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PROPOSED CONSTRUCTION OF THE UNIVERSITY OF DAR ES SALAAM CAMPUS AT
PLOT NO 1, BLOCK 'B' LIKUNJA RUANGWA URBAN, KITANDI VILLAGE, IN
RUANGWA DISTRICT, LINDI REGION.

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

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EXECUTIVE SUMMARY

Introduction

The Likunja Site Sub-project is one of the Higher Education for Economic Transformation (HEET) Projects 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 programs 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 and avoid or minimize adverse impacts, and 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, which was 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 Lecture Rooms, Offices, Hostel and Mini-Cafeteria at the University of Dar Es Salaam (UDSM) Likunja Centre. The Likunja Research Centre Site occupies a total area of about 1,618,700 Square metres (SQM) or 400 Acres, and it is located about 2.31 km to the north of Kitandi Village Centre and 1.4 km from Likunja Village Centre to the south. The Centre Site forms boundaries with cultivated farms to the south, west and north, and the Ruangwa–Nanganga Road to the east.

The proposed lecture room and office building have been designed to have a total floor area of about 165.418 Square metres (SQM). The building will comprise staff offices, a lecture room, staff toilets, students' toilets, a ramp, a planter and a corridor. The lecture room will have a capacity to accommodate 50 students. The total area to be occupied by the proposed facilities inside the lecture room and office building is estimated to be 163.828 SQM.

The proposed mini-cafeteria building has been designed to have a total floor area of about 373.934 Square metres (SQM) with a capacity to accommodate 40 students. The total area

to be occupied by the proposed facilities inside the mini-cafeteria building is estimated to be about 460SQM.

The proposed hostel building has been designed to have a total floor area of about 542.820 Square metres (SQM). The hostel has 15 bedrooms, three stores, warden office, waiting area, access ramps, laundry and washrooms. The total area to be occupied by the proposed facilities inside the hostel building is estimated to be about 456.740 SQM.

The total construction cost of the proposed building is estimated to be United States Dollars (US D) 437,500.00 or Tanzania Shillings (TZS) 1,019,375,000.00 at Bank of Tanzania (BOT) Exchange Rate of 1 US D = TZS 2,330. The Government of the United Republic of Tanzania will fund the project 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 implement the Agency through the dedicated Project Implementation Unit (PIU).

The construction period is estimated to be about 18 Months, whereby 1 month will be for the mobilization period, 16 months for the construction period, and 1 month for the demobilization period. After the construction period, the Research Centre infrastructure will be operated for an estimated period of 50 years. Thereafter, the Centre infrastructure will have to undergo renovation. The Research Centre 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);

WB relevant Environmental and Social Standards. This ESIA study has applied 6 relevant standards 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;
- ESS8 – Cultural Heritage; and
- ESS10 - Stakeholder Engagement and Information Disclosure.

Baseline Environmental and Social Conditions

The project site is within the surveyed area, with more than 90% being undeveloped. The existing vegetation cover provides a natural habitat for insects and animals like rats, squirrels, reptiles, amphibians, and birds. Continental and lacustrine sedimentary formations dominate the geology of the project area. The sub-soil is dominated by marine limestone, mainly sandy clay and clayey sands.

The area has a water supply whereby the residents obtain water from both Ground and Surface water, mainly the Ruangwa River, rain harvesting, and shallow wells. The project area has a telecommunication system and electricity from the national grid. There is the presence of school both Primary and Secondary and Health center within the project area.

Stakeholder Engagement and Public Consultations

The stakeholders' identification and engagement process was conducted based on the EIA and Audit Regulations, 2005, and its amendment of 2018, the World Bank Environmental and Social Standards (ESS10), and the Stakeholders' Engagement Plan (SEP).

The SEP covers both national and subnational engagement; however, a greater focus was placed on subnational stakeholders. It provides details on the engagement needed associated with project activities.

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 and District Office, Ruangwa District Council, Ruangwa District, Likunja ward, Likunja and Kitandi villages in the project area. 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. The identified stakeholders can be categorized into Developers, Decision makers, interested parties, and Affected parties, positively or negatively and directly or indirectly. In addition, a mechanism was put in place to address grievances, Gender based Violence (GBV), Sexual Exploitation and Abuse (SEA) and Sexual Harassment (SH).

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)
- Ruangwa District Council (RDC),
- 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)
- Rural and Urban Water Authority (RUWASA)
- Project Affected Persons (PAPs)
- Ruvuma and Southern Basin Water Board
- Local Communities Adjacent to the Project Site

Stakeholders raised the following issues.

- The project is expected to generate both solid and liquid waste during the construction and operation phases.
- Construction works are expected to endanger the safety of the workforce and the community around the project area.
- Dust is expected to be the major issue to the workforce during construction works especially during the transportation of the building materials,
- The construction works are expected to generate noise during construction works
- The project will provide various employment opportunities to the local community around the project area in both phases.
- The project will add value to the land in the flanking environment
- The Project operation is anticipated to attract financial institutions, such as Banks close to the community
- The expected increase in population and presence of a cafeteria will provide an opportunity to farmers to produce more products and sell it to the research centre
- The presence of the research centre will increase the speed of selling the surveyed plots flanking the proposed research centre
- Research centre will help civil servant close to the project area to engage in evening studies, the opportunity that is warmly waited,
- The education from the research centre will help the locals to increase agricultural produce and fish production

- Implementation of research centre building will add scenic beauty of the project area and will also motivate local people to construct buildings to the surveyed plots
- Presence of the new research centre will increase employment for the lecturers
- The operation of the project will make Ruangwa more famous
- The local farmers will be trained in the best way of cultivating and earning more agricultural produce
- The project should be in line with the upgrading of the local social services infrastructures

Recommendations

The following are some of the recommendations provided by the consulted stakeholder officials:

- Contractor should provide first priority to the local community when employing workforces,
- The proposed project area is flanked by farmlands, so most of the foreseeable construction impacts will not affect the local individuals,
- Waste that will be generated during construction and operation should be well managed to avoid environmental degradation,
- Safety issues has to be identified and prioritised during all phases of the project,
- Monitoring of the environmental and social issues during construction is of more important to protect the flanking environment,
- Contractor should deploy the construction vehicles that are in good conditions and the maintenances of the vehicles has to be done often to protect the soil and water pollution from grease and oil spillage,
- The excavated/spoil materials should be removed immediately from site to protect it from being deposited to the nearby streams during the rain,
- Excavation should be done in the areas currently being developed, not in the future development areas. This will help to protect soil erosion within the project area.
- Design should include the chamber for burning the sanitary ped
- The wastewater infrastructure should be similar to the expected population in the project area
- The design of lecture rooms should follow the health policy
- The proposed infrastructure should consider the people with disability
- The design should consider the location of hand wash to combat the pandemic diseases
- During the construction stage, engagement of the health and safety personnel is of more important
- Design should consider the presence of solid waste collection points within the campus area

Project Alternatives

Several 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-Both “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 “Machine Intensive Method.
- Diesel Engine Alternative VS Solar Power Alternative -The Sola Power Alternative was selected over the diesel engine alternative due to its lower environmental impact.

- WSP Alternative VS Constructed Wetland-The WSP Alternative was selected in favour of Constructed Wetland due to the availability of space for WSP and the lack of potential area for a Constructed Wetland.

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 7 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.
- Noise nuisance is created to the adjacent receptors due to construction activities.
- Degradation of the landscape and loss of aesthetic value of the surrounding environment due to accumulation of construction/demolition solid wastes.
- Loss of ecological functions and landscape quality due to removal of existing vegetation/ trees.

Positive Social Impacts

- Creation of employment opportunities for local people due to recruitment of construction workers.
- Creation of income generation opportunities for local people due to increased demand for food from construction workers.
- Increased student enrolment and revenue for the UDSM due to the availability of space after the construction of lecture rooms and a hostel at Likunja Research Centre.
- Increased revenue for infrastructure/ utility service providers due to increased power and water supply demand.

Negative Social Impact

- Increased prevalence of HIV/AIDS and STI transmission due to interaction between construction workers and students.
- Risk of construction-related accidents due to trespassing by unauthorized persons into the construction site.
- 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 (ESMoP), 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 implementing mitigation measures amounts to Tanzania Shillings **(TZS 103,400,000.00)**. The EESMP 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 proponent mentioned above shall be responsible for the overall implementation of the ESMP in collaboration with their contractor. The ESMP is an estimate of the 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 develop these figures.

The project shall ensure that the activities causing environmental impacts 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 contractors to ensure that implementation is done accordingly.

Furthermore, the proponent shall ensure the availability of resources required for implementing 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, and temporary facilities or works. Restoring surfaces to an equal or better than the existing condition shall be considered 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







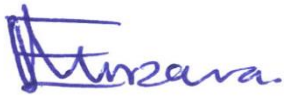
The Project Proponents might consider renovating or demolishing his building as the case may be depending on the condition of the building at that time let say after about 99 years projected life of the structure. In case the demolition is considered, specific conditions for mitigation are generally 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 by enhancing the beneficial (positive) impacts. UDSM is responsible 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, along with 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

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ABBREVIATION AND ACRONYMS

AIDS	: Acquired Immunodeficiency Syndrome
CBOs	: Community Based Organisations
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
GBV	: Gender-Based Violence
GOT	: Government of the United Republic of Tanzania
GRM	: Grievances Redress Mechanism
HEET	: Higher Education for Economic Transformation
HIV	: Human Immunodeficiency Virus
HSMP	: Health and Safety Management Plan
LAA	: Local Assessment Area
LGAs	: Local Government Authorities
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
PAD	: Project Appraisal Document
PAPs	: Project Affected Personnel
PDA	: Project Development Area
P-ESMP	: Project ESMP
PIU	: Project Implementation Unit
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
POM	: Project Operation Manual
PWDs	: People with Disabilities (PWDs).
RAA	: Regional Assessment Area
RAP	: Resettlement Action Plan
RUWASA	: Rural and Urban Water Supply Authority
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
TFV	: Ten Per cent 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 Organization
LPCD	: Litres per capita per day

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

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

Among others, 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 the 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, the project activity implementation covers Lot 1: Dar Es Salaam Campus (Mwalimu Julius Nyerere Mlimani - MJKNM Campus Sites; ColCT-Kijitonyama, SoAF-Kunduchi), and Lot 2: Out of Dar Es Salaam Campuses (Ngongo Area - Lindi Campus; IMS-Buyu, Zanzibar Site; and Likunja Site - Ruangwa).

As a requirement to the construction of new buildings, the project will involve excavation activities and vegetation clearance on the site. Buildings construction and associated activities will certainly have adverse environmental, social and economic impacts, which need to be identified and mitigation measures put in place for ensuring sustainability of the project. 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 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 Environmental and Social Framework (ESF), Environmental and Social Standards as well as HEET project's Environmental and Social Management Framework (ESMF) were observed in the study.

1.2 Project Rationale

In the past 10 years, Tanzania has witnessed a remarkable change in basic education. For instance, enrolment at the primary level has increased to 24.5% from 8,116,488 in 2015 to 10,111,671 pupils in 2018 and 10,601,616 in 2019. In the year 2013/14 the enrolment trend in secondary education showed a positive increase in the number of students transitioning to post-primary education. According to PAD of 2021, student demand for higher education is expected to increase by 2030, therefore the tertiary education system (public and private) must expand and be of better quality to accommodate these additional students.

Despite the fact the country has successfully recorded an increase in basic education, there is prevalent acknowledgement among policy makers that the overall outcome of the successful performance in basic education is the demand for subsequent levels of education and particularly higher education. In this regard, 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 system 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

According to the HEET Project Appraisal Document (PAD, 2021), the challenges in the current higher education system include:

- 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 56.5 percent in 2013 to 67.4 percent in 2018;
- University graduates struggle to find jobs, at least in part due to skills mismatches;
- 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;
- Shortage of well-trained lecturers, and the majority of academic staff use traditional teaching methodologies;
- Most of higher education institutions are not currently able to access or use modern technologies to deliver training; and
- The global pandemic has reinforced the need for higher education institutions to develop thoughtful resiliency plans.
- Technology, skills and education combined together will help Tanzania to develop its productive sectors and create jobs for youths entering the labour market every year (PAD, 2021).

To address these issues, the World Bank has launched the Higher Education for Economic Transformation (HEET) project. The main objective of the project is to improve the quality, relevance, and equity of higher education in Tanzania. It supports the development of academic programs, research centres, and partnerships in priority areas and provides scholarships, grants, and loans to students and institutions. The project is expected to benefit over 100,000 students and 3,000 faculty members by 2028.

The HEET project will invest in infrastructure, facilities, and quality assurance systems in fields such as engineering, medical sciences, agriculture, energy, and natural resources. It will also improve the operational capacities of public universities, be in line with the country's economic needs, and continue to fuel sustainable economic growth through its missions, objectives, and core values.

1.3 Project Objectives

1.3.1 Objectives of the HEET Project

The main objective of the project is to strengthen 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 enrollment. This calls for the need to expand its facilities including infrastructures so as to create supportive environment towards achieving its goal.

Prior to the construction of the proposed project, an environmental and social impact assessment is required by World Bank and Tanzanian laws and regulations in order to protect the environment and people's lives. The ESIA study shall be conducted in accordance with the 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. In complying with 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 Likunja Site

The project activities to be undertaken at Likunja site involve construction of Lecture Rooms and Offices, Hostel, and Mini-Cafeteria Buildings at UDSM Likunja Centre, in Ruangwa District, Lindi Region. The total construction cost of the project is estimated to be Tanzania Shillings (TZS) 1,019,375,000.00.

1.5 The Objectives and Scope of the Assignment

The ESIA study aims to identify potential environmental and social effects/impacts of the proposed project activities before their actual implementation. The study therefore shall address the social, economic and environmental issues associated with the project activities. The study will also provide 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, analyze 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 details on the scope of the assignment are provided in the Terms of Reference. 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) literature review both secondary data, policies, laws, regulations, Development Plans (ii) conduct meeting for open discussions and focus group discussions (iii) Field visit (iv) other methods such as use of assessment tools such as checklists and matrices. The information collected were main baseline information which was also used as a basis for 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, Buildings designs, existing land uses of the areas, climatic and ecological data, relevant policies, laws, regulations, strategies at 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, collection of relevant secondary information that might provide insights of the impacts and benefits of the project.

1.6.2 Field Work

The ESIA team visited the site and made observation and assessment of the biophysical conditions, social, economic and environmental characteristic 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 was conducted by defining the scope of the EIA. Data collected during scoping allowed the study team to determine whether more detailed information on environmental conditions at the development site and its surroundings are needed and where such information can be obtained. Furthermore, information on the 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.

1.6.3 Measurement of baseline

1.6.3.1 Selection of measured air quality, noise and vibration stations

The measured one station was established/selected based on the norms prescribed by local standards (Environmental Management (Air Quality Standard) Regulations, 2007) and international guidelines. 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.

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 PM_{2.5}; (ii) Ambient pollutant gases i.e., Sulphur dioxide (SO₂), Nitrogen dioxide (NO₂), Carbon monoxide (CO), Hydrogen Sulphide (H₂S) and Volatile Organic Compounds (VOCs); (iii) ambient noise, and (iv) ground vibrations.

(a) Dust as particulate matter in terms of TSP, PM₁₀ and PM_{2.5}

Dust levels were measured by using Aeroqual series 500 monitor (S-500). Particulate matter (TSP, PM₁₀ 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 PM_{2.5}. 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 the established station during the daytime and night-time hours. The recorded data 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, NO₂, SO₂, H₂S, and VOC) were measured using "Aeroqual series 500 monitors (S-500)". 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 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 the established station during the daytime (L_{day}) and night-time (L_{night}) 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 at the established station. The averaged L_{day} and L_{night} 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

millimeters per second in the vertical direction to secure data associated with proposed project. Periodic measurements were taken during the day and night hours. The mean value of all recorded data was calculated and used to represent that particular station. The average value recorded at the 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 investigations of 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 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; Terrestrial Environment; Public Health and Safety; Labour and Economy; and Community / Public Services Infrastructure / Utilities.

The identified impacts have been assessed by using 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 condition is permanent or temporary.
- **Reversibility**- reversible or irreversible.
- Whether **Cumulative / Synergistic** for 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.

1.9 The Report Format

The preparation of this ESIA report has been carried out in accordance with the requirements of Sub-regulation 18(1), 18(2) and 18(3) of the Environmental Impact Assessment and Audit Regulations (2005). This report is structured in the following style:

- (i) Executive Summary
 - (ii) Table of Contents
 - (iii) Acknowledgement
 - (iv) Abbreviations and Acronyms
 - (v) Introduction
1. Project description
 2. Policy, administrative and legal framework
 3. Baseline/ Existing conditions
 4. Stakeholders Analysis
 5. Assessment of Impacts and Identification of Alternatives
 6. Environmental and Social Mitigation Measures
 7. Environmental and Social Management Plan
 8. Environmental and Social Monitoring Plan
 9. Resource Evaluation / Cost Benefit Analysis
 10. Decommissioning and Closure
 11. Summary and Conclusions
 12. References
 13. Appendices

CHAPTER TWO

2.0 PROJECT DESCRIPTION

2.1 Location

The proposed University of Dar Es Salaam (UDSM) Likunja Centre is located Likunja Ward, Ruangwa District, Lindi Region. The Lindi Region forms boundaries with Morogoro Region to the south-west; Pwani Region to the north; Indian ocean to the east; Mtwara Region to the south; and Ruvuma Region to the west. The map shown the location of Lindi Region is provided in **Figure 2.1-1**.

The Ruangwa District forms boundaries with Nachingwea District to the west, Kilwa District to the north, Lindi District to the east, and Mtwara Region to the south. The map illustrates the location and boundaries of Ruangwa District.

Finally, the Likunja Ward forms boundaries with Makanjiro Ward to the west; Nachingwea Ward to the north; Mandarawe and Nkowe Ward s to the east; Chienjele Ward to the south; and Nachingwea District to the south-west. The map illustrates the location and boundaries of Likunja Ward.

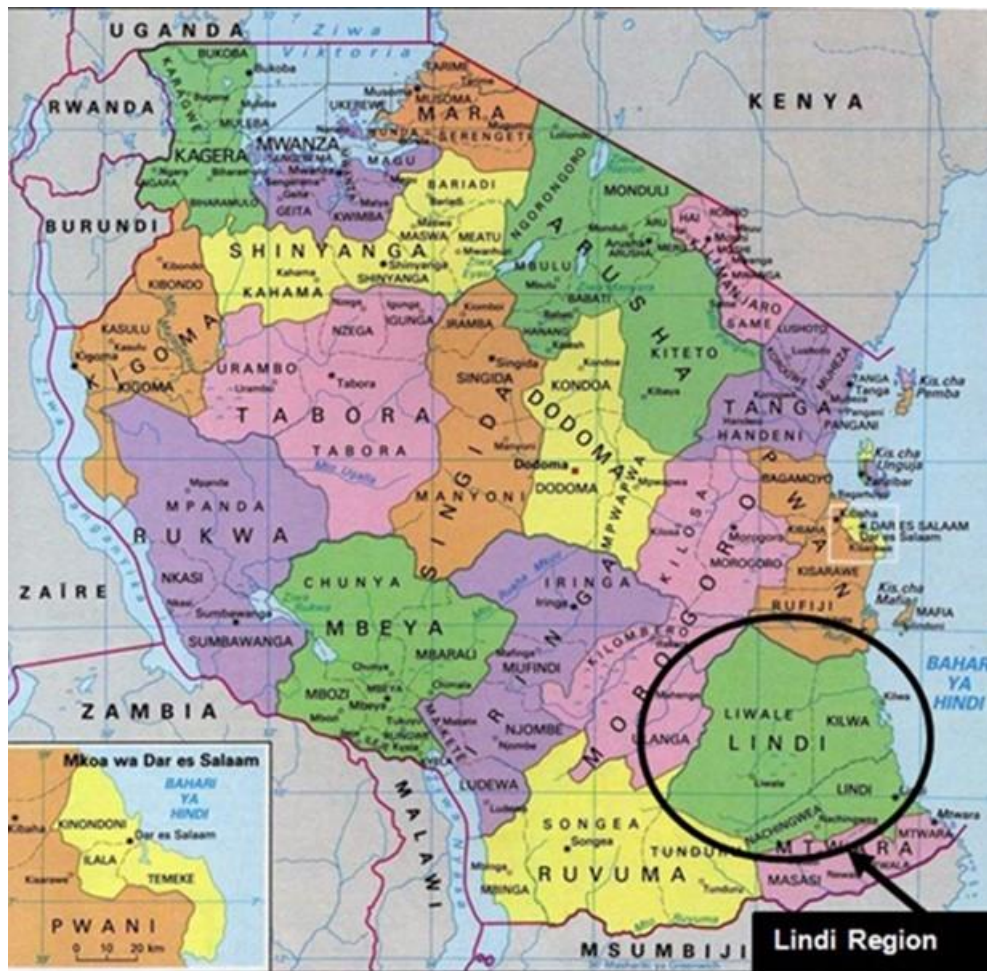


Figure 2.1-1: Location and boundaries of Lindi Region.

Source: https://sw.wikipedia.org/wiki/Picha:Tanzania,_administrative_divisions_-_sw_-_colored.svg

2.2 Description of the Project Site

2.2.1 Location

The proposed Likunja UDSM Campus is located at Likunja Area, Likunja and Kitandi villages, Likunja Ward, in Ruangwa District Council, Lindi Region, about 12 km from the centre of Ruangwa District. The Likunja Centre Site occupies a total area of about 1,618,700 Square metres (SQM) or 400 Acres. The Campus Site (**Figure 2.2-1**) forms boundaries with cultivated farms to the south, west and north, and the Ruangwa – Nanganga Road to the east. The boundaries of the project site are defined by the following are the UTM Coordinates (Zone 37L):

DSE	Easting	Northings
IPC1	489879.00 m E	8879653.00 m S
SEE3	489867.00 m E	8879553.00 m S
SEE4	489888.00 m E	8879016.00 m S
SEE5	489901.00 m E	8878424.00 m S
SEE6	488434.00 m E	8878379.00 m S
IPC2	488435.00 m E	8879464.00 m S
IPC3	489063.00 m E	8879483.00 m S
IPC4	489065.00 m E	8879472.81 m S
SEE15	489069.00 m E	8879446.00 m S
SEE16	489092.00 m E	8879420.00 m S
SEE17	489122.00 m E	8879400.00 m S
SEE18	489331.00 m E	8879405.00 m S
SEE19	489384.00 m E	8879441.00 m S
SEE20	489401.00 m E	8879475.00 m S
IPC5	489424.00 m E	8879646.00 m S

The Likunja Camus is located about 2.31 km to the north from Kitandi Village Centre and 1.4 km from Likunja Village Centre to the south. The establishment of Likunja Centre has driven the Ruangwa District Council to survey the area and produce 5000 surveyed plots.

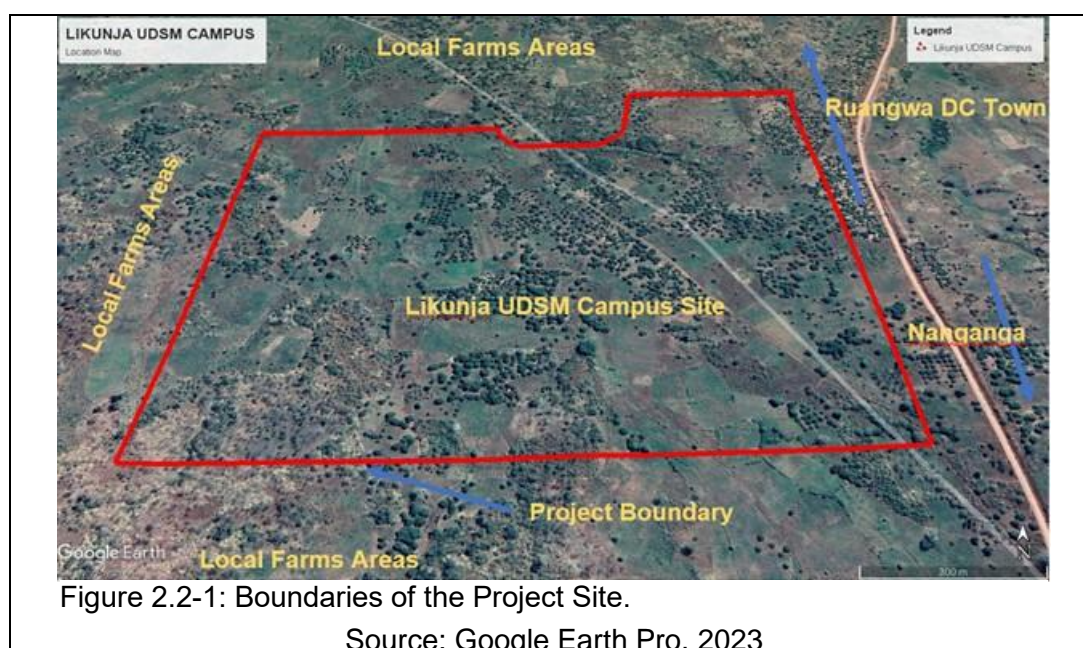


Figure 2.2-1: Boundaries of the Project Site.

Source: Google Earth Pro, 2023

2.2.2 Layout

The proposed site layout at UDSM Likunja Centre as illustrated in **Figure 2.2-2** indicates the site will be comprised of administration buildings, staff accommodations blocks, Day care, workshops, cafeteria, students' accommodations, research flats, club, lecture theatres, shops, student centre, health centre, auxiliary police post, labs and offices, classrooms and offices, library conference facilities, agro economics and business centre, agro innovation and museum centre, veterinary medicine animal science, recreational, estates. However, only three (3) buildings will be constructed during the initial phase. These include lecture hall; semi-cafeteria; and hostel buildings.

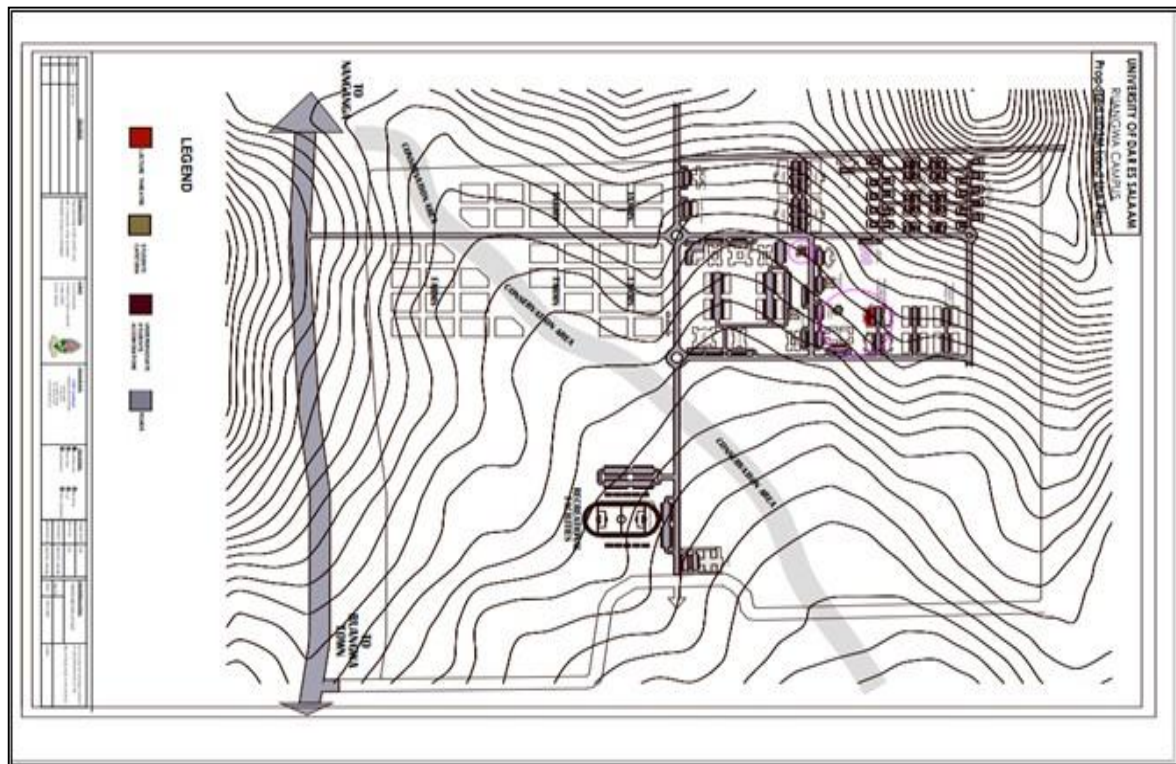


Figure 2.2-2: Site Layout at Likunja Centre.

Source: BICO, Architectural Drawings

2.2.3 Land Ownership and Requirement

University of Dar es Salaam is the registered owner of the plot with Title Deed No. 2791LND, covering a total area of 38,565 Square Metres (SQM). The Title Deed for Likunja Site is provided in **APPENDIX 1**.

The land use of the plots is designed for an organization/institution or education purposes, Use Group C and Use Class (a) as per Urban Planning (Use Groups and Use Classes) Regulations, 2018. Hence the development in the area is compatible with the designed land use of the title. The total area to be occupied by the proposed buildings is estimated to be about 917.048 SQM (2.36%), whereby 163.828 SQM are occupied by Lecture Rooms Building, 296,430 SQM by Mini-Cafeteria, and 456.740 SQM by Hostel Building.

2.2.4 Current Land Use and Important Features

2.2.4.1 Cultivated Farms

The project site is surrounded by cultivated farms comprised of permanent and temporary crops. Cultivated farms are associated with temporary shelters, mainly for crop protection against pest animals and birds. During the agricultural season, farmers decide to stay close to their farms instead of going back to village centres, and this is aimed at ensuring the security of their farms from pest animals such as monkeys and humans.

2.2.4.2 Access Road

The project site can be accessed through Ruangwa-Nanganga bitumen paved road. The project site is about 12 km from Ruangwa Town and about 48 km from Nanganga Town As discussed in section 2.1 of this report; the proposed project site is located 2.31 Km and 1.4 Km from Kitandi and Likunja villages respectively. Locals are using the earth road that connect their farms area and the Ruangwa-Nanganga tarmac road and the said access road is under TARURA.

2.2.4.3 Utilities

Since the project site is used as the farms area, currently the electric infrastructure is just passing along the Ruangwa-Nanganga tarmac road towards Likunja village. The Likunja and Kitandi villages are supplied with water by RUWASA. However, the project site is not yet connected to RUWASA water supply.

2.2.4.4 Vegetation and Wildlife

The project site is covered by natural vegetation. The vegetation is mainly naturally grown cashew nut, mango trees and grasses. According to the farmers adjacent to the project area, snakes, birds, and monkeys are the common wildlife around the project site.

2.3 Project Design

The University of Dar Es salaam is planned to construct three (3) buildings at first in Likunja Centre. These include Lecture Rooms and Offices Building; Hostel Building, and Mini-Cafeteria. Buildings are constantly subject to several climatic and environmental elements (wind, sunlight, temperature, rain, earthquakes, and other factors). Before commencement of the project, UDSM involved experts to assess, understanding and integrating risk management in 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, storm water management systems, adequate natural ventilation and lighting, and green space infrastructures shall be accommodated in the design of the UDSM Likunja Centre 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 tree canopy cover and shade provided by trees in the area for more provision of ecosystem services. In doing so 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 in the site, and reducing land cover important for carbon sequestration. Trees are proposed to be planted along the vehicular access road and footpaths to improve landscape and reduce effects of sun radiation during the day.
- Green areas: Green areas are distributed in every zone/ block to allow cross fresh air into the buildings. Due to the topographical nature and nature vegetation cover, green

belt and conservation zone intend to preserve the ecosystem and control land degradation. Trees and grasses will reduce soil erosion in sloping plains and all areas prone to soil 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, class rooms, 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; and accommodation of rainwater harvesting, storm water and waste management systems and embracing water-efficient processes.

2.3.2 Disaster 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 diseases 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 huge enough to accommodate cars. Likunja Centre 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 to all genders, with special attention to accommodating individuals with special needs (e.g. physical, learning impairment, emotional and behavioural). These include provisions of ramps, toilets, etc.

2.3.4 Occupational Health and Safety (OHS)

During 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 will be accessed by members of the public, 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.

During 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 risk including cholera, HIV/AIDS, COVID-19, and impacts of dust to 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 sign boards directing where these services are situated and transport 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 emphasize on training related to specific hazards such as working at height, ergonomic, slips and falls, dust and moving machinery and any other relevant hazard that will be identified during construction.

During operation phase

All the emergency situations associated with building operations will be included as part of the design aspects including allocation of emergency assembly point. Emergency plans procedures will be developed to prevent and mitigate likely consequences associated with each incident. The document that details potential emergencies and response 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 of the like exposure to eruption disease, risks of fire explosion and security will be given due considerations. Fire extinguishers of powder foam type and fire hose reel will be placed in several strategic areas at the site and serviced on time.

During 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 elevation 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 decommissioning phase, the contractor shall be required to have a clear understanding on 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 Ruangwa District Council and Lindi Region, and specific conditions as provided a certificate of occupancy from 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 storm water is directed into the highway storm drains.

The expansion of Likunja Centre was characterized by two main factors, one of which being 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 public higher learning institutions located in regions. 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 with increase in the student's enrolment.

2.3.5.1 Lecture Rooms and Offices Building Design

The proposed lecture room and office building has been designed to have a total floor area of about 165.418 Square metres (SQM)². The building will be comprised of staff offices, lecture room, staff toilets, students' toilets, ramp, planter and corridor. The total area to be occupied by the proposed facilities inside the lecture rooms and offices building is estimated to be 163.828 SQM as illustrated in **Table 2.3-1**. The lecture room will have a capacity to accommodate 50 students. The 3 D Model of the Lecture Hall is illustrated in **Figure 2.3-1**.

Table 2.3-1: Details of the Lecture Rooms and Offices Building.

S/n	Proposed Facilities	Area Covered (m2)
1	Female Students Toilet Room with 2 WCs and 2HWB Male Student Toilet Room with 1 WC, 2 HWB, and 3UR Disabled Toilet Room with 1 WC: $(2,625 + 1,925) \times (3,500 + 3,500) = 31,850,000 = 31.850$ SQM	31.850
2	Corridor Area: $(1,000 + 500 + 150 + 950 + 1,000 + 800 + 150) \times 1,800 = 8,190,000 = 8.190$ SQM	8.190
3	Male Staff Toilet Room with 1 HWB and 1WC (Western), Female Toilet Room with 1HWB, and 1WC: $2,900 \times 4,075 = 11,817,500 = 11.818$ SQM	11.818
4	Cleaner room & pantry $1,650 \times 4,075 = 6,723,750 = 6.723$ SQM	6.723
5	Lecture Room (50 Students): $8,150 \times (3,500 + 3,500) = 57,050,000 = 57.050$ SQM	57.050
6	Corridor Area: $(200 + 1,575 + 900 + 150 + 1,800 + 900 + 150 + 900 + 1,600 + 150) \times 1,800 = 8,325 \times 1,800 = 14,985,000 = 14.985$ SQM	14.985
7	Staff Offices (No. 1, 2, and 3):	
8	Staff Offices 1 = $2,650 \times 4,075 = 10,798,750 = 10.799$ - SQM	10.799
9	Staff Offices 2 = $2,850 \times 4,075 = 11,613,750 = 11.614$ SQM	11.614
10	Staff Offices 3 = $2,650 \times 4,075 = 10,798,750 = 10.799$ SQM	10.799
	Total:	163.828

Source: Architectural Drawings, 2023



Figure 2.3-1: The 3D Model of the Proposed Lecture Theatre Hall.
Source: BICO, Architectural Drawings

2.3.5.2 Mini-Cafeteria

² Total Floor Area = $13,025 \times 12,700 = 165,417,500 = 165.418$ Square metres (SQM).

The proposed mini-cafeteria building has been designed to have a total floor area of about 373.934 Square metres (SQM)³ with a capacity to accommodate 40 students. The total area occupied by the proposed facilities inside the mini-cafeteria building is estimated to be about 296.48 SQM as illustrated in **Table 2.3-2**, The 3 D model of the proposed cafeteria building is provided in **Figure 2.3-2**.

Table 2.3-2: Details of the Mini-Cafeteria Building.

S/n	Proposed Facilities	Area Covered (m2)
1	Serving Counter	12.85
2	Storage Area	10.48
3	Kiosk	18.57
4	Kitchen	37.20
5	Lockers	5.36
6	Office	5.99
7	Canteen	108.97
8	Female Toilet Room with 2 WCs and 2 HWBs	13.38
9	Male Toilet Room with 2 WCs, 2 HWBs, and 2 URs	13.38
10	Entrance foyer	70.30
	Total:	296.48

Source: Architectural Drawings, 2023



Figure 2.3-2: The 3 D Model of the Proposed Cafeteria Building.

Source: BICO, Architectural Drawings

2.3.5.3 Hostel

The proposed hostel building has been designed to have a total floor area of about 542.820 Square metres (SQM)⁴. The hostel has total of 15 bedrooms, three stores, warden office, waiting area, access ramps, laundry and washrooms. The total area occupied by the proposed facilities is estimated to be about 456.740 SQM as illustrated in **Table 2.3-3**, The 3 D model of the proposed hostel building is provided in **Figure 2.3-3**.

Table 2.3-3: Details of the Hostel Building.

S/n	Proposed Facilities	Area (m2)
1.	Room 1-5 @ 15m2	75.000

³ Total Floor Area = 16,415 x 22,780 = 373,933,700 = 373.934 SQM.

⁴ Total Floor Area = 43,600 x 12,450 = 542,820,000 = 542.820 SQM.

2.	Room 6 (Special Needs) with 1 WC (Western)	15.000
3.	Female Washroom with 2 WC (Eastern), 2 Shower Rooms and Service Duct Area	17.500
4.	Female Laundry	7.500
5.	Male Washroom with 2 WC (Eastern), 2 Shower Rooms and 2 Urinals and Service Duct Area.	17.500
6.	Male Laundry	7.500
7.	Room 7 (Special Needs)	15.000
8.	Room 8-10 @ 15m2	45.000
9.	Corridor Area	93.740
10.	Convenient Store 1-2@12 m2	24.000
11.	Store	24.500
12.	Warden's Office	15.000
13.	Waiting Area	24.500
14.	Room 11-15@15 m2	75.000
15.	3 Access Ramps (Left, Middle and Right)	-
	Total:	456.740



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

Source: BICO, Architectural Drawings

2.4 Utility Requirements

2.4.1 Energy

The proposed site for the Likunja Centre 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 Likunja Centre is 1050kwhr per day and 350 kVA. It is expected that the power consumption of the Campus will increase when the proposed project will be in entire operation.

To meet the Centre demand of electricity, the project design has provision for installation of backup power (generators) to operate in zones with a capacity of 350KVA to serve administrative and academic purposes only. The Centre will also look into feasibility of installing solar panels on the buildings in the proposed Likunja and running the beamers and laptops.

2.4.2 Water

The Likunja and nearby villages are supplied with water by RUWASA, However, the project site is not yet connected to RUWASA water supply. Sources of water are pipe schemes, boreholes, shallow wells, springs, and rain water harvesting. The Likunja Centre 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. The domestic water required to be used during construction is estimated to 4,000 Litres / day. The proponent shall apply water use efficiency technologies during construction and operation phase and there will be enough water storage tanks during operation.

2.4.3 Wastewater Disposal

The wastewater generation per day is estimated be 3.200 Litres per day. This is based on the assumption that about 80% of 4,000 Litres of consumed water will be converted into wastewater. The generated wastewater will be discharged into septic tank system.

2.5 Project activities

The University of Dar Es salaam is planned to construct three (3) buildings at first in Likunja Centre. These include Lecture Rooms and Offices Building; Hostel Building, and Mini-Cafeteria. The undertaking involves various phases from the planning phase all the way to the construction and operation phase. Each specific phase has its own activities and as a result different waste fraction. Waste types and generation varies 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 proposing procedures and operational controls for onsite storage, treatment and final disposal of wastes.

2.5.1 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.

2.5.2 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 Likunja Centre.
- Painting of the Likunja Centre
- Establishment of Access Road
- Construction waste water collection and disposal facilities
- Construction of solid waste collection facilities

2.5.3 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 demobilization 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

2.5.4 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 services
- Operation of campus hostel
- Periodic maintenance of the Campus infrastructures,
- Preparations of farms for researches
- Operation Min-cafeteria

2.6 Material Requirements

2.6.1 Gravel/Fill Materials

Likunja Borrow pit, is the only source available for gravel materials close to the project site. The source is used for upgrading of the Ruangwa - Nanganga road to bitumen standard. The

estimated quantities for the identified source are 150,000 m³. The contractor is advised to find other sources of gravel materials when need arises.

2.6.2 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 sources of crushed stones aggregates are located at Chikuliamboya area along Ruangwa - Nanganga Road and Matiati area Ruangwa town. The Chikuliamboya quarry site is currently used by the contractor who is upgrading the Ruangwa – Nanganga Road to bitumen standards. The Matiati quarry site is merely used for supplying aggregates for building construction in Ruangwa town. Both sites have fine grained weathered granite rock, and has been used to supply crushed aggregates and base course materials for various project within the Ruangwa district. 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

2.6.3 Sand Materials

Ruangwa River is the major sand source that have been identified close to the project area. The source is used for construction of the number of projects in Ruangwa District Council. The river has been traversed the huge area of the Ruangwa District Council. 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.

2.6.4 Construction Water and Energy

The Likunja and Kitandi villages are supplied with water by RUWASA. Contractor is advised to investigate other water sources close the project area. On the other hand, the Contractor is responsible for the quality of water sources that will be used for construction works. 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. The major source of energy will be from TANESCO and Standby Generator. The amount of water and energy required during construction is provided in **Table 2.6-1**.

Table 2.6-1: Water and Energy Requirement.

Requirement	Type	Source	Quantity
Water	Supply by using pipes	Boreholes and RUWASA	20,000 Liters per day will be used for construction.
Energy	Electricity + Generator	TANESCO and Standby generator	1050kwhr per day and 350kVA

2.6.5 Domestic Water

The potential source of domestic/drinking water to workforces will be from RUWASA taps or in bottles from the commercial areas. The said sources are available at Likunja and Kitandi villages which are located at the average of 2.5 Km from both villages.

The amount of domestic water requirement during construction can be estimated to be 4,000 Liters per day, based on 80 people at a rate of 50 Litres per capita per day (LPCD). The 50 LPCD has been determined based on the DCOM Manual Volume of the Ministry of Water⁵ and on the that Likunja is within a rural area.

2.6.6 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.

2.6.7 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 (bowzers), graders, pokers, vehicles, trucks, dewatering pumps, site dumper, hydraulic cranes, etc.

2.6.8 Manpower

The project is expected to deploy skilled, semi-skilled and unskilled labours to execute the works. The estimated 8 skilled labour will be deployed from both Contractor and supervision Consultant, while 15 semiskilled and 57 unskilled will be employed by the Contractor. The actual number of the labours to be deployed during project implementation. The expected working hours for the workforces is 8 hours from the starting hours including lunch time. Overtime payments will be practiced in the extra working hours. However, employment priority for semiskilled and unskilled/casual labour will be given to the local people. This will 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. The amount of estimated manpower, equipment and water requirements during construction phase is provided in **Table 2.6-2**.

Table 2.6-2: Manpower, Equipment and Water during Construction Phase.

Requirement	Type	Source	Amount
Man power	Skilled	Contractor & Consultant	8
	Semi-skilled	Contractor & local people	15
	Unskilled	Local People	57
Water	Domestic use	RUWASA	4,000 Litres per day
Equipment	Concrete mixer	Contractor	1
	Tippers	Contractor	1
	Grader	Contractor	1
	Bulldozer	Contractor	1
	Oil tank	Contractor	1
	Water bowser	Contractor	1

2.7 Waste Management

2.7.1 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.

⁵ THE UNITED REPUBLIC OF TANZANIA. MINISTRY OF WATER. DESIGN CONSTRUCTION SUPERVISION OPERATION & MAINTENANCE (DCOM) MANUAL. VOLUME I. DESIGN OF WATER SUPPLY PROJECTS. Edited by Ninatubu Lema, Mengiseny Kaseva and William Sabaya. PROJECT REPARATION, COORDINATION AND DELIVERY UNIT (PCDU).

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.

2.7.2 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 number 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 2.7-1**.

Vehicle and construction equipment's emissions which are carbon dioxide CO₂, small number of noxious gases such as sulphur dioxides SO_x, nitrogen oxides (NO_x), 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 2.7-1: Quantity of Wastes to be Generated during Construction Phase.

Category of waste	types	Quantity	Treatment Disposal
Solid Waste (Degradable)	General garbage (food remains, cardboards and papers etc.)	20 kg/day (based on generation rate of 0.25kg/day/person and 80 workers)	to be collected in skip bucket then disposed at the Mtichi dumpsite
	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

Category of waste	types	Quantity	Treatment Disposal
	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	4,000 Litres per day (Based on 80 people, water consumption rate of 50 LPCD and 80% wastewater) discharge factor.	To be collected in onsite sanitation
	Oils and greases	Variable	To be collected and sold by the authorized recyclers or to be disposed by the registered firm by the NEMC and VPO

2.7.3 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 Mtichi dumpsite. However, the re-usable materials can be handed over to the local people. Mtichi dumpsite is the authorized area for dumping solid wastes within the Ruangwa District Council jurisdiction.

2.7.4 Operation Phase

The waste to be generated during operation is food waste from cafeterias, waste water from toilets and baths (black and grey waste water), paper waste, plastic waste. solid waste will be collected and transported to Mtichi dumpsite, about 16 km from the proposed site.

Food wastes will be sold or handed over to livestock keepers around the project site. Plastic solid wastes will be collected and sold or handed over to recyclers.

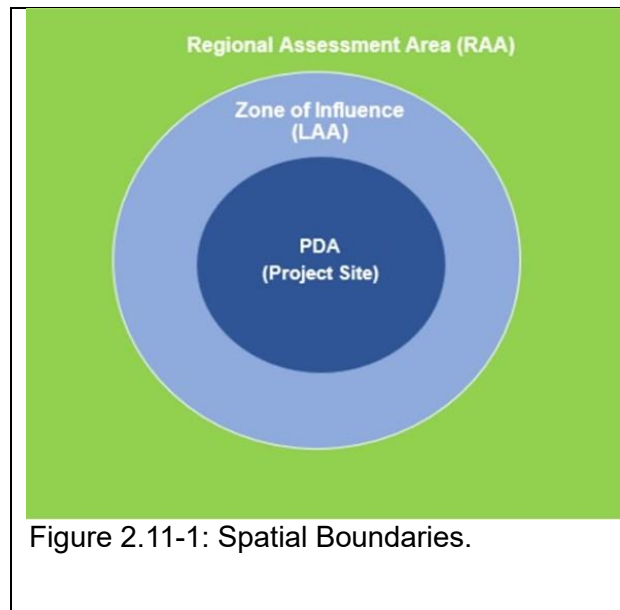
The amount of water consumption during operation phase at Likunja Centre is estimated to be between 3,600-4,800 based on 50 Nos, students and 10 Nos. staff at a rate of 60-80 LPCD⁶. Therefore, the amount of wastewater to be generated is estimated to be between 2,880-3,200 Litres per day. The generated wastewater will be discharged into septic tank systems,

2.8 Project Boundaries

2.8.1 Spatial Boundaries

⁶ The United Republic of Tanzania. Ministry of Water. Design, Construction, Supervision, Operation & Maintenance (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).

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 2.6-1**.



2.8.1.1 Project Development Area (PDA)

The Project Development Area (PDA) is the most basic and immediate area 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 will be covered by the project facilities which is 38,565 Square Metres (SQM).

2.8.1.2 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.

2.8.1.3 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.

2.8.2 Temporal Boundaries

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

The following are the temporal boundaries of the project during mobilization, construction, and demobilization phase:

Activities	Duration
Mobilization phase:	1 months
Construction phase:	16 months
Demobilization phase:	1 Months
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 are operational. Instead, the building will continue to be undergoing regular maintenance and improvement depending on the future requirements.

2.8.3 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. The identification of institutional boundaries helps to reduce institutional conflicts and enhance collaboration among various institutions or sectors. The institutional boundaries for conducting environmental and social impact t of HEET project is comprised of World Bank (WB), Ministry of Education Science and Technology (MoEST), Vice President's Office (VPO), and 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 is the result of the review of the 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 to improve the welfare of present and future generations.

The policy provides various measures and actions responding to key environmental issues and challenges. It provides the framework for an integrated approach to planning and sustainable management of the environment in the country. It also recommends strong institutional and governance measures to support achieving 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;

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>

- 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 recognizes the role and responsibilities of key players for the 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), Environmental Appeals Tribunal, Civil Society Organizations, Academic and Research Institutions, Local Communities, Media, Development Partners, Regional and International Bodies,

Relevance / Compliance

UDSM is implementing the project 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 the NEP objectives and strategies into the project and will ensure 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) led to the establishment of the 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 to HIV/AIDS transmission due to interaction between construction workers and students or local community members. Therefore, the project proponent will ensure the Contractor develops and implements HIV/AIDS prevention and control programmes 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 the development of sustainable human settlement and to facilitate the provision of adequate and affordable shelter to all people, including the poor. The policy outlines several objectives; however, the relevant objective is to protect the environment within human settlement and natural ecosystem against pollution, degradation, and destruction to attain sustainable development.

Relevance / Compliance:

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

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 consider 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 for poverty eradication by ensuring that both women and men access 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 for 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 National Employment Policy (2008)¹⁰ aims to stimulate national productivity, attain full, gainful, and freely chosen productive employment, reduce unemployment and 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 resource 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 by formulating and implementing an HIV/AIDS preventive and control programme.

3.1.1.6 Occupational Health and Safety Policy (2009)

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

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.

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

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 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)¹² emphasizes on 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, strengthening the impact of the diverse investments 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 in 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 the emergence of GBV/SEA and SH. This will include awareness creation on GBV/SEA and SH for construction workers.

3.1.1.8 National Disability Policy (2004)

The objectives of the policy are;

- Encourage the development of people with disabilities
- Empower families of people with disabilities
- Review /amend legislation 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
- 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.

3.1.1.9 Education Training Policy (2014)

¹¹ The United Republic of Tanzania. Ministry of Labour, Employment and Youth Development. National Occupational Health and Safety Policy. 2009.

¹² 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>

Tanzania aims to improve the quality of education. This is through collaboration with all education stakeholders to modernise the curriculum at all levels and ensure it meets requirements. The education training policy of 2014 stressed that to improve the quality of education in Tanzania, there should be a shift from using many textbooks to using a single textbook for each subject. The policy also emphasises all private schools need to have affordable school fees on the basis of “Unit per course” and analyse its operation as well. The school fees should relate to the service offered by the school. This project aligns with this policy as it will modernise education training and implement state-of-the-art equipment for training. In addition, the university fees will be affordable to all people.

3.1.1.10 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 emphasizes 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.

3.1.1.11 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.

Relevance/Compliance

The project will plan to utilize the area during its implementation properly.

3.1.2 Sectoral Policies

3.1.2.1 Construction Industry Policy (2003)

The vision of the Construction Industry Policy (2003)¹³ 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. 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 sectors).

Relevance/Compliance

The project proponent has been involved in the service of local consultants in the design, preparation of bidding documents and supervision. During construction, priority will be given to local contractors or joint ventures/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)

¹³ Construction Industry Policy (2003). The United Republic of Tanzania. Ministry of Works. November, 2003.

The overall aim of a National Land Policy (1995)¹⁴ 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. 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 the landscape after construction. The Engineer will ensure construction activities are confined within the permitted areas in order to minimize land degradation.

3.1.2.3 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.

Relevance/Compliance

As far as this project is concerned, mining activities are directed to quarrying activities for obtaining stones and aggregates. Fine and coarse aggregates for the proposed project will be strictly purchased from authorized vendors.

3.1.2.4 National Energy Policy (2015)

The Vision of the National Energy Policy (2015)¹⁵ 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 environmentally friendly modern energy services to all while ensuring the 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 the transformation of the national economy. The policy outlines sector specific issues, statements, and objectives. With regard to energy efficiency and conservation, the policy objective is to promote energy efficiency and conservation in all sectors of the economy.

Relevance/Compliance

The relevant issues to this project are energy efficiency in the transport sector and the residential and commercial sectors. 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.

3.1.2.5 National Health Policy (2003)

The National Health Policy (2003)¹⁶ 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

¹⁴ National Land Policy (1997). The United Republic of Tanzania. Ministry of Lands and Human Settlements Development, Dar Es Salaam, Tanzania. Second Edition 1997.

¹⁵ National Energy Policy (2015). The United Republic of Tanzania. Dar Es Salaam. December, 20015.

¹⁶ The United Republic of Tanzania. Ministry of Health, National Health Policy, Ministry of Health, October 2003.

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)¹⁷ 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

The Environmental Management Act Cap 191 (EMA Cap 191)¹⁸ 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 an 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 the commencement of construction works. This EIA is an indicator of compliance with the requirements of the EMA Cap 191.

¹⁷ National Water Policy (2002). The United Republic of Tanzania. Ministry of Water and Livestock Development. July 2002.

¹⁸ Environmental Management Act No. 20 of 2004. The United Republic of Tanzania. Vice President's Office. 11th November 2004.

3.2.1.2 The Environmental Impact Assessment and Audit Regulations (2005)

The Environmental Impact Assessment and Audit Regulations (2005)¹⁹ are made under Environmental Management Act No. 20 of 2004. The regulations provide the 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 Assessments, 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 an Environmental Impact Assessment study.

Relevance / Compliance

The project falls under those projects that require an 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 provide some amendments to the EIA and Audit Regulations (2005) and classify 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.

3.2.1.4 The Occupational Health and Safety Act (2003)

The Occupational Health and Safety Act No. 5 of 2003²⁰ 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 conducts risk assessment, including providing 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 2009²¹ 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.

¹⁹ Environmental Impact Assessment and Audit Regulations (2005). The United Republic of Tanzania.

²⁰ Occupational Health and Safety Act (2003). The United Republic of Tanzania. Ministry of Labour. 13th February 2003.

²¹ The Public Health Act No. 1 of 2009.

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 the 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 so that waste water will be directed into the 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 2008²² 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 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 2004²³ is an Act to provide for core labour rights to establish basic employment standards; a framework for collective bargaining; the prevention and settlement of disputes and to provide for related matters.

Relevance / Compliance:

The project involves the 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)²⁴ is an Act to provide for compensation to employees for disablement or 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.

²² HIV and AIDS (Prevention and Control) Act (2008). The United Republic of Tanzania. Ministry of Health and Social Welfare. 1st February 2008.

²³ Employment and Labour Relations Act (2004). The United Republic of Tanzania. Ministry of Labour. 14th April 2004.

²⁴ The United Republic of Tanzania. Chapter 263. The Workers' Compensation Fund Act. (Principal Legislation). Revised Edition of 2015.

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 dependent.

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.

The Contractors Registration Act (1997)

The Contractors Registration Act No. 17 of 1997²⁵ 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.

Section 12(l) prohibits non-citizen of the United Republic from forming a local contracting firm unless the citizens of United Republic of Tanzania own the majority of its shares. 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.

3.2.1.9 The Contractors Registration (Amendment) Act (2008)

The Contractors Registration (Amendment) Act No. 15 of 2008²⁶ 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 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

²⁵ Contractors Registration Act No. 17 of 1997. United Republic of Tanzania.

²⁶ Contractors Registration (Amendment) Act No. 15 of 2008. United Republic of Tanzania.

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.

3.2.1.10 The Engineers Registration Act (1997)

The Engineers Registration Act No. 15 of 1997²⁷ 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.

3.2.1.11 The Engineers Registration (Amendments) Act (2007)

The Engineers Registration (Amendment) Act No. 25 of 2007²⁸ 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"

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 employ only qualified professional engineers.

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 the construction of new depot in the government land. 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)

²⁷ Engineers Registration Act No. 15 of 1997. United Republic of Tanzania.

²⁸ Engineers Registration (Amendments) Act No. 25 of 2007. United Republic of Tanzania.

The Land Use Planning Act No. 6 of 2007²⁹ is an Act to provide for procedures for preparation, administration, and enforcement of land use plans, to repeal the Land Use Planning Commission and to provide 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 – responsible for planning and managing all lands in the district and assisting Village Councils to plan and manage their areas of jurisdiction.

Land Use Planning Commission – which prepares national land use planning framework plan and assist the lower echelon to prepare plans and manage their lands.

Relevance / Compliance:

The project proponent will make 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

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 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 enroll 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.

²⁹ 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.

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;

- The Muhimbili University College of Health Science Act, 1991;
- The Mzumbe University Act, 2001;
- The Open University of Tanzania Act, 1992;
- The Sokoine University of Agriculture Act, 1984 and
- The University of Dar Es Salaam Act, 1970

Relevance / Compliance:

The project will deal with the construction of a 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 involves 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 project as it concerns it will prevent early and forced marriage by provide 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.

3.2.3 International Conventions**3.2.3.1 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. 14830)

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 only³¹. 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:

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

(b) Worst Forms of Child Labour Convention, 1999 (No. 182)³²

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 be trying 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)³³

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.

³⁰ [https://en.wikipedia.org/wiki/Working_Environment_\(Air_Pollution,_Noise_and_Vibration\)_Convention,_1977](https://en.wikipedia.org/wiki/Working_Environment_(Air_Pollution,_Noise_and_Vibration)_Convention,_1977)

³¹ https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:11300:0::NO::P11300_INSTRUMENT_ID:312293

³² https://en.wikipedia.org/wiki/Worst_Forms_of_Child_Labour_Convention

³³ [https://en.wikipedia.org/wiki/Discrimination_\(Employment_and_Occupation\)_Convention](https://en.wikipedia.org/wiki/Discrimination_(Employment_and_Occupation)_Convention)

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.

Workmen's Compensation (Accidents) Convention, 1925 (No. 17) 34

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:

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.

3.2.3.2 United Nations Framework Convention on Climate Change (1992)

The objective of the United Nations Framework Convention on Climatic Change (UNFCCC) is to stabilize 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 buildings.

3.3 World Bank Environmental and Social Framework

The review of the World Bank Environmental and Social Framework (ESF) has been necessary because the project will receive funding from the World Bank. The ESF are used to ensure 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 increase prosperity in a sustainable manner for the benefit of the environment and their citizens.

³⁴ [https://en.wikipedia.org/wiki/Workmen%27s_Compensation_\(Accidents\)_Convention,_1925](https://en.wikipedia.org/wiki/Workmen%27s_Compensation_(Accidents)_Convention,_1925)

The review and screening of WB ESS have been carried out to find out which of those ten standards are applicable, as summarized in **Table 3.3-1**. The results indicate that three ESS, namely the Environmental and Social Standard 1 (ESS 1), Environmental and Social Standard 2 (ESS 2), Environmental and Social Standard 3 (ESS 3), Environmental and Social Standard 4 (ESS 4), Environmental and Social Standard 8 (ESS 8), and Environmental and Social Standard 10 (ESS 10) will be applicable. The purpose of this section is to describe each of the applicable ESSs and how the project proponent has complied or will comply with the Applicable ESS.

Table 3.3-1: Applicable WB Environmental and Social Standards

S/n	Safeguard Policy	Applicable (Yes /No)	Remarks
1.	ESS 1: Assessment and Management of Environmental and Social Risks and Impacts	Yes	The project is likely to create some environmental and social risk/impacts.
2.	ESS 2: Labour and Working Conditions	Yes	The project will involve recruiting construction workers, creating temporary employment opportunities for local people. The presence of construction workers will result into increased demand for food, hence creation of income generation opportunity for local people.
3.	ESS 3: Resource Efficiency and Pollution Prevention and Management	Yes	The Project is likely to create air pollution due to dust emission from construction activities. The project will also result into consumption of finite land based resources like sand, gravel, and crushed stone aggregates.
4.	ESS 4: Community Health and Safety	Yes	The project is likely to create health and safety risk to the local community members. For example, the project is likely to create construction related risk of accidents due to trespassing of unauthorized people into the construction site.
5.	ESS 5: 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 Likunja Centre, which is owned by the Government of Tanzania.
6.	ESS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	No	The construction site is located within already built-up urban environment at the UDSM Likunja Centre. Moreover, the proposed construction site is currently occupied by planted trees; hence no important critical habitat in the area.
7.	OP/BP4.10 Indigenous Peoples	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
8.	ESS 8: Cultural Heritage	Yes	The construction site is located in already built-up urban environment with no history of archaeological or paleontological findings. There are no

S/n	Safeguard Policy	Applicable (Yes /No)	Remarks
			any important historical, cultural, scared or religious features or natural landscape features within the construction site; Nevertheless, the project considers this ESS for chance find since it constructions involves land excavations.
9.	ESS 9: Financial Intermediaries	No	There is no international waterway involved in the project area.
10.	ESS 10: Stakeholder Engagement and Information Disclosure	Yes	This ESS is 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.

3.3.1 ESS1: Assessment and Management of Environmental and Social Risks and Impacts.

The ESS 1 sets out the Borrower's responsibilities for assessing, managing and monitoring E&S risks and impacts associated with each stage of a project supported by the Bank through Investment Project Financing, in order to achieve E&S outcomes consistent with the ESS safeguards.

Objectives of ESS 1:

- To identify, evaluate and manage the E&S risks and impacts consistent with the ESSs.
- To adopt the mitigation hierarchy approach (avoid, minimize, rehabilitate/restore, compensate/offset);
- Ensure disadvantaged or vulnerable people are not disadvantaged in sharing benefits and opportunities from the project.
- To utilize national legislative frameworks in the assessment, development and implementation of projects, whenever appropriate.
- To promote improved environmental and social performance.
- The ESS 1 will be Applicable because the project is likely to create some environmental and social risk/impacts and therefore EIA has to be conducted In accordance with the requirements of ESS 1.

3.3.2 ESS 2: Labour and Working Conditions

The ESS2 recognizes the importance of employment creation and income generation in the pursuit of poverty reduction and inclusive economic growth. Borrowers can promote sound worker-management relationships and enhance the development benefits of a project by treating workers in the project fairly and providing safe and healthy working conditions.

Objectives of ESS 2:

- To promote safety and health at work.
- To promote the fair treatment, non-discrimination and equal opportunity of project workers.
- To protect project workers, including vulnerable workers such as women, persons with disabilities, children (of working age, in accordance with this ESS) and migrant workers, contracted workers, community workers and primary supply workers, as appropriate.
- To prevent the use of all forms of forced labour and child labour.

- To support the principles of freedom of association and collective bargaining of project workers in a manner consistent with national law.
- To provide project workers with accessible means to raise workplace concerns.

This ESS is Applicable because the project will involve recruitment of construction workers, hence creation of temporary employment opportunities for local people. The presence of construction workers will result into increased demand for food, hence creation of income generation opportunity for local people.

3.3.3 ESS 3: Resource Efficiency and Pollution Prevention and Management

The ESS 3 recognizes that economic activity and urbanization often generate pollution to air, water, and land, and consume finite resources that may threaten people, ecosystem services and the environment at the local, regional, and global levels. The current and projected atmospheric concentration of greenhouse gases (GHG) threatens the welfare of current and future generations. At the same time, more efficient and effective resource use, pollution prevention and GHG emission avoidance, and mitigation technologies and practices have become more accessible and achievable.

Objectives of ESS 3:

- To promote the sustainable use of resources, i.e. energy, water and raw materials.
- To avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities.
- To avoid or minimize project-related emissions of short and long-lived climate pollutants.
- To avoid or minimize generation of hazardous and non-hazardous waste.
- To minimize and manage the risks and impacts associated with pesticide use.
- This ESS will be Applicable because the project is likely to create air pollution due to dust emission from construction activities. The project will also result into consumption of finite land-based resources like sand, gravel, and crushed stone aggregates.

3.3.4 ESS 4: Community Health and Safety

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

Objectives of ESS 4:

- To anticipate and avoid adverse impacts on the health and safety of project-affected communities during the project life cycle from both routine and non-routine circumstances.
- To promote quality and safety, and considerations relating to climate change, in the design and construction of infrastructure, including dams.
- To avoid or minimize community exposure to project-related traffic and road safety risks, diseases and hazardous materials.
- To have in place effective measures to address emergency events.
- To ensure that the safeguarding of personnel and property is carried out in a manner that avoids or minimizes risks to the project-affected communities.

This ESS will be Applicable because the project is likely to create health and safety risk to the local community members. For example, the project is likely to create construction related risk of accidents due to trespassing of unauthorized people into the construction site.

3.3.5 ESS 10: Stakeholder Engagement and Information Disclosure

The ESS 10 recognizes the importance of open and transparent engagement between the Borrower and project stakeholders as an essential element of good international practice. Effective stakeholder engagement can improve the E&S sustainability of projects, enhance project acceptance, and make a significant contribution to successful project design and implementation.

Objectives of ESS 10:

- To establish a systematic approach to stakeholder engagements that will help Borrowers identify stakeholders and build and maintain a constructive relationship with them, in particular project-affected parties.
- To assess the level of stakeholder interest and support for the project and to enable stakeholders' views to be taken into account in project design and environmental and social performance.
- To promote and provide means for effective and inclusive engagement with project-affected parties throughout the project life cycle on issues that could potentially affect them.
- To ensure that appropriate project information on environmental and social risks and impacts is disclosed to stakeholders in a timely, understandable, accessible and appropriate manner and format.

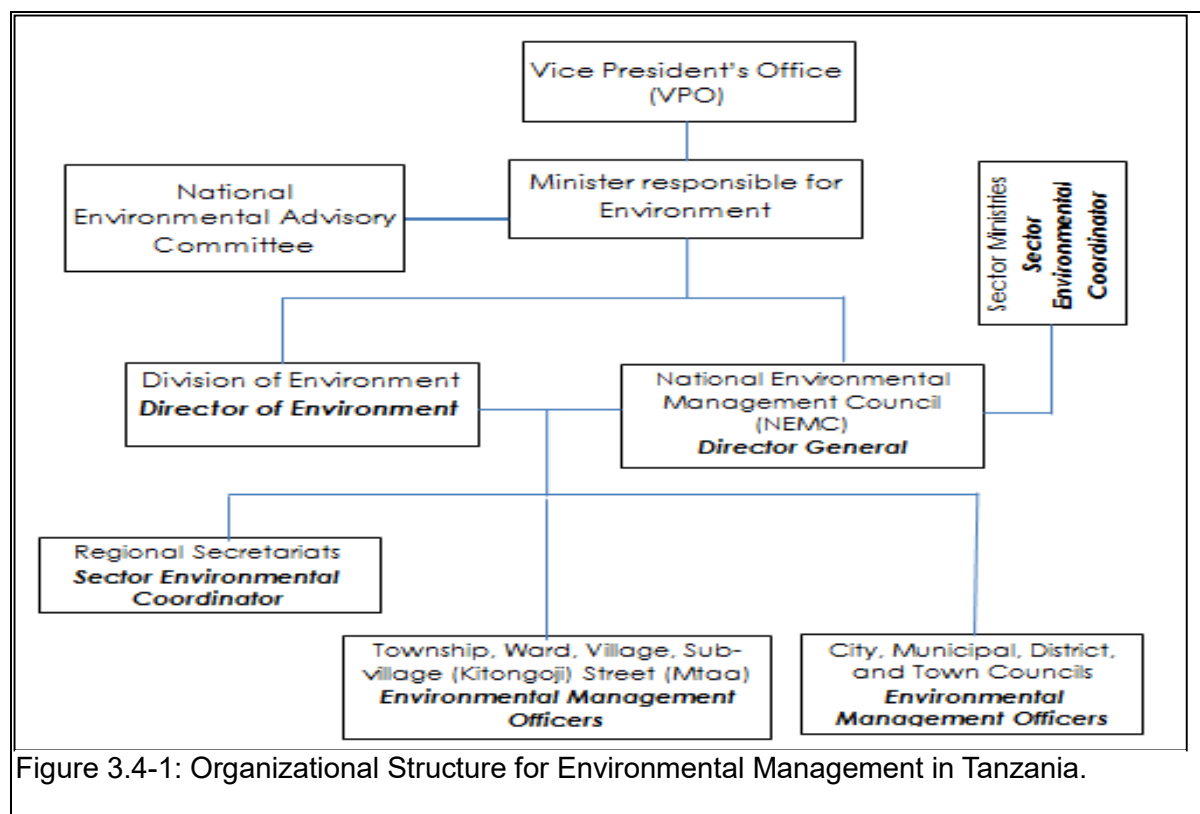
This ESS will be Applicable because the project is likely to affect various stakeholders directly or indirectly and positively or negatively. Therefore, stakeholder engagement and consultation will be necessary at all stages of the project implementation.

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 level to national level. The organizational structure for implementation of environmental management matters from national to local government authorities' level is provided in 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**.



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 organizational structure for implementation of environmental and social management issues at project level is provided in **Figure 3.4-1**. 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 3.4-1: Institutional Responsibilities from National to Local Authority Level.

Institution	Roles and responsibilities	Relevant Legislations
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: 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.	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.
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	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.

Institution	Roles and responsibilities	Relevant Legislations
	environmental decision making. Ensuring that the project is being implemented in an environmentally friendly and socially acceptable manner.	Section 18 of the EMA Cap. 191- which stipulates the function of NEMC.
Municipal Council Level		
Ruangwa District 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.
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.

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.

Institution	Roles and responsibility
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	<p>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:</p> <ul style="list-style-type: none"> • 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, 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)	<p>Work with the NPIU/APIU/UPIU to understand the requirements of the environmental and social assessment;</p> <p>Conduct initial site visits with the NPIU/APIU/UPIU to understand the sub-project setting and site-specific requirements;</p> <p>Prepare the ESIA 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;</p> <p>Cost all the mitigation and management measures proposed in the ESMPs and SSEMPs</p>

Institution	Roles and responsibility
	<p>Propose a capacity building plan for the implementation of the sub-projects for all actors involved with cost estimates and schedule;</p> <p>Carry out public consultations;</p> <p>Conduct trainings as needed;</p> <p>Assist the APIU/UPIU in preparing documentation to obtain certification from NEMC for the ESIA's and ESMPs.</p> <p>Contractors (</p>
Contractors (Environmental and Social Team)	<p>Compliance with relevant environmental and social legislative requirements (project-specific, district- and national level), including allocating adequate budget for implementation of these requirements;</p> <p>Work within the scope of contractual requirements and other tender conditions;</p> <p>Prepare CESMPs based on the ESMP in the bidding documents and contracts;</p> <p>Train workers about EHS (including relevant WBG EHS Guidelines) and the site specific environmental and social measures to be followed;</p> <p>The EHS officer of the contractor will participate in the joint site inspections with the APIU/UPIU and Environmental Supervision Engineer/consultant;</p> <p>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.</p> <p>Carry out any corrective actions instructed by the Supervision Engineer/consultant;</p> <p>In case of non-compliances/discrepancies, carry out investigation and submit proposals on mitigation measures, and implement remedial measures to reduce environmental impact;</p> <p>Propose and carry out corrective actions in order to minimize the environmental impacts;</p> <p>Send weekly reports of non-compliance to the Supervision Engineer/consultant;</p> <p>Send monthly progress reports to the Supervision Engineer/consultant</p>

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 is characterized by undulating terrain with an altitude ranging from 375 meter above sea level (m.a.s.l.) to a maximum of about 396 m.a.s.l. The topography indicates the middle part of the project site has the lowest altitude.

4.1.2 Climate

The project area has a tropical climate characterized by hot and humid weather throughout of the year with an average temperature of 26°C. The hottest season is from October to March during which temperatures can raise up to 34°C with the average 26 °C annually (temperature ranges between 24 °C and 34 °C). It is relatively cool between May and August, with temperature around 24°C.

The average annual rainfall is 800mm to 1200mm of total rainfall received within a period of seven months between November and May annually. The district in recent years also receives unpredictable rain seasons particularly during the onset of agricultural season.

4.1.3 Climate Change

The evidences of climate change in recent periods in Tanzania³⁵ 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 (CO₂); Methane (CH₄); and Nitrous Oxide (N₂O). 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 ($\frac{2}{3}$) 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 from the atmosphere due to sequestration (absorption) effects. In 2010 Ruangwa District had 111kha of tree cover, extending over 44% of its land area. In 2021, it lost 132ha of tree cover, equivalent to 43.1kt of CO₂ emissions³⁶.

Implication for the project

The project is not likely to contribute into climate change effects, because the project site has few isolated trees. However, the project will utilize the climate 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.

³⁵<https://www.nbs.go.tz/index.php/en/census-surveys/environmental-statistics/593-the-national-climate-change-statistics-report-2019>

³⁶ <https://www.globalforestwatch.org/dashboards/country/>

4.1.4 Geology and Soils

The geology of the project area is dominated by continental and lacustrine sedimentary formations³⁷. The sub-soil is dominated by marine limestone, mainly comprised of sandy clay and clayey sands.

4.1.5 Ground and Surface Water Resource

4.1.5.1 Ground Water Resource

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 marl³⁸.

4.1.5.2 Surface Water Resource

The major source of surface water is Ruangwa River, the river traversing different part of the district including residence and farm areas. The river is highly contaminated due to the use of manure in the close farms, domestic waste and the colour of water 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 daily average concentrations of 0.031 mg/m³ for TSP, 0.023 mg/m³ for PM₁₀ and 0.010 mg/m³ for PM_{2.5} were measured at UDSM Campus at Likunja ward established station (**Appendix 2a**). The findings indicate all the measured values of TSP, PM₁₀ and PM_{2.5} were found below the prescribed TBS limits and WHO guideline criteria.

4.1.6.2 Ambient Pollutant Gases

The measured Sulphur dioxide (SO₂), Volatile Organic Compounds (VOCs), and Nitrogen dioxide (NO₂) concentrations were minimal and in conformity with their respective prescribed TBS and WHO/IFC limits. Similarly, the recorded CO concentrations found complying with both TBS limit of 15 mg/m³ and WHO/IFC guideline value of 30 mg/m³ (**Appendix 2b**). However, Hydrogen sulphide (H₂S) concentrations were very low with its impacts considered insignificant, taking into account that H₂S has no limit specified in both the TBS standards and/or international guidelines. Generally, the ambient air quality in the area can be considered to be good most of the time, with no exceedance recorded against the prescribed TBS Limits and WHO/IFC Guidelines.

4.1.6.3 Noise Levels

The recorded noise levels were 45.8 dBA and 42.5 dBA for daytime and night-time, respectively (**Appendix 2c**). These measured levels are acoustically safe for people residing nearby the project site as the recorded daytime and night-time noise levels found to be well outside the daytime WBG/IFC General EHS Guidelines level of 55 and TBS limit of 52 dB(A) prescribed for institutional areas.

4.1.6.4 Ground Vibrations

The recorded vibration level of 0.001 mm/s PPV was recorded at the station established within UDSM-Likunja Campus project site (**Appendix 2d**). The anticipated impact resulting from the measured vibrations is considered insignificant as the measured level 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 level is low and thus is not likely to impact negatively any sensitive receptors.

³⁷ 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

³⁸ Hydrogeology of Tanzania. http://earthwise.bgs.ac.uk/index.php/Hydrogeology_of_Tanzania

4.2 Biological Environment

4.2.1 Flora

The project site is within the surveyed area with more than 90% is undeveloped. The project area is currently used for agricultural activities. In the project area there exist few houses whereby most of them are built up of temporary building materials and mostly the houses are used during the agricultural seasons. The project area is dominated by natural vegetation such as Cashew nut trees (*Anacardium occidentale*) and followed by mango trees (*Mangifera indica*).

4.2.2 Fauna

There are no identified natural habitats for fauna species of conservation value. In addition, no identified endangered, threatened, rare or unique fauna species were identified in the project area.

4.3 Socio-Economic Environment

4.3.1 Population

According to 2022 Tanzania population and housing census Ruangwa district has the total of 185,573 people. Out of these 91,469 are Male and 94,104 are female. The population distribution in Ruangwa District Council is provided in **Table 4.3-1**.

Table 4.3-1: Population Distribution in Ruangwa District Council.

Total	Male	Female	Sex Ratio	Household Number	Household Size
185,573	91,469	94,104	97	60,931	3.0

The project area is located at Likunja ward in Ruangwa District has the population of 10,977 where male was 5,351, female 5626. The population distribution in Likunja Ward is provided in **Table 4.3-2**.

Table 4.3-2: Population Distribution in Likunja ward.

Total	Male	Female	Sex ratio	Number of households	Number of household size
10,977	5351	5626	95	3,822	2.9

4.3.2 Ethnicity

The district dominated by Mwera, Makonde, Makua, Magingo, Yao Ngindo and Matumbi. It was observed that majority of the population is made up of mainly Muslim with elements of African Tradition faith, there is small but significant of Christian population

4.3.3 Social economy

About 90% of the population of Ruangwa depends on agriculture they cultivate food crops like maize, sorghum, paddy, cassava, pigeon peas, cow peas and groundnuts cash crops like cashew nuts, sesame, onions, tomatoes, sunflowers and groundnuts, and livestock keeping like cattle, goat, sheep and poultry.

4.3.4 Education

Primary school

Ruangwa district has 82 government primary schools and 2 private schools. Enrolment of boys and girls they are almost the same. In 2018. Boys was 2,687, and girls were 2,762. Enrolment by sex in the district has exceeded the expected number since 2016, with the exception of 2018. As shown in **Table 4.3-3**, in year 2016 the total number of enrolments was 4414 out of

which, girls were 2123 and boys were 2291 this was 126.36 percent of the target. In the year 2017 total number of enrolments was 5546, out of which, girls were 2619 and boys were 2927. This is 120.67%.

Table 4.3-3: Primary school enrolment 2014 to 2018

Years	Total required pupils	Total enrolled pupils	Total required girls	Total girls' enrollment	Total required boys	Total boys' enrollment	Total percent of pupils enrollment
2014	4136	3861	2111	1966	2025	1895	93.35
2015	4639	4240	2516	2288	2123	1972	91.39
2016	3493	4240	2516	2123	1730	2291	126.36
2017	4596	5546	2315	2619	2281	2,927	120.67
2018	5526	5284	2762	2597	2764	2687	95.62

Source: Primary Education Department

Enrolment has been increasing due to the following reasons:

- Good sensitization on importance of education to the stakeholder
- Implementation of by laws which stand for government education policy of 2014. The policy states that, all children aged 7-13 years should go to school.
- Increasing number of primary schools due to different education programs
- Introduction of sport and games in school, such as school band football netball and volleyball.
- Presence of people from other parts of the country(workers) since they have come with their families.
- Conducive teaching and learning environment, such as construction of modern school building and teaching facilities.
- The government policy of free education from primary education to lower secondary education.

According to **Table 4.3-4**, the dropout rate has been increasing due to absentees, pregnancy, death and other reason like early marriages, traditional dances(unyago), diseases and migration.

Table 4.3-4: Dropout Rate.

Year	Number of Dropouts	
	Boys	Girls
2014	748	610
2015	1262	837
2016	1149	654
2017	993	624
2018	778	610
Total:	4930	3335

The following initiatives have been taken to overcome pupil's dropout:

- District council bylaws have been introduced and applied to the parents whose children do not attend school. For example, every parent who wants to celebrate circumcision ceremony (:jando") and initiation ceremony ("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.

Secondary school

Ruangwa has 16 secondary schools, 15 is ordinary secondary school and 1 is high school, they are all public school. Girls were 2282 and 2,164 were girls. no vocational training centre or college in Ruangwa.

4.3.5 On-gong Activities and Adjacent Land Use at the project area

The major social economic activity in the flanking project area is agricultural activities. The common agricultural activities in the project area are; maize, Cashew nut and mango. The locals depend on cashew nut and maize as their commercial crops. The on-going construction of Ruangwa – Naganga (60 km) Road to bitumen standard is the major source of social economic activity currently in the project area since it has engaged the huge number of local individuals. The project has engaged both semi-skilled and unskilled personnel in the project area. The locals have been engaged in construction of stone pitching drains at Likunja area along the Ruangwa – Nanganga road.

Another source of income in the project area is the surveyed plots. Currently the Ruangwa District Council has surveyed the farms in the project area and produces about 3000 plots that will start to be sold soon. The value of the land is currently higher compared when the project was announced. The project implementation is going to change the existing farmlands to residential and commercial areas.

4.3.6 Recreation

In Ruagwa district they have natural sites of attractions like shimo la Ng'au, natural forest, rivers in Mbwemkulu and Nanganga ward the home of various species of fish including Tilapia and lungfish. In the project area there is no any recreation activity they expect the project to come with hotels, bar and restaurant.

4.4 Gender Based Violence (GBV)

In Tanzania, 40% of all women aged 15-49 years have experienced physical violence, while 17% have experienced sexual violence. Of women aged 15-49, 44% have experienced either physical or sexual violence by an intimate partner. Spousal violence prevalence is highest in rural areas, averaging 52% while the prevalence in urban areas averages 45%. Almost 30% of girls experience sexual violence before the age of 18.

Type of Gender Based Violence (GBV) reported at Ruagwa District council are sexual violence, harmful traditional practices, child marriage, children neglect, old people to lack care and from their children. They expect the project will reduce violence because of people interaction of different culture and norm.

4.5 Community Safety and Security

4.5.1 HIV/AIDS Prevalence

The implementation of the project may positively or negatively impact the community. Positive impacts include the provision of education, community HIV/AIDs training, safety and environmental conservations trainings, improved health services at the dispensaries and health centres in the vicinity of the project. Negatively the host community is likely to be affected directly or indirectly with the dust from the proponent operations, noise and vibrations. The project construction contractors may come into contact with the nearby villages where by social sexual relations may arise. It should also be borne in mind that individual characteristic differs from one person to another and may be affected by the existing environmental conditions and community around.

According to Tanzania HIV/AIDS and Malaria Indicator Survey (THMIS, 2017/18), Tanzania is experiencing some recent decline in national HIV prevalence. Between 2004 and 2012, the overall adult prevalence rate fell from 7% to 5.0 (from 6% to 3.8% % for men and from 8% to

6.5% % for women). Declines in HIV prevalence was also observed among pregnant women attending antenatal clinics and among blood donors.

The downward trend in levels of HIV infection correlates with the reduction in behaviours known to have a high risk of transmitting HIV. For example, in the 15-49 age group, casual sex with non-marital, non-cohabiting partners declined from 46% to 29% among men, and from 23% to 16% among women. (National HIV and AIDS Policy, 2013)

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

4.5.2 Health

Ruangwa own 1 hospital owned by government 4 health centre and 34 dispensaries. Malaria is leading disease in Ruangwa district council, followed by ARI, diarrheal(bacteria), Pneumonia, skin diseases, tuberculosis, Anemia, Asthma and HIV/AIDS. In the project area there is no health facility.

Table 4-1Number of health facilities in Ruangwa

Health facilities	Government	Private
Hospital	1	0
Health centre	4	0
Dispensary	34	0
Mobile clinics	4	0
Out reach	53	0

4.6 Transportation Network

Ruangwa has a total road network of 730.12km which are categorized as follows; regional roads 193km, district roads 362.76km, urban roads 19.7km and 154.72km are feeder roads. People around the project area use bicycles, buses, motorcycles in their daily activities.

4.7 Water Supply

Data shows that only 71,244 (51.23%) of the people have access to clean and safe water. While 48.57% are facing shortage of clean and safe water which lead to diarrhoea and trachoma. They depend on fetching water from the river, deep, shallow well and rain harvesting as source of water.

CHAPTER FIVE

5.0 STAKEHOLDER IDENTIFICATION AND CONSULTATION

5.1 Stakeholder Identification and Analysis

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. 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.

5.1.1 Developers

The developers in this project are the Ministry of Education, Science and Technology (MoEST); and University of Dar es Salaam (UDSM) Vice Councilors at 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 Ruