling are strictly forbidden at the construction site.
- Fighting is strictly forbidden at the construction site.
- Life and production of the surrounding area and the local people shall not be interfered.
- Local traditional culture, customs and traditional activities shall be respected.
- Smoking is only allowed in designated area.
- Dressing and personnel hygiene shall be appropriate.
- Sanitary conditions of accommodation shall be proper.

The *Code of Ethical Conduct* shall be followed even outside the project site in their residential areas during interaction with local community members.

The followings are strictly forbidden at the construction site and the surrounding area:

- Impacting or damaging the structure with historical or architectural value;
- Burning of solid wastes into the surroundings without permission from resident engineers.
- Drinking during working time.
- Mechanical maintenance (engine oil and lubricant addition) of vehicles outside the designated area.
- Dumping of solid wastes outside the designated area.
- Dangerous driving in the surrounding area and local roads.
- Failure to PPE (safety shoes, reflective vests, face masks, and helmet) at the construction site.
- Causing any health and safety impact to the surrounding people.
- Leakage of any pollutant leakage, like waste oil; and
- Dumping of solid waste into the surrounding environment (e.g., plastic bottles, plastic bags, food cans, etc.).

All Contractors, office workers or other personnel who violate the above regulations shall be subject to punishment of verbal warning or termination of employment contract depending on the severity.

9.3.6 Health and Safety

The Contractor shall ensure the project conforms to all national and local safety regulations and other damage avoidance measures. Before construction, the Contractor shall execute safety training for the workers. Other measures include:

- Provision of sufficient sunlight during the day time and light during the night time.
- Provision of enclosure made up of corrugated iron sheet around the construction site, and shall be regularly inspected and maintained during construction. This will be reinforced by provision of written warning signboard in Kiswahili and English Language to prevent trespass by unauthorized persons into the construction site without the approval of the Contractor's personnel.
- Provision of Fire-fighting equipment, like fire extinguisher at the Contractor's Office.
- Provision of sufficient PPE such as eye goggles, protective gloves, face shield, dust cover, helmet, ear plugs, steel helmet, etc.) to the construction workers.
- Safety regulations, contingency plans and emergency contact information shall be indicated in the bulletin board at the construction site.
- Conducting medical examination for the construction workers annually;
- Provision of training on personal basic hygiene and epidemic prevention, including respiratory disease and communicable disease.
- Conducting HIV/AIDS prevention and control campaigns for construction workers and local community members, including publicity at the construction site and the surrounding areas in the form of bulletin and training course.
- Provision of basic emergency rescue service and emergency measures for the construction workers.
- Including to comply with the advice provided by OSHA and fire and rescue force

9.3.7 Storage of Fuel, Oil/Grease, and Other Hazardous or Toxic Material

All fuel shall be stored in a concrete paved the storage yard with bund walls and shall be 110% of the fuel storage container. Fuel storage sites shall not to be located near any water sources (i.e., within 100 m from the water source). Dangerous goods shall be stored in a designated storage device. Temporary storage regulations shall be prepared for fuel, oil and paint, etc.

Only authorized personnel are allowed to enter the storage area. The storage area shall be free from vehicle damage, and shall be subject to periodic inspection for leakage, damage and pollution condition.

Equipment maintenance can only be made at the workshop / garage. The operation surface (concrete floor within the rail area) must be properly designed to ensure collection of oil and fuel in the appropriate container. In case of oil/fuel leakage, the soil polluted must be removed and transported to the approved area. Relevant preventive measures must be taken to prevent the grease, oil, fuel, solvent and chemicals from polluting soil and water.

9.3.8 Solid Waste Management

During construction, the Contractor must take proper measure to timely remove the waste at the construction site to the approved waste treatment equipment. Construction material accumulation shall be reduced by any possibility.

Household garbage produced during the Contractor's activities at the campsite must be placed in the can (210 L steel or plastic buckets) or garbage truck. The Contractor must ensure to empty the garbage container weekly or as required.

All garbage must be immediately put into the garbage can or truck. The garbage shall not be thrown about in operation area or Contractor's campsite.

The construction waste must be temporarily stored within the construction site and transported to the approved dumping site. Incineration or burning of any kind of solid wastes is strictly forbidden at the construction site.

9.3.9 Wastewater and Storm Water Management

Wastewater from the construction site and the campsite shall not be directly discharged to the surface waters. Domestic sewage must be discharged after proper treatment by using onsite sanitation system.

Storm water must be discharged to the sea through concrete lined storm water drainages to prevent sedimentation of the marine environment. Storm runoff discharged from the construction site (temporary drainage facility) shall be through concrete lined storm water drainages.

9.3.10 Noise Control

Construction works shall be confined to the day time only and construction near the sensitive receptors be noise-free.

Personnel, visitor and construction worker at the site must wear proper hearing protection device to avoid hearing injury by noise.
The Environmental Specialist must check the site periodically to ensure the site comply with *Occupation Health and Safety*.

9.4 Grievances Redress Mechanism

The Contractor will be required to formulate Grievances Redress Mechanism (GRM). The purpose of the GRM is to outline a process for dealing with or resolving project-level grievances raised by Aggrieved Person (AP) regarding specific activities, and/or unanticipated social impacts resulting from Project implementation. The GRM applies to the construction workers, local community members, and other stakeholders who are directly or indirectly affected by the project. The grievance process outlined hereunder provides procedures for

handling complaints/claims internally in a transparent manner, to avoid conflict and therefore maintain good relationships with various stakeholders.
The PIU will oversee implementation of GRM during execution of the Project, to ensure the protection of the rights of APs and beneficiaries during Project implementation. The requirements for the GRM are as follows:

- The grievance process must not impose any cost to those raising the grievances (i.e., the complainants).
- Concerns arising from Project implementation must be adequately addressed promptly.
- Participation in the grievance process must not preclude the pursuit of legal remedies under the laws of Tanzania.

The issues covered by the GRM, among others, include complaints related to employment, sexual harassment, and gender-based violence. Specifically for employment issues may include:

- Failure by the Contractor to serve the employment contract.
- Failure by the Contractor to pay minimum wage following the labour laws.
- Failure by the Contractor to remit monthly national social security contributions.
- Failure by the Contractor to provide medical treatment for a sick employee.
- Unlawful termination of a worker,
- General workers' welfare such as annual leave, and sick, maternity and family leave,
- Failure to provide Project workers with adequate periods of rest per week, as required by the labour laws.

In case of GBV/SEA and SH a proper reception channel will be in place by appointing an NGO (or CBO) to handle all kind of complains related to GBV/SEA and SH), including providing appropriate counselling to the victims.

Formation of Grievances Redress Committee
To address grievances, a Grievance Redress Committee (GRC) will be formed for dealing with grievances as they arise. The GRC will be comprised of the following:

- ESU's Safeguard Officer.
- Supervision Consultant's Environmental Specialist and Social/Gender Specialist
- Contractor's Human Resource Officer.
- Municipal Environmental Management Officer (MEMO) and Municipal Community Development Officer (MCDO).
- Ward Executive Officers (WEO) from the Ward where project is located.
- Street ("Mtaa") Executive Officers from Streets located in the project site.

Note that the presence of the local government authorities is important because some of the grievances may originate outside the project boundaries. The involvement of NGO / CBO will also be necessary. For example, if a project worker is involved in sexual harassment of a local community member, the matter will be handled by a qualified NGO / CBO.

The construction workers and local community members will be informed of the existence of the GRM as soon as it is in place, as well as of the following:

- Members of the Grievances Redress Committee (GRC)
- How to access the GRC.
- How to lodge a formal complaint.
- The timeframes for each stage of the process.
- Characteristics of the GRC: confidentiality, responsiveness, and transparency.
- Alternative avenues of grievance resolution in case of conflicts of interest.

9.4.1 Role and Responsibility of Grievances Redress Committee

The Gender Redress Committee (GRC) will be chaired by SEU's Safeguard Officer who shall be responsible for receiving and registering grievances. The Supervision Consultant's Social/Gender Specialist shall be the Secretary of the GRC and shall be responsible for assisting the Chairperson in documenting, registering, communicating, and reporting issues related to grievances management.

The grievance management procedure will be simple and will be administered as far as possible by the GRC at the Project Level. The GRC will prepare monthly reports showing how received grievances were handled summary and submit to UDSM and WB for record purposes. To ensure transparency, the Grievance Redress Procedure will be printed in A3 Size Paper and posted at all strategic locations within the project site to be read by construction workers and local community members.

The GRC shall disseminate detailed procedures to redress grievances and appeal process among the construction workers and local community members through their local government offices (E.g., Ward Officers and Mtaa Officers).

9.4.2 Grievance Redress Procedures

The formal, detailed GRM to be developed will contain specific grievance procedures, including both informal and formal grievance mechanisms. The grievance redress mechanism for dealing with complaints is summarized in **Figure 9.4-1.**

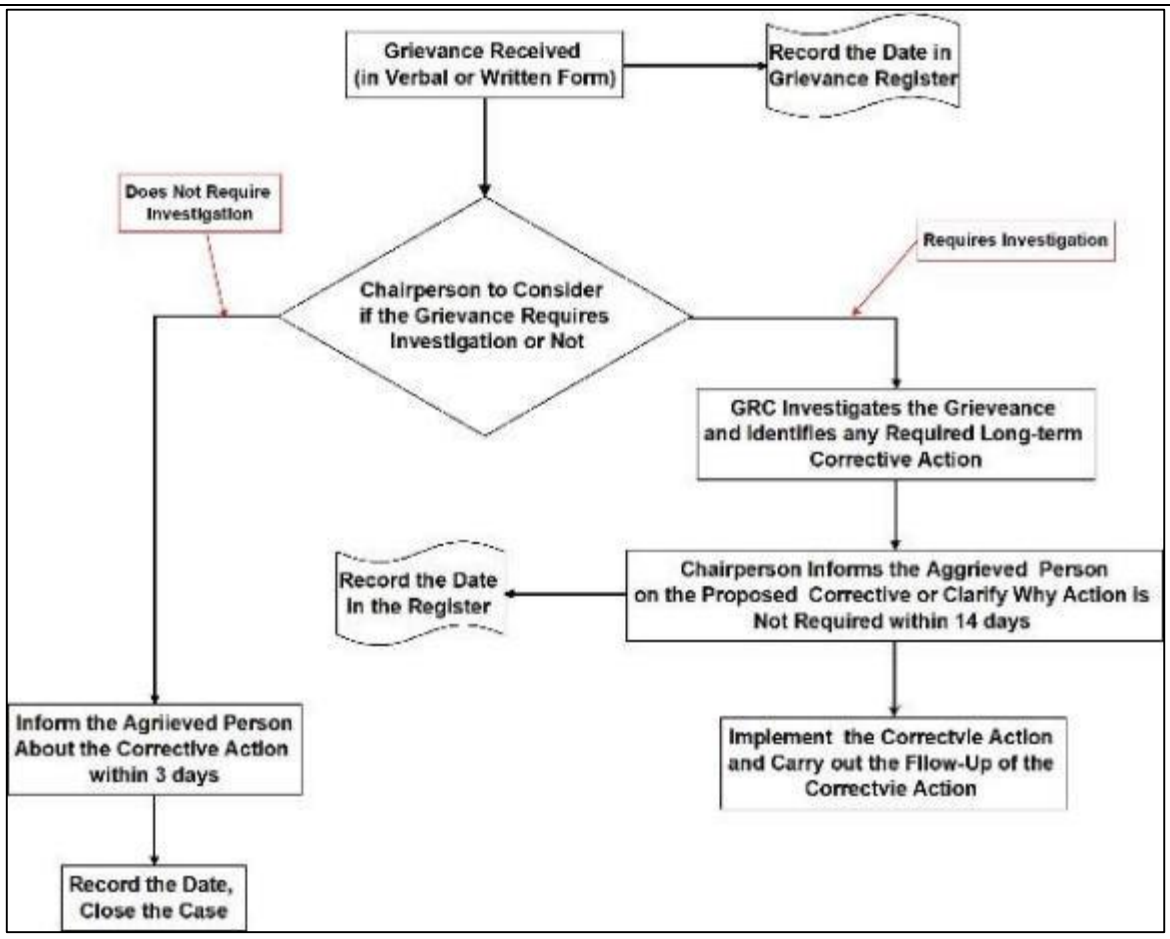

Figure 9.4-1: **Grievances Redress Mechanism**.

In general, complaints and disputes should be resolved at the project level. Each grievance will be treated confidentially.
The grievance resolution process is comprised of four stages:

- Reception
- Investigation and inquiry.
- Response
- Follow up and closeout.

The access to the GRM will be easy and quick, in particular to APs, who are the people most likely to need it. The formal grievance will be:

(i) documented in a written Grievance Form and recorded in a logbook:
(ii) assessed on its level of urgency/severity; and
(iii) assigned to GRC, which will then inform the complainant within seven (7) days that it has received the grievance and that it is under review.

The Aggrieved Person (AP) will report his/her grievance to the GRC through its Chairperson. If a grievance is received face to face or over the phone and the aggrieved wishes to address the grievance formally, it is the responsibility of Chairperson who receives the grievance to complete a Grievance Registration Form.

In general, grievances should be resolved within 30 days. The Chairperson will communicate the findings of the investigation and resolution and seek approval from the AP, who will either accept or appeal the outcome. If the AP is satisfied with the outcome, then the grievance is closed out and will provide his/her signature (or fingerprint) on the Grievance Form as confirmation.

If an agreement is unable to be reached between the AP and the GRC, the grievance will be submitted to UDSM as a lead Project Implementation Agency for review and a final decision through its HEET Team. If necessary, further action will be taken to resolve the issue. The national courts are the last avenue for addressing grievances. In case the AP reaches the judicial system, there should be no cost to the claimant.
A grievance is closed out when no further action can be or needs to be taken. Closure status will be entered into the Grievance database as follows:

- Resolved: the resolution of the complaint was reached and implemented and signed documentary evidence exists.

- Unresolved: the agreed resolution of the complaint was not reached and the case has been authorized for closeout by the Grievance Redress Committee (GRC).

- Abandoned: complaints in which efforts to contact a given complainant were unsuccessful for two months after receipt of the formal grievance.

Specifically, depending on the issues that may arise during project implementation the following stages will be observed in the grievances redress process:

Stage 1: Reception
The Aggrieved Persons (AP) is documented in the appropriate form to be provided by Chairperson. If during the process it appears that the AP does not understand the procedures, this will be explained. The Chairperson should not discourage the filing of a grievance form. The grievance will also be documented in the Grievance/Issues Register. The Grievance Registration Form should be signed and dated by the aggrieved person. Where the aggrieved person is unable to write, he shall obtain assistance from the Chairperson to fill the form and emboss the form with his/her thumbprint.

Step 2: Investigation
If the issue is easily resolvable and it does not require investigation the Chairperson will refer to the GRC, which will carry out the hearing of the grievances and provide the answer within 3 days, after the date of hearing the grievances.

If the grievance is a more complex project-related issue, it will be investigated further, and then arrange the hearing within 7 days after the date of registration.
The Chairperson will arrange the hearing day within 7, which shall be attended by the AP and the party causing the grievances. The Chairperson will notify both parties within 3 days after the date of hearing the grievance.

Step 3: Response
It is assumed that all cases shall be solved at the GRC level. However, some cases may remain unresolved. For such cases, the AP shall have the option to refer his/her case to the District Commissioner for final amicable solution. The Chairperson will prepare a preliminary report containing the details of the grievance and hearing date, and decision of GRC and submit to the District Commissioner.

Step 4: Follow Up and Close-Out
If no amicable solution is reached in Step 3 the AP will have recourse to the court of law as a last resort. This can be a labour court, criminal court, or civil court depending on the type of grievance.

This is a stage that although should always be open and available, it will be discouraged by all positive means such as timely communication and open negotiations. The institutional arrangement has been designed to allow for the process to detect and deal with problems in a timely and satisfactory manner for all parties concerned. Therefore, the GRC shall take necessary measures to ensure that solutions are reached by consensus based on negotiation and agreement.

9.5 Stakeholder Consultations

Stakeholder consultations has been carried out in during execution of scoping exercise also will be carried out during preparation of this ESIA Report and its associated Environmental and Social management Plan (ESMP) and relevant stakeholders will be given the opportunity to raise issues and their concerns regarding the project. All the raised issues /concerns will be taken into consideration during the project design and preparation of ESIA Report, ESMP. However, in order to properly address environmental and social issues, further stakeholder consultation will be necessary during the project implementation.

The stakeholder consultations are aimed at providing a two-way communication or information exchange between the Contractor and the PAPs and the public. This is to ensure that information on the impact of the project is timely delivered by the Contractor and Project Proponent to the PAPs and the public. The Contractor shall disclose relevant content of the Project, potential environmental and social impacts and mitigation measures; GBV /SEA issues and EH&S issues.

The following actions will be taken by the Contractor during construction phase:

- During construction, the Contractor shall keep open communication with local government, and the surrounding local community members.
- Before construction, the Contractor shall disseminate the project information to the PAPs and surrounding local community members and the public in general in the form of brochures written in both Kiswahili and English Languages.

- Relevant project information to be published in the brochures shall include, but not be limited to:
    - Project Overview;
    - Construction Plan;
    - Main Construction Activities;
    - Main Environmental Problems and Mitigation Measures; and
    - Name and phone number of the Contractor's Project Manager, the Consultant's Resident Engineer and PIU Safeguard Officer.

The Contractor shall regularly communicate with the Supervision Consultant's Environmental Specialist and Social/Gender Specialist on the main sensitive subjects and to mitigate any unfavorable environmental and social impacts.

The Contractor shall provide training to the workers before commencement of construction works on Grievances Redress Mechanism, Contractor's Code of Ethical Conduct and Code of Conduct on EH&S and GBV/SEA, and thereafter regularly (monthly) throughout the project implementation period.

Relevant information on Grievances Redress Mechanism, Ethical Code of Conduct, and Code of Conduct on GBV/SEA will be posted at strategic locations for easy access by construction workers in Kiswahili and English Languages.

Complaint recording shall be placed at the Contractor's Office, whereby all submitted complaints problems and other matters shall be included in the Monthly Progress Reports and submitted to the Resident Engineer and ESU for review and approval.

9.6 Institutional Capacity Building

To ensure the sustainability of this project there is a need for institutional capacity building. The purpose of institutional capacity building is to ensure the sustainability of the benefits obtained after the construction of Ngongo UDSM Campus infrastructure and effective implementation of the outlined enhancement / mitigation measures in the ESMP during operation phase.

Therefore, institutional capacity building will involve:

- Training of the ESS Team on environmental, social, gender, health and safety issues during construction phase; and environmental and social monitoring issues during operation phase.
- Training of Contractor's Staff and Construction Workers.

9.6.1 Training of ESS Team

The objective of organizing training for ESS Team is to strengthen environmental management during construction and operation phase, and to ensure the quality of environmental monitoring and effective environmental management, thus improving the quality of the construction works. At the end of the training the ESS Team will be able to understand the main environmental and social issues during the construction and operation phase, and have a better understanding of existing problems and deficiencies on environmental management; and take necessary preventive and control measures as soon as possible.

The training shall be conducted by Supervision Consultant's Environmental Specialist in collaboration with Social/Gender Specialist. In addition, the ESS Team will be involved in on-the job training by participating in the environmental and social monitoring during construction phase. They will be submitting their environmental and social monitoring reports for

assessment by the Supervision Consultant's Environmental Specialist in collaboration with Social/Gender Specialist.

9.6.2 Training of Contractor's Staff and Construction Workers

Before commencement of construction works training will be organized for the responsible personnel and construction workers, in order to avoid environmental damages due to project implementation during construction. The training objective is to define the environmental protection responsibilities of the contractor; and for construction workers, the objective is to ensure the proper construction practice during the construction period in order to avoid some construction behaviours, which have adverse impacts on the environment.

The training will be helpful for the project responsible personnel to understand their obligations in environmental protection needed to be assumed and possible consequences of the environmental damage. The construction workers will have a better understanding of the protection level and methods for environmental sensitive areas. Based on the actual situation of the Project, the training period for construction workers will not be more than one week.

9.7 Cost Estimates for Mitigation Measures

The cost estimate for mitigation measures takes into consideration those costs to be incurred due to affected resources as a result of rehabilitation works/ activities and costs to be incurred as a result of the Contractor's adherence to good engineering practice.

Those costs resulting from implementation of mitigation measures for negative environmental and social impacts are considered as extra costs outside the Project Budget. However, the project will not be responsible for costs that arise out of normal responsibility of the project proponent or implementing agency. Therefore, for that reason, recurrent costs during operation and maintenance are excluded.

The cost estimates for the implementation of ESMP mitigation measures are cost due to the implementation of specific mitigation measures. These include Air Pollution Control; Abatement of Noise Nuisance; Solid and Liquid Waste Management; Implementation of GBV/SEA Awareness Programme Prevention and Control of COVID-19; HIV/AIDS Prevention and Control Programme; and Health and Safety Management Plan (HSMP).

In this regard, the following cost estimates for mitigation measures have been considered for protection of environmental and social resources; and as such for implementation of ESMP:

S/n	Particulars of Cost Items	Amount (TZS)
1.	Air Pollution Control	5,000,000.00
2.	Abatement of Noise Nuisance	2,000,000.00
3.	Solid and Liquid Waste Management	10,000,000.00
4.	GBV/SEA Awareness Programme	15,000,000.00
5.	Prevention and Control of COVID-19	5,000,000.00
6.	HIV/AIDS Prevention and Control Programme	50,000.000.00
7.	Health and Safety Management Plan	52,000,000.00
8.	Tree Planting and Landscaping	5,000,000.00
	Total 1:	**94,000,000.00**
	Add 10% Contingency:	9.400,000.00
	Total 2:	**103,400,000.00**

This makes the total cost for implementation of mitigation measures has been estimated to be about Tanzania Shillings **(TZS 103,400,000.00).** These costs will be included in the Bill of

Quantities during the preparation of the Bidding Document. The cost estimates have been based on the Consultant's experience on projects of similar nature.

9.8 ESMP Implementation Schedule

The role of ESMP is to outline environmental requirements for the project and provide guidance for the Contractor to follow and properly manage environmental impacts during construction. It specifies mitigation, monitoring and institutional measures to be taken during construction and operation phases to eliminate any adverse environmental and social impacts, offset them or reduce them to acceptable levels.

Specifically, ESMP schedule as shown in **Table 9.8-1** summarizes all anticipated significant adverse environmental impacts and provides specific description of institutional arrangement for carrying out mitigation measures. In order to have effective ESMP there must be an integration of efforts among various institutions/stakeholders. This ESMP therefore specifies roles and responsibilities of various institutions/stakeholders during implementation. However, it is important that all responsible institutions /stakeholders should appreciate that they are united and should interact and work towards a common purpose.

Table 9.8-1: ESMP Implementation Schedule.

Effects/Impacts	Mitigation/Enhancement Measures	Responsibility	Cost Estimates (TZS)
A. Mobilization Phase			
Loss of ecological functions and landscape quality of the surrounding environment due to removal of existing vegetation/trees.	▪ Proper landscaping by planting grass and trees in open areas around the buildings after construction. ▪ However, precaution must be taken to avoid trees species that can cause damage to the building foundations	Contractor monitored by Supervision Consultant's Environmental Expert	5,000,000.00
B. Construction Phase			
Creation of air pollution due to dust emission from construction activities.	▪ Application of water on dusty areas. ▪ Minimize stockpiling of excavated soils within the construction site by immediate removal and transportation to dumping site. ▪ Trucks hauling excavated soil materials and dusty construction materials must be covered with tarpaulins.	Contractor monitored by Supervision Consultant's Environmental Expert	5,000,000.00
Creation of noise nuisance to the adjacent receptors (office /classroom buildings and hostel buildings.	• Limiting noisy construction activities only to day time hours. • Fencing of the construction site with corrugated irons sheets to minimize transmission of noise to the sensitive receptors.	Contractor monitored by Supervision Consultant's Environmental Expert	2,000,000.00
Landscape degradation and loss of aesthetic value of the surrounding environment due to accumulation of construction / demolition solid wastes.	▪ All stockpiled soil materials and demolition solid wastes must be immediately removed and transported to the permitted dumping site.	Contractor monitored by Supervision Consultant's Environmental Expert	10,000,000.00

Effects/Impacts	Mitigation/Enhancement Measures	Responsibility	Cost Estimates (TZS)
	▪ Useful soil materials can be retained for landscaping purpose, but must be properly stockpiled.		
Increased transmission of HIV/AIDS and STIs	▪ Formulation and implementation of HIV/AIDS prevention and control programme. ▪ Giving employment priority to local people to minimize the number of new comers, hence minimizing the likelihood of new HIV transmission. ▪ Collaboration with local NGOs/CBOs dealing with HIV/AIDS to promote awareness and education campaigns.	Contractor monitored by Supervision Consultant's Environmental Expert	50,000.000.00
Increased risk of Covid-19 transmission due increased population at the project sites.	▪ The Contractor will take necessary precautions as stipulated in the ESF/Safeguards Interim Note: Covid-19 Consideration in Construction/Civil Works Projects.	Contractor monitored by Supervision Consultant's Environmental Expert	5,000,000.00
Increased risk of construction related accidents	▪ Fitting all mobile construction equipment / machinery and trucks with sounding alarm and signal device to warn people, especially during backward movement. ▪ Putting a written warning sign boards in Kiswahili and English languages at strategic locations to prohibit or prevent entrance of unauthorized persons into the construction site. ▪ Restrict operation of mobile construction machinery / equipment to trained personnel only. ▪ Fencing the construction site to prevent people from entering the construction site. This will include putting a written warning in	Contractor monitored by Supervision Consultant's Environmental Expert	2,000,000.00

Effects/Impacts	Mitigation/Enhancement Measures	Responsibility	Cost Estimates (TZS)
	both English and Kiswahili at a strategic location to prevent unauthorized people from entering the construction site.		
Creation of occupational health and safety risks.	▪ Formulation and implementation of Health and Safety Management Plan (HSMP), including provision of Personal Protective Equipment (PPE). ▪ Avoid prolonged use of hand-held equipment by workers beyond the prescribed 8 hours in accordance with Tanzania Standards[52].	Contractor monitored by Supervision Consultant's Environmental Expert	50,000,000.00
Increased employment opportunities for local people due to recruitment of construction workers.	▪ The contractor will give employment priority to the local people and avoid any kind of discrimination based on gender, race, or religion. ▪ The Contractor will ensure compliance with the World Bank ESS 2: Labour and Working Conditions and national legislations regarding employment and workers' social welfare. These include the Employment and Labour Relations Act No. 6 of 2004; The Employment and Labour Relations (General) Regulations (2017); The Labour Institutions Act No. 7 of 2004; Labour Institutions Wage Order (2013) (Labour Institutions Act (Cap 300).; The Workers' Compensation Act (Cap. 263 R.E. 2015); The National Social Security Fund Act [CAP. 50. R. E. 2018)	Contractor monitored by Supervision Consultant's Environmental Expert	Not Applicable
Risk of emergence of GBV/SEA and SH due to interpersonal relationships and social interactions.	▪ The Contractor will ensure there are codes of conduct on prevention of Gender-Based	Contractor monitored by Supervision Consultant's Environmental Expert	15,000,000.00

[52]The United Republic of Tanzania. The Environmental Management (Standards for Control of Noise and Vibration Pollution) Regulations (2010). THIRD SCHEDULE (Made Under Regulation 15(1)).

Effects/Impacts	Mitigation/Enhancement Measures	Responsibility	Cost Estimates (TZS)
	Violence (GBV)/ Sexual Exploitation and Abuse (SEA) and Sexual Harassment (SH). ▪ Disseminating information that raises awareness on the prohibition of GBV/SEA and SH among the workers, local community members and general public and disseminate information that promotes good and respectful relationships between workers and the local community members. ▪ Provision of cultural sensitization training for foreign workers regarding interaction with local community members ▪ Grievances Redress Mechanism will be in place to deal with GBV/SEA and SH issues involving construction workers, project staff and the local community members.		
Increased income generation opportunities for local people due increased demand for food from construction workers.	▪ Provide enabling environment for food vendors to sell their food in a clean and hygienic environment by providing shelter and water supply.	Contractor monitored by Supervision Consultant's Environmental Expert and Social/Gender Expert	2,000,000.00
Disruption of traffic flow along the adjacent local roads.	▪ Formulation of traffic management plan. This includes deployment of flag persons to guide movement of vehicles.	Contractor monitored by Supervision Consultant's Environmental Expert and Social/Gender Expert	10,000,000.00
C. Demobilization Phase			
Loss of temporary employment opportunities by local people due to retrenchment of construction workers after project completion.	▪ Give employment priority to local people, because after project closure they will easily revert back to their normal economic activities.	Contractor monitored by Supervision Consultant's Environmental Expert and Social/Gender Expert	To be provided m the BOQ for Other Items

Effects/Impacts	Mitigation/Enhancement Measures	Responsibility	Cost Estimates (TZS)
	▪ Ensure that all construction workers are registered with social security funds and are paid their terminal benefits immediately before retrenchment from jobs.		
D. Operation Phase			
Increased enrolment of students and revenue for the institute.	▪ The CoAF Ngongo Campus will promote marketing of the institute at national and international levels.	The Management of CoAF Ngongo Campus.	NA
Increased revenue for infrastructure/ utility service providers.	▪ UDSM will make consultation with infrastructure/utility service providers.	UDSM-CoAF Ngongo Campus in collaboration with infrastructure/ utility service providers.	NA

CHAPTER TEN

10.0 ENVIRONMENTAL AND SOCIAL MONITORING PLAN

10.1 Implementation of Monitoring Plan

The information collected during monitoring exercise helps to improve ESMP by adapting measures to ensure that the anticipated impacts are mitigated. For example, in case environmental monitoring identifies some environmental concerns during construction or operation phase then construction or operation works has to be modified or stopped, whenever necessary.

Thus, the objectives of environmental monitoring programme are:

- To ensure that mitigation and benefit enhancement measures have been adopted and are effective.

- To identify any unforeseen negative impacts during EIA stage and propose appropriate mitigation measures.

- To provide information on the actual nature and extent of key impacts and effectiveness of mitigation and benefit enhancement measures, which through feedback mechanism can improve the planning and execution of future, similar projects.

The ESMP monitoring during construction phase will be comprised of two activities:

- Review of Contractor's plans, methods statement, and temporary works design and arrangements to ensure that environmental protection measures specified in the contract documents are adopted and Contractor's proposals provide acceptable levels of impact control.

- Systematic observation of all site activities and the Contractor's offsite facilities, including borrow pits and quarry sites areas. To ensure that the contract requirements relating to environmental matters are being complied with and that mitigation measures for those unforeseen impacts are formulated and implemented by the contractor.

The monitoring activities will be comprised of visual observation during site inspection and will be carried out at the same time as the engineering supervision activities. Site inspections will take place with emphasis on early identification of any environmental problems and the initiation of suitable remedial action. Where remedial actions have been required on the part of the Contractor, further checks will need to be made to ensure that these are actually being implemented to the agreed schedule and in the required form.

All sites where construction is taking place will be formally inspected from an environmental view point on a regular basis. However, in addition to visual observation there shall be informal questioning of members of the local communities and their leaders who live near the project. This is because they may be aware of matters which are unsatisfactory but may not be readily apparent or recognized during normal site inspection visits.

The monitoring plan will also be integrated with other construction supervision and carried out by the Resident Engineer. The Resident Engineer will decide on the appropriate course of action to be taken in cases where unsatisfactory reports are received from the field staff regarding environmental matters. In case of relatively minor matters, advice to the Contractor on the need for remedial action may suffice, but in all serious cases, the Resident Engineer will issue a formal instruction to the Contractor to take remedial action, depending on the extent of delegated powers.

10.2 Monitoring and Reporting Responsibilities

10.2.1 Supervision Consultant

The Supervision Consultant will appoint an Environmental Specialist and Social /Gender Specialist who shall be responsible for Environmental and Social Compliance Monitoring. The Supervision Consultant's Environmental Specialist and Social / Gender Specialist shall be making a daily site inspection and shall be attending Engineer's Site Meetings.

The participation of Environmental Specialist and Social /Gender Specialist in the Engineer's Site Meetings shall enable the Environmental Specialist and Social /Gender Specialist to:

- Review the status of any problem addressed in the previous meeting; propose additional mitigation measures, if the problem has not been resolved.
- Review the main construction activities and any environmental problem that occurred since the last meeting.
- Review the construction activities and general environmental performance as listed in the ESMP.

The Environmental Specialist and Social/Gender Specialist shall be preparing Monthly Environmental and Social Monitoring Reports which will highlight:

- The extent to which the Contractor is complying with the environmental and social specifications and contract conditions (compliance monitoring).
- Any unforeseen environmental and social impacts (i.e., the failure or inadequacy of the mitigation measures) and recommendations on how to manage unforeseen impacts.

In addition, the Vice-Chancellor of UDSM shall deploy an Environmental Officer and Social/Gender Officer who shall be collaborating with the Supervision Consultant's Environmental Specialist and Social /Gender Specialist to oversee implementation of ESMP. The Environmental Officer and Social/Gender Officer apart from making a close follow-up on engineering issues shall be responsible for environmental and social monitoring on monthly basis.

There must be feedback from monitoring to ensure that failure to implement an approved measure incurs a penalty to the Contractor. The Resident Engineer's responsibility will include enforcement of mitigation measures. In case an approved measure turns out to be ineffective or results into unforeseen adverse impacts it should be reported to the Vice-chancellor of UDSM through the Campus Manager, which would be capable of finding out why, and of commissioning appropriate further measures.

10.2.2 Contractor

The Contractor will be responsible for implementation of environmental and social mitigation measures under the supervision of Resident Engineer. This is to ensure that technical and environmental clauses are followed and well implemented by the Contractor.

The Contractor shall assign an Environmental Manager who shall be responsible for carrying out monitoring on daily basis and overseeing compliance with environmental and social mitigation measures. The Contractor's Environmental Manager will be assisted by EHSO and Social/Gender Specialist.

The Contractor's Environmental Manager shall submit a Monthly Environmental, Social, Health, and Safety (ESH&S) Compliance report to the Resident Engineer specifying that:

- All previously notified failures to comply with the mitigation measures have been rectified.
- All newly notified requirements have been fulfilled and all standard requirements (as specified in this report) have been put into effect.

The Resident Engineer shall countersign the report and make it available to the UDSM and World Bank. UDSM in turn should pass a copy to Lindi Municipal Council within a reasonable period not exceeding 30 days from receipt.

10.3 Monitoring Methods

The purpose of monitoring is to ensure that the Contractor implements the outlined mitigation measures in the ESMP. Therefore, monitoring methods will be based mainly on visual inspection and will be carried out by the Supervision Consultant's Environmental Specialist and Social/Gender Specialists in collaboration with Contractor's Environmental Manager assisted by Environmental, Health and Safety Officer (EHSO) and Social/Gender Specialist on daily basis.

To verify environmental effects predictions, and to evaluate the effectiveness of mitigation measures committed during the ESMP preparation, it is necessary to collect baseline data before the commencement of the construction works that may result in changes to the environment. The purpose of baseline data collection is to update the baseline information and establish the existing conditions at the construction site.

Establishing baseline conditions allows for a comparison with conditions before and after construction works to determine the extent of any project-related environmental effects, the need for additional mitigation measures, and/or to confirm the effectiveness of mitigation measures that have been or are being implemented.

In case any environmentally and socially sensitive issues have been identified during baseline monitoring and not covered during the ESMP preparation, adaptive measures and additional monitoring or mitigation will be developed and implemented as may be necessary.

10.4 Environmental and Social Monitoring Costs

The cost of environmental and social monitoring will be included in the cost of Construction Supervision. The Supervision Consultant will be responsible for the cost of environmental and social monitoring. These costs include payment of professional fees for Environmental Specialist and Social/Gender Specialist. However, these costs will be included in the overall costs of commissioning the Supervision Consultant.

10.5 Monitoring Schedule

The ESMP monitoring schedule as summarized in **Table 10.5-1**, addresses the following questions:

- WHAT parameter to be monitored? (Monitoring Parameters)
- WHY is the parameter being monitored? (Monitoring Objective)
- WHAT indicator to be used in monitoring? (Monitoring Indicators)
- WHERE to be monitored? (Monitoring Location).
- HOW is to be monitored? (Monitoring Methods).
- HOW frequent is to be monitored? (Monitoring Frequency)
- WHAT is the monitoring targets or standards? (Performance Standards)
- WHO is responsible for monitoring? (Monitoring Responsibility)

Table 10.5-1: ESMP Monitoring Schedule.

Monitoring Parameters	Monitoring Objective	Monitoring Indicators	Monitoring Locations	Monitoring Methods	Monitoring Frequency	Performance Standards	Monitoring Responsibility
A. Pre-construction Phase							
A1. Submission of Contractor's Site Plan	To ensure compatibility of the site plan with local land use plan.	Submitted Contractor's Site Plan	Contractor Office/ Camp Site	Visual inspection.	Once before construction works.	Site Plan is compatible with local land use plan. Office / camp site is equipped with all support facilities.	Developer's Site Engineer.
A2. Access of local people to employment in the project area	To ensure employment priority is given to local people. To ensure equal employment opportunity without gender and/or racial discrimination. To ensure Contractor is providing employment contracts in accordance with the labour laws.	Number of local people employed in the project by gender.	Contractor's Office	Contractor's Monthly ESH&S Compliance Report. Sample of Employment Contract.	Continues throughout construction period.	Employment priority is being given to the local people. Number of reported cases of gender or racial discrimination. Employment contracts are in accordance with labour laws.	Independent Environmental and Social Consultant (IESC) in collaboration with Site Engineer
A3. Submission of C-ESMP, HSMP and HIV/AIDS Programme.	To ensure compliance with EH&S issues by Contractor.	Submitted C-ESMP, HSMP, HIV/AIDS programme.	Based on submission of the documents to the Engineer.	Review of C-ESMP and HSMP documents.	Once, before construction works.	C-ESMP, HSMP and HIV/AIDs Programme has been approved and being implemented.	Independent Environmental and Social Consultant (IESC) in collaboration

Monitoring Parameters	Monitoring Objective	Monitoring Indicators	Monitoring Locations	Monitoring Methods	Monitoring Frequency	Performance Standards	Monitoring Responsibility
							with Site Engineer
B. Construction Phase							
B1. Dust and smoke emission around the project site.	To minimize impacts from dust and exhaust emission.	Intensity of visible dust and smoke emission.	Construction sites.	Visual inspection.	Continuous	No visible dust and smoke emission around the construction sites. Dust and smoke emission control measures are being implemented.	Independent Environmental and Social Consultant (IESC) in collaboration with Site Engineer
B3. Noise nuisance and vibration effects.	To minimize noise and vibration impacts from construction activities	Noise and Vibration Levels	At the boundaries of construction sites.	Audible noise.	Continuous	No complaints regarding noise nuisance and vibration effects.	Independent Environmental and Social Consultant (IESC) in collaboration with Site Engineer.
B5. Accumulation of construction / demolition solid wastes.	To prevent or minimize landscape degradation.	Presence of excavated soil materials and construction solid wastes.	At the construction sites.	Visual inspection.	Continuous	No accumulation of excavated soil materials and construction solid wastes.	Independent Environmental and Social Consultant (IESC) in collaboration with Site Engineer.
B6. Implementation of HIV/AIDs Prevention and Control Programme.	To minimize risk of HIV transmission.	Number of HIV/AIDS campaigns and training sessions.	Based on submission of HIV/AIDS Campaign reports	Monthly ESH&S Compliance Reports.	Monthly	Number of Voluntary Clinical Testes (VCTs)	Independent Environmental and Social Consultant (IESC) in

Monitoring Parameters	Monitoring Objective	Monitoring Indicators	Monitoring Locations	Monitoring Methods	Monitoring Frequency	Performance Standards	Monitoring Responsibility
		Number of participants by gender.				HIV//AIDS program is in place and being implemented on a regular basis.	collaboration with Site Engineer.
B7. Implementation of Covid-19 prevention and control programme.	To prevent or minimize risk of Covid-19 transmission.	Number Covid-19 campaigns and training sessions. Number of participants by gender.	Based on submission of Covid-19 reports	Monthly ESH&S Compliance Reports.	Monthly	Precautions being taken as stipulated in the ESF/ Safeguards Interim Note: Covid-19 Consideration in Construction/Civil Works Projects.	Independent Environmental and Social Consultant (IESC) in collaboration with Site Engineer.
B2. Health and Safety of Construction workers.	To prevent or minimize occupational health and safety risks.	Number of toolbox sessions. Number of workers provided with and using appropriate PPE. Presence of approved Health & Safety Management Plan (HSMP)."	Construction sites	Visual inspection. An informal interview with workers. Monthly ESH&S Compliance Reports.	Continuous	Number of reported occupational diseases and accidents.	Independent Environmental and Social Consultant (IESC) in collaboration with Site Engineer.
B8. Construction related risk of accidents.	To prevent or minimize construction related accidents.	Presence of fence around the around the construction site.	Construction sites.	Visual inspection.	Continuous.	Number of reported constructions related accidents.	Independent Environmental and Social Consultant (IESC) in collaboration

Monitoring Parameters	Monitoring Objective	Monitoring Indicators	Monitoring Locations	Monitoring Methods	Monitoring Frequency	Performance Standards	Monitoring Responsibility
		Presence of written warning signboard in Kiswahili and English. Presence of trained mobile equipment /machine operators.					with Site Engineer.
B9. Incidence of traffic accidents due to movement of heavy trucks to and from the construction site.	To prevent or minimize risk of traffic accidents,	Presence of traffic management plan. Presence of flag persons at strategic locations.	At the junction of access road and main road.	Visual inspection	Continuous	Number of reported cases of traffic accidents.	Independent Environmental and Social Consultant (IESC) in collaboration with Site Engineer.
B10. Incidence of Gender-Based Violence (GBV)/ Sexual Exploitation and Abuse (SEA and Sexual Harassment (SH).	To prevent incidence of GBV/SEA and SH.	Number of awareness sessions.	Office/Camp Site and Construction sites.	Verification of awareness sessions organized with workers Verification of consultations with and involvement of local communities	After every 15 days	Number of workers who participated in awareness sessions by gender. Consistent and regular involvement of local community members	Independent Environmental and Social Consultant (IESC) in collaboration with Site Engineer.

Monitoring Parameters	Monitoring Objective	Monitoring Indicators	Monitoring Locations	Monitoring Methods	Monitoring Frequency	Performance Standards	Monitoring Responsibility
B11. Workers Welfare[53] and Child labour.	To ensure compliance with labour laws.	Monthly Salary Slips; NSSF Monthly Payment Receipts. WCF Monthly Payment Receipts	Based on submission of Monthly Compliance Reports.	Monthly ESH&S Compliance Reports	Monthly	Number of reported complaints regarding minimum wages. Reported cases of non-payment of Monthly NSSF and WCF contributions.	Independent Environmental and Social Consultant (IESC) in collaboration with Site Engineer.
B12. Income generation opportunities for local people.	To facilitate income generation opportunities for local residents.	Provision of clean and hygienic environment.	Food vending areas around the project ate.	Visual inspection.	Continuous	Food vendors are selling food in a clean and hygienic environment.	Independent Environmental and Social Consultant (IESC) in collaboration with Site Engineer.
C. Demobilization Phase							
C1. Retrenchment of workers during project completion.	To ensure NSSF contributions and terminal benefits have been paid to all retrenched workers.	Number of retrenched workers	Contractor's and Engineer's Office	Monthly Compliance Site Closure Report	Once, during project completion.	All retrenched workers have been paid their terminal benefits and NSSF contributions.	Independent Environmental and Social Consultant (IESC) in collaboration with Site Engineer.
D. Operation Phase							

[53] (1) Payment of Minimum Wage (2) NSSF and WCF Contributions by the Contractor (3/ Deductions from payment of wages to be made as allowed by national law (project workers to be informed of the conditions under which such deductions will be made). (4) Project workers to be provided with adequate periods of rest per week, annual holiday, and sick, maternity and family leave, as required by national law.

Monitoring Parameters	Monitoring Objective	Monitoring Indicators	Monitoring Locations	Monitoring Methods	Monitoring Frequency	Performance Standards	Monitoring Responsibility
Enrolment of students and revenue generation for the institute.	To ensure the Increased enrolment of students and revenue for the institute.	Number of enrolled students Amount of fee paid to the institute.	Annual Enrolment Report.	Visual Inspection.	Annually	There is an increased enrolment of local and foreign student.	Developer in collaboration with tenants and vehicle owners.
Revenue collected by infrastructure/ utility service providers.	To ensure there is increased revenue for infrastructure/ utility service providers.	Amount of monthly bill paid by the institute to service providers.	Monthly electricity and water bills.	Visual Inspection.	Monthly	There is increased revenue collected by infrastructure/ utility service providers.	Developer

CHAPTER ELEVEN:

11.0 RESOURCE EVALUATION OR COST BENEFIT ANALYSIS

11.1 Project Costs and Benefits

11.1.1 Project Costs

The total construction cost of the proposed buildings is estimated to be Tanzania Shillings (TZS) 6,996,990,000.00.

11.1.2 Project Benefits

The project is expected to have both short-term and long-term socio-economic benefits to the local community and the nation.

11.1.3 Short-term Benefits

The short-term socio-economic benefits include creation of temporary employment and increased income generation opportunities to the local people. It is expected that during construction employment priority will be given to the local people.

During construction some local people, especially women will get opportunity to increase their income by selling food items to the construction workers. This benefit will be enhanced by providing water supply and sanitary facilities to enable them sell their food in clean and hygienic environment, hence preventing transmission of hygiene related disseises like cholera and diarrhoea to the construction workers.

11.1.4 Long-term Benefits

The long-term socio-economic benefits include increased revenue due to increased students' enrolment, and increased productivity due to operation of Lecture Theatres and Laboratory Facilities; and increased revenue for infrastructure / utility providers due to increased demand for power, water supply and telecommunication services.

11.2 Environmental Costs

The cost of environmental mitigation measures as shown in **Table 12.3-1** is considered to be the environmental[54] cost to be incurred due to implementation of mitigation measures for this project, which is estimated to be TZS 103,400,000.00.

Table 12.3-1: Direct Environmental Cost Estimates.

S/n	Particulars of Cost Items	Amount (TZS)
9.	Air Pollution Control	5,000,000.00
10.	Abatement of Noise Nuisance	2,000,000.00
11.	Solid and Liquid Waste Management	10,000,000.00
12.	GBV/SEA Awareness Programme	15,000,000.00
13.	Prevention and Control of COVID-19	5,000,000.00
14.	HIV/AIDS Prevention and Control Programme	50,000.000.00
15.	Health and Safety Management Plan	52,000,000.00
16.	Tree Planting and Landscaping	5,000,000.00
	Total 1:	**94,000,000.00**
	Add 10% Contingency:	9.400,000.00
	Total 2:	**103,400,000.00**

11.3 Determination of Benefit/Cost Ratio

The resource evaluation or cost benefits analysis focuses on comparing the project costs and environmental costs. The environmental costs for this project to be TZS 103,400,000.00, and

[54]The term "environmental" in this report also means "social" and "cultural", unless otherwise specified.

the total project costs is estimated to be TZS 7,100,390,000, after including the environmental costs.

When compared with total project costs (TZS 7,100,390,000), the overall environmental cost is about 1.456% of the total project costs. It can be concluded that the environmental costs are significantly small and can be tolerated for this project.

The benefit/cost ratio is a good indicator of project viability from economic, environmental, and social point of view. However, due to lack of economic analysis the benefit/cost ratio cannot be determined for this project.

Nevertheless, it is anticipated that there will not be any significant difference in Benefit/Cost Ratio before and after incorporating environmental costs, because the environmental costs have been found to be significantly small and do not have any significant effects on the project costs. Ultimately, the Benefit/Ratio is expected to be greater than 1, hence making the project to be economically viable, and therefore it should be implemented without delay.

CHAPTER TWELVE

12.0 DEMOBILIZATION PLAN

12.1 Implementation of Demobilization Plan

The demobilization and site reclamation process are one of the required project management activities during the project completion or closure of the projects. The demobilization activities will involve removal of all mobilized items and cleaning up of the construction site. It will include the removal of all temporary safety signs, temporary fencing, construction debris including crushed stone aggregates, pieces of wood, construction stakes, and other construction-related refuse, and temporary facilities or works. The restoration of surfaces to an equal or better than the existing condition shall be considered to be part of demobilization plan. Site reclamation includes reclamation of areas disturbed during construction, other than access and staging areas, to pre-project conditions or better.

In order to ensure that all demobilization and site reclamation works are done in a comprehensive way right from the beginning, it is important to have a demobilization checklist which shows all items that need to be completed during implementation of demobilization plan. An example of Environmental and Social Demobilization Checklist is provided in **APPENDIX 28**, which groups the different items that need to be completed and inspected. The checklist covers the following issues and areas to be considered during implementation of demonization plan:

- Workers Welfare Management
- Camp Sites and Office Facilities; Solid Waste Management; Soil Erosion and
- Sedimentation Control; Groundwater and Dewatering Contol.
- Workshops/Garages,Vehicle Washing and Refuleing Areas.
- Fuel and Chemical Storage Area
- Sanitary and Wastewater Disposal Facilities.
- Landscape Management and Run-off Control
- Borrow pits/Quarry Sites Rehabilitation.

The demobilization checklist will be used by Supervision Consultant's Environmental Specialist. For each inspection item, the form has a column for the work completion status (Yes, No or Not Applicable), observation comments made by the inspector for non-compliance works that need to be rectified by the Contractor and the target completion date for completing the non-conformant works. The Environmental Inspector will be taking some photographs during the site inspection for recording purpose. The photographs will be attached to the Environmental Demobilization Checklist and submitted to the Resident Engineer for action.

12.2 Retrenchment of Employees

Three (3) months before completion of the project, the Contractor through Human Resource Officer (HRO) will make sure NSSF contributions for all construction workers have been paid to the NSSF. This will involve posting of the names of all employees on the notice board indicating their Names, NSSF numbers and Monthly NSSF contributions. This is to ensure that the monthly NSSF deductions have been paid by the Contractor and allow rectification for any identified shortcomings before retrenchment of employees.

12.3 Exit Medical Examination for Employees

The Contractor will carry out an exit medical examination for all employees before retrenchment. This is the requirements of Sub-section 24(2) of the Occupational Health and Safety Act No. 5 of 2003. The legislation requires the Contractor shall carry out an exit medical examination through a qualified occupational health physician. According to Sub-section 24(3), the Contractor shall be responsible for the prescribed fee and all other medical expenses.

12.4 Restoration of Utilities and Landscape

During demobilization phase all work areas, offices, workshops /garages, and other temporary installations will be cleaned up and the site will be restored. These includes removal of temporary buildings, surplus materials, pieces of wood, pieces of bricks or any other material that is not in the area before construction works.

Damaged trees will be chopped / lopped and crosscut and removed from the construction sites. The site will be cleared of equipment, solid wastes, debris, and overburden resulting from construction works.

12.5 Restoration of Workshops / Garages and Materials Storage Areas

The workshop and other materials storage areas will be cleaned to remove petroleum products like oils and grease. The petroleum products should be handled in accordance with the provisions given in the Standard Specification for Road Works (2000).

All blocks, cements, stockpiled gravels, and any other surplus materials will be removed from the Materials storage yard. The useable materials should be taken away and stored in a safe place far from the abandoned site. The spilled materials must be removed and the site must be properly cleaned and restored to its original state. If possible, the site must be prepared and planted with vegetation to the unpaved areas as approved by Engineer.

12.6 Restoration of Solid Wastes and Spoil Materials Dumping Sites

All unwanted soil/spoil materials will be removed from temporary dumping sites and transported to permitted disposal site. The remaining useful soil materials will be mixed with surrounding topsoil, properly levelled, and graded to allow vegetation growth.

The solid waste dump site will be cleared, levelled, and returned to a regular form. All non-toxic wastes in the dump site will be thoroughly covered with topsoil. The Contractor will ensure that no wastes are visible.

The eliminated dry materials should form a stable slope and must be in harmony with the surrounding landscape. The wastes will be covered with 1 m of topsoil. The soils will be compacted thoroughly, the slope flattened and spread a layer of additional cover material and cover with topsoil to allow growth of natural vegetation.

CHAPTER THIRTEEN

13.0 SUMMARY AND CONCLUSION

13.1 Summary

Project Overview

The objective of this project is to undertake the construction of buildings and associated infrastructure for the Ngongo UDSM Campus. The justification for the project has been prompted by the need to strengthen the learning environment in alignment with labour market and improve the management of higher education system.

Therefore, in order to achieve the mentioned objective, the UDSM has received financial support from the World Bank (WB) through the Ministry of Education, Science and Technology (MoEST) under the project named Higher Education for Economic Transformation (HEET-P166415). The UDSM Ngongo Campus is one of the selected locations where the HEET Project will be implemented.

For Ngongo UDSM Campus, the HEET Project involves construction of several buildings and supporting infrastructure. These include Administration Building; Lecture Rooms Building to accommodate 360 students; Laboratory and Workshop Building; Hostel Building to accommodate 512 students; Cafeteria Building; Dispensary Building. The associated infrastructure includes internal roads network; external fence; water distribution network; sewer network; power distribution network; fibre optic telecommunication network.

The total area to be occupied by the proposed facilities is estimated to be 1082.172 Square metres (SQM), whereby Lecture Rooms and Offices Building will occupy about 165.418 Square metres (SQM), Hostel Building about 542.820 Square metres (SQM), and Mini-Cafeteria Building about 373.934 Square metres (SQM).

The total construction cost is estimated to be United States Dollars (US D) 3,003,000.00 or Tanzania Shillings (TZS) 6,996,990,000.00 at Bank of Tanzania (BOT) Exchange Rate of 1 US D = TZS 2,330. The project will be funded by the Government of the United Republic of Tanzania through the University of Dar Es Salaam (UDSM) in collaboration with the Ministry of Education, Science and Technology (MoEST) and The World Bank. The UDSM will be the implementing Agency through the dedicated Project Implementation Unity (PMU).

Review of Policy, Legal and Institutional Framework

The screening of World Bank Environmental and Social Standards (ESS), ESS 1, ESS 2, ESS 3, ESS 4, and ESS 10 are applicable to the project. The review of national policies, legalisations and institutional framework indicates the project is compatible and complies with the national development policies and legal requirements, and the institutional framework for environmental management is well established at street (“Mtaa”) levels to national level.

Environmental Baseline Conditions

The topography of the project is characterised by undulating terrain with an altitude ranging from 375 m mean above sea level (m.a.s.l.) to a maximum of about 396 m (m.a.s.l.). The topography indicates the middle part of the project site has the lowest altitude.

The project area is dominated by few natural vegetation, mainly Cashew nut trees which are more than 70% of the command area, and followed by mango trees. The existing vegetation cover provides a natural habitat for insects and a variety of animals like rats, squirrels, reptiles, amphibians, and birds.

The ambient noise level in the project area has been estimated to be 35 dBA. The major source of noise and vibration emissions is from vehicles and motorcycles (“Bodaboda”),

Tricycles ("Bajaj" plying along the local roads. These include the Lindi-Mtwara Road. The nearest sensitive receptor is the existing Ngongo Secondary School, about 600 m to the south-east, from the boundaries of the project site. The findings indicate the two sensitive receptors are likely to be affected due to noise emission from the construction site, hence the need to take precaution during construction. This includes fencing of the construction site with corrugated iron sheets to minimize noise levels. Therefore, measures will be taken by fencing the construction site with corrugated iron sheets to reduce noise impacts to the sensitive receptors.

The major source of air pollutants is from vehicles plying along the local roads, especially dust emission from unpaved local roads during dry seasons. Burning of domestic solid wastes is also contributing into air pollution.

The existing infrastructure around the project site includes three (3) electricity power poles**;** LUWASA Water supply pipelines, Ngongo Secondary School Classrooms, and 14 Staff Houses**.** On the south-eastern boundaries there is an overhead electricity power transmission line, power transformer and overhead telephone cables.

Results of Stakeholder Consultations

The results of stakeholder consultation indicate the consulted stakeholders due support the project, but they have raised some issues/concerns. The stakeholders were mainly concerned about solid and liquid wastes management, solid waste management, health and safety of workers and local community members, dust emission due to transportation of construction materials, and soil pollution due to oil spillage.

Considered Alternatives

The three alternatives were considered for this project based on the techno-economic, environmental and social criteria. These include the "No Project Alternative"; "Project Alternative" and Construction Methods Alternative. The findings indicate the "Project Alternative" has short-term environmental impacts but long-term socioeconomic benefits. Therefore, the "Project Alternative" was selected and "No Project Alternative" was rejected. Regarding the Construction Method Alternatives, it was found that both "Labour Intensive Method" and "Machine Intensive Method" should be used selectively depending on the construction requirements. However, more emphasis should be on "Labour Intensive Method" in order to enhance employment opportunities for the local people. Also, taking into account that "Labour Intensive Method" has less environmental, heath, and safety risks than "Machine Intensive Method".

The septic tank system Alternative was selected in favour of other wastewater treatment systems

Identification of Potential Impacts

In general, the project has been found to have both beneficial (positive) and adverse (negative) effect/impacts. However, the positive impacts have been found to outweigh the negative impacts. Moreover, most of the identified negative impacts are short-term, as they occur only during construction phase, but most of the identified positive impacts are long-term as they continue during the operation phase. The positive impacts will be enhanced in order to maximize the project benefits.

The identified positive impacts include creation of temporary employment and income generation opportunity for local people during construction; increased revenue for infrastructure/utility service providers; and increased enrolment of students and revenue for the UDSM due to availability of space after construction of lecture rooms and hostel at Ngongo UDSM Campus. The employment opportunities can be increased by emphasising on labour-

intensive construction methods. The labour-intensive construction methods apart from increasing employment opportunities for local people, it helps them build some skills for future employment and creates some sense of project ownership by the local community.

The identified negative impacts include creation of air pollution due to dust emission from construction activities; creation of noise nuisance due to operation of construction equipment/machinery; landscape degradation and loss of aesthetic value of the surrounding environment due to accumulation of excavated soil materials; loss of ecological and landscape quality due to removal of existing vegetation/trees;; increased HIV/AIDS prevalence due to social interaction between construction workers and students/local community members; increased risk of exposure to Covid-19 due to influx of people into the construction site; increased risk of exposure to construction related accidents due to trespassing of unauthorized persons into the construction site; increased exposure to occupational health and safety risks due to handling/operation of hazardous construction materials/equipment; increased risk of traffic accidents due to movement of heavy trucks to and from the construction site; loss of temporary employment by local people due to closure or completion of the project.

Implementation of Mitigation Measures

In order to ensure the sustainability of this project, the enhancement and mitigation measures have been proposed and outlined in the Environmental and Social Management (ESMP), which specifies the institutional roles, responsibilities and cost estimates for mitigation measures. The cost of mitigation measures, which is estimated to be Tanzania Shillings (TZS) 103,400,000, will be incorporated into the Bill of Quantities (BOQ). In addition, the Environmental Monitoring Plan (EMP) has been prepared to ensure effective implementation of the proposed mitigation measures during construction. The IFC Performance Standards in combination with relevant national policies and legislations will be used to monitor the effectiveness of ESMP implementation.

Project Benefits

The cost benefit analysis indicates the project benefits will outweigh the project costs. In addition, the cost of mitigation measures was found to be only 7.75% of the total project costs, and therefore the could be included in the project budget.

13.2 Conclusion

The findings indicate the project is not located within environmentally sensitive area and has complied with the requirements of EMA Cap 191, whereby no development is permitted within a distance of 60 m from the Ngongo River. Again, the project is not likely to affect any important natural habitat or any unique, rare, threatened or endangered flora and fauna.

Although there is no any important natural habitat the removal of existing vegetation/trees will result into loss of ecological functions and landscape quality. There are several ecological functions being provided by existing vegetation / trees. Apart from being important natural habitats for birds, insects, reptiles, etc., they help to minimize soil erosion and sedimentation of storm water drainages, control wind speed, provide shade, and refresh air by absorbing carbon dioxide and releasing oxygen into the atmosphere.

It is therefore recommended that some of the trees should be retained by carefully selecting the location of lecture theatre and laboratory building. Trees and grass should be planted around the building to prevent soil erosion and sedimentation of storm water drainages. However, trees species to be planted must be carefully selected to avoid trees species which may damage building foundation.

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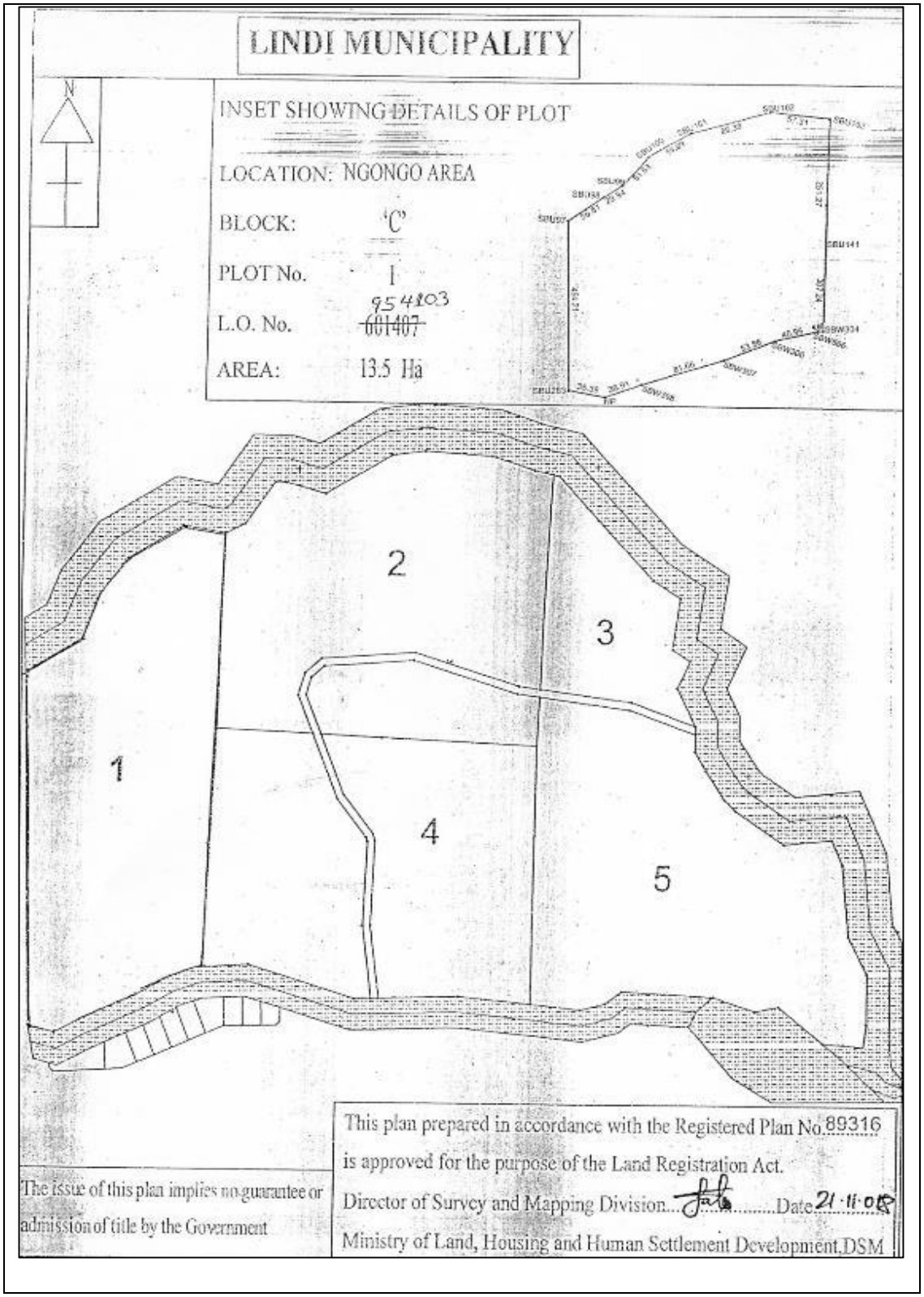
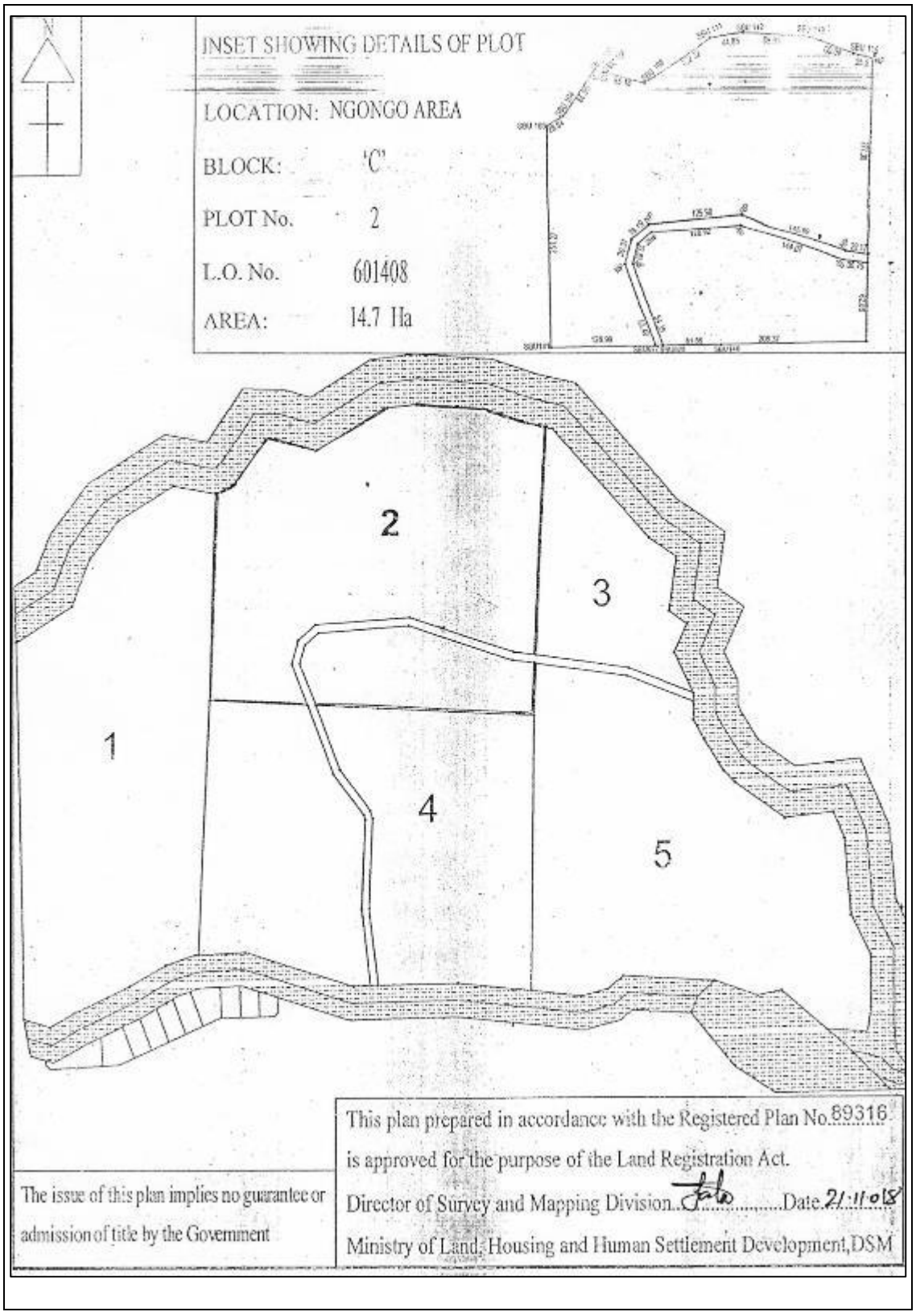
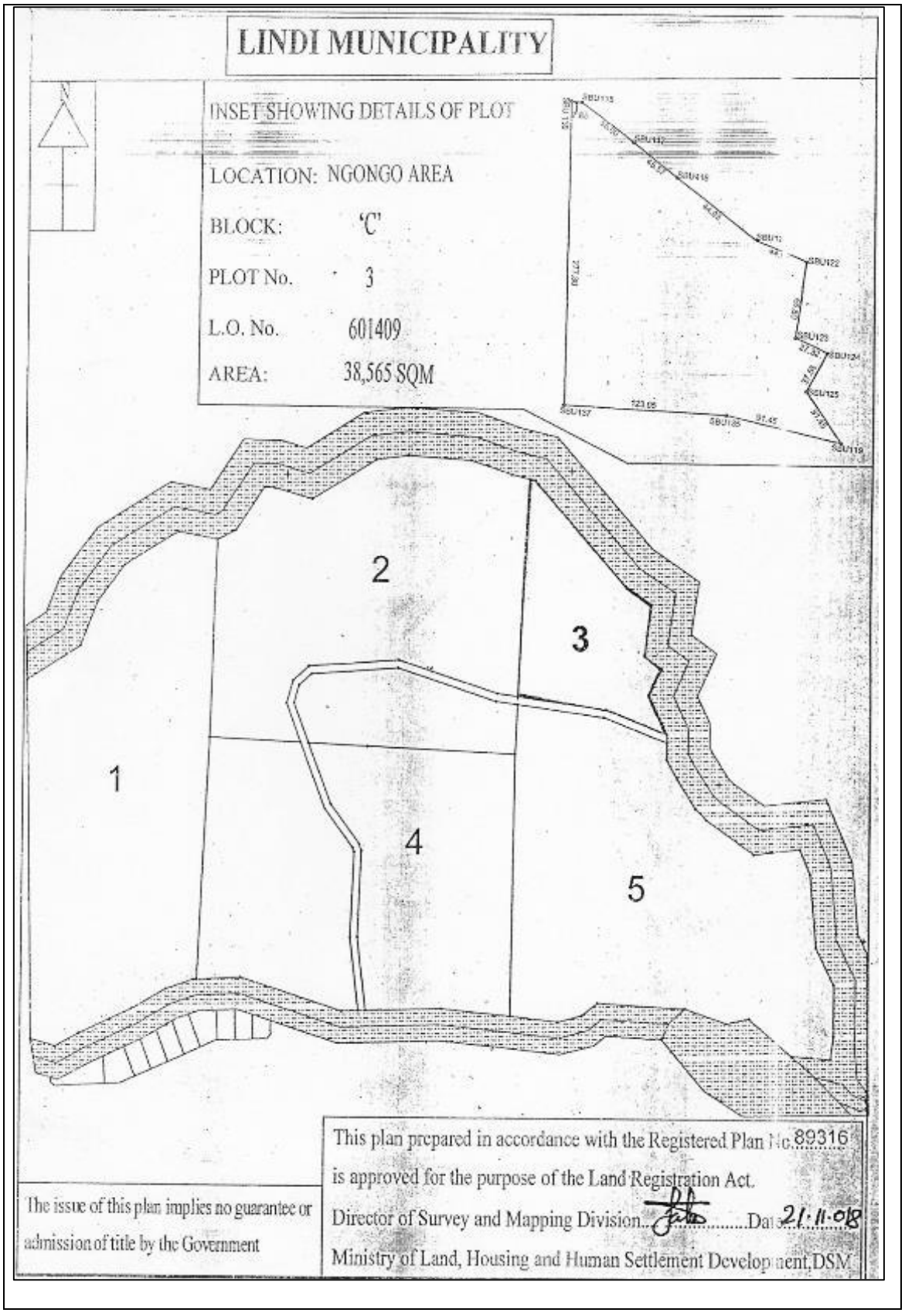
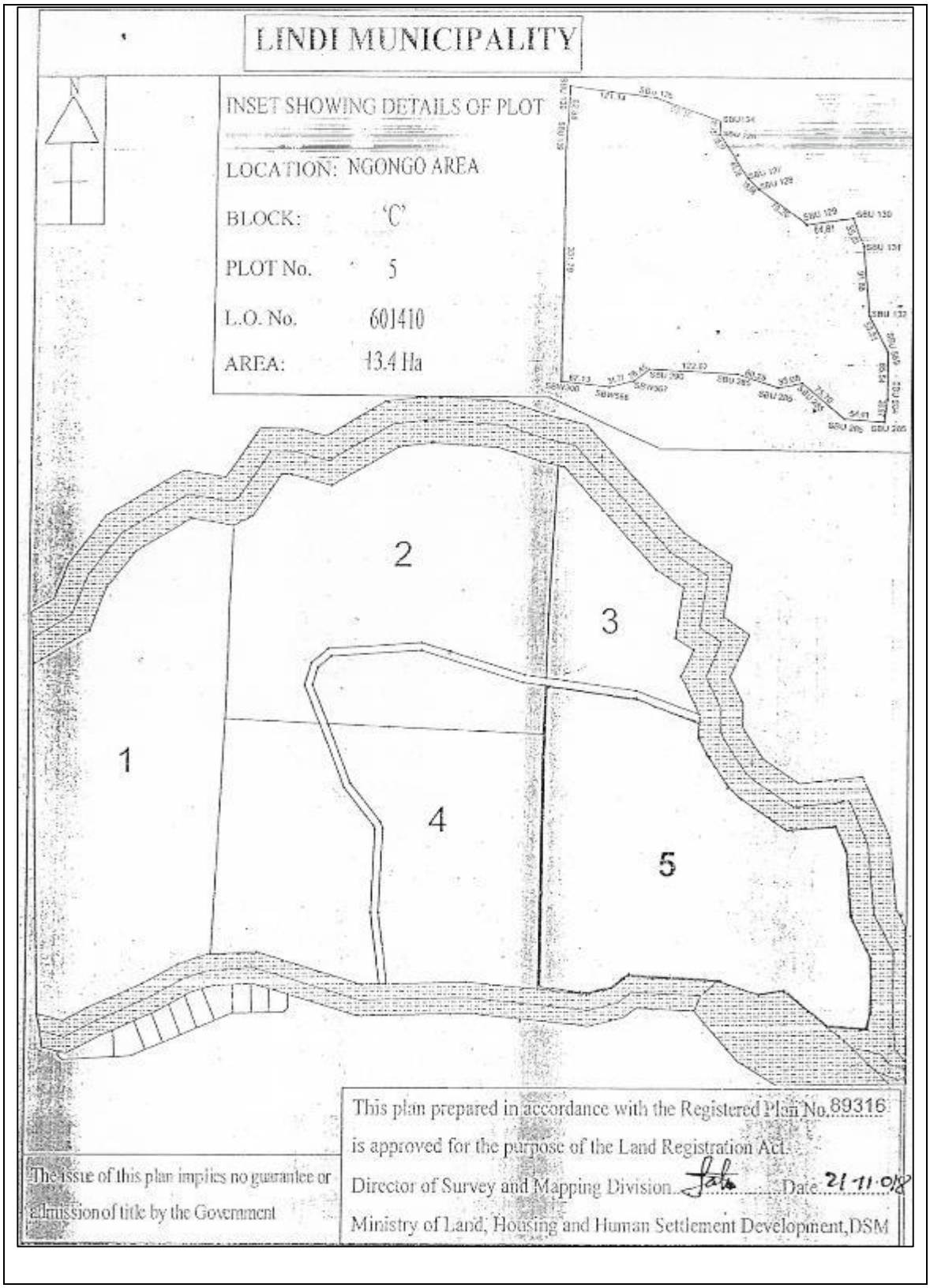
APPENDICES

APPENDIX 1: TITLE DEEDS FOR PLOT NO.1, 2, 3, AND 5.




INSET SHOWING DETAILS OF PLOT
LOCATION: NGONGO AREA
BLOCK: 'C'
PLOT No. 2
L.O. No. 601408
AREA: 14.7 Ha
1
2
3
4
5
The issue of this plan implies no guarantee or admission of title by the Government
This plan prepared in accordance with the Registered Plan No. 89316 is approved for the purpose of the Land Registration Act.
Director of Survey and Mapping Division ..... Date 21/11/18
Ministry of Land, Housing and Human Settlement Development, DSM


LINDI MUNICIPALITY
INSET SHOWING DETAILS OF PLOT
LOCATION: NGONGO AREA
BLOCK: 'C'
PLOT No. 3
L.O. No. 601409
AREA: 38,565 SQM
1
2
3
4
5
The issue of this plan implies no guarantee or admission of title by the Government
This plan prepared in accordance with the Registered Plan No. 89316 is approved for the purpose of the Land Registration Act.
Director of Survey and Mapping Division.....Date 21.11.018
Ministry of Land, Housing and Human Settlement Development,DSM


LINDI MUNICIPALITY
INSET SHOWING DETAILS OF PLOT
LOCATION: NGONGO AREA
BLOCK: 'C'
PLOT No. 5
L.O. No. 601410
AREA: 13.4 Ha
1
2
3
4
5
This plan prepared in accordance with the Registered Plan No.89316
is approved for the purpose of the Land Registration Act.
Director of Survey and Mapping Division..... Date 21-11-018
Ministry of Land, Housing and Human Settlement Development,DSM
The issue of this plan implies no guarantee or admission of title by the Government

APPENDIX 2: BASELINE DATA ON AIR QUALITY, NOISE AND VIBRATIONS

Appendix 2a: Ambient Particulate Matter measured at three stations

Station Code	Location		Particulate Matter		
	GPS Readings		TSP	PM_{10}	$PM_{2.5}$
	Latitudes	Longitudes	mg/m^3	mg/m^3	mg/m^3
AQMS1	-10.041222	39.624347	0.013	0.010	0.006
AQMS2	-10.040803	39.624792	0.022	0.015	0.009
AQMS3	-10.041864	39.628689	0.015	0.011	0.006
Environmental Management (Air Quality Standards), 2007			**0.5**	**0.15**	**0.075**
WHO/IFC (2007) and WB AQG 2006			**0.23**	**0.05**	**0.025**

Source: Measurements on February 2024.

Appendix 2b: Measurements of Ambient pollutant gases

Station Code	Location		Ambient Pollutant Gases				
	GPS Readings		CO	NO_2	SO_2	H_2S	VOCs
	Latitudes	Longitudes	mg/m^3	mg/m^3	mg/m^3	mg/m^3	mg/m^3
AQMS1	-10.041222	39.624347	5.22	0.072	0.31	0.27	4.1
AQMS2	-10.040803	39.624792	5.61	0.094	0.29	0.21	3.8
AQMS3	-10.041864	39.628689	3.32	0.036	0.21	0.11	3.5
TBS Limits			**15**	**0.12**	**0.5**	**-**	**6.0**
WHO/IFC Guidelines			**30**	**0.2**	**0.5**	**-**	**--**

Source: Field Measurements on February 2024.

Appendix 2c: Ambient Noise Levels measured at three stations.

Station Code	Location		Noise Levels in dBA	
	GPS Readings		Daytime	Night-time
	Latitudes	Longitudes	dBA	dBA
AQMS1	-10.041222	39.624347	47.7	40.9
AQMS2	-10.040803	39.624792	45.4	40.7
AQMS3	-10.041864	39.628689	47.6	41.2
TBS Limits for Institution areas			**<52**	**<42**
WHO/IFC/WB Guidelines			**<60**	**<45**

Source: Field Measurements on February 2024

Appendix 2d: Vibrations measured at three measured stations.

Station Code	Location		Vibration Levels (mm/s PPV)
	GPS Readings		
	Latitudes	Latitudes	
AQMS1	-10.041222	39.624347	0.001
AQMS2	-10.040803	39.624792	0.001
AQMS3	-10.041864	39.628689	0.001
Human detection level			**<0.15**
TBS Limit			**5**
British Limit			**0.3**

Source: Field Measurements on February 2024

APPENDIX 3: ENVIRONMENTAL IMPACT ASSESSMENT MATRIX.

Affected Valued Environmental Components (VECs)	Project Related Activities	Potential Environmental Effects/Impacts	Importance (A1)	Magnitude (A2)	Permanance (B1)	Reversibility (B2)	Cumulativity (B3)	α1xα2 = ∂T	β1+β2+β3=σT	∂TxσT=ES	Significance	Ranking	Mobilization Phase	Construction Phase	Demobilization Phase	Operation Phase
1. Atmospheric Environment	Construction activities (soil excavations and transportation of dry soil materials and dusty construction materials)	Creation of air pollution due to dust emission	1	-2	2	3	3	-2	8	-16	Low	-2	0	✓	✓	0
2. Acoustic Environment	Operation of construction equipment / machinery	Creation of noise nuisance to the nearby sensitive receptors.	2	-2	2	3	3	-4	8	-32	Medium	-3	0	✓	0	0
3. Terrestrial Environment	Accumulation of construction and domestic solid wastes into the surrounding environment.	Creation of landscape degradation and loss of aesthetic value of the surrounding environment.	1	-3	2	2	1	-3	5	-15	Low	-2	0	✓	0	0
	Removal of exisitng vegetation/trees.	Loss of ecological and landscape value of the surrounding environment.	2	-2	3	3	2	-4	8	-32	Medium	-3	0	✓	0	0
4. Public Health and Safety	Social interaction between construction workers and local community	Increased prevalence of HIV/AIDS and STIs.	3	-2	2	3	3	-6	8	-48	High	-4	✓	✓	0	0
	Handling and operation of hazardous construction materials and equipment.	Creation of occupational health and safety risks.	1	-3	2	2	1	-3	5	-15	Low	-2	✓	✓	0	0
	Induced influx of people into the project sites.	Increased risk of exposure to Covid-19 transmission.	3	-2	2	3	3	-6	8	-48	High	-4	✓	✓	0	0
	Trespassing by unauthorized persons into the construction site.	Increased risk of construction related accidents.	1	-2	2	3	2	-2	7	-14	Low	-2	✓	✓	0	0
	Movement of heavy trucks to and from the construction site.	Increased risk of traffic accidents.	1	-2	2	3	2	-2	7	-14	Low	-2	✓	✓	0	0
5. Labour and Economy	Recruitment of construction workers	Creation of employment opportunity for local people.	2	3	2	1	2	+6	5	+30	Medium	+3	✓	✓	0	0
	Increased demand for food and other items from construction workers	Creation of income generation opportunities for local people	2	2	2	1	2	+4	5	+20	Medium	+3	✓	✓	0	0
	Interaction among the project emplyees with differences in gender and socio-economic status.	Risk of Emergence of Gender Based Violence, Sexual Exploitation and Sexual Harassment	3	-2	2	3	3	-6	8	-48	High	-4	0	✓	0	0

	Retrenchment of construction workers after project completion.	Loss of temporary employment by local people.	**2**	**-1**	**3**	**3**	**3**	**-2**	**9**	**-18**	**Low**	**-2**	**0**	**0**	✓	**0**	
	Operation of ICT Complex Facilities after construction.	Increased enrolment of students.	**4**	**3**	**3**	**1**	**1**	**12**	**5**	**60**	**High**	**+4**	**0**	**0**	**0**	✓	
6. Community and Public Service Infrastructure/Utilities.	Increased demand for infrastrucure/utlity services.	Increased revenue for infrastructure and utility service providers.	**2**	**3**	**3**	**1**	**3**	**+6**	**7**	**+42**	**High**	**+4**	**0**	**0**	**0**	✓	
6. Currentd Land and Resource Use.	Removal of outdoor concrete desks from the proposed construction site.	Disruption of outdoor concrete desks for CoET students.	**1**	**-2**	**3**	**3**	**2**	**-2**	**8**	**-16**	**Low**	**-2**	✓	**0**	**0**	**0**	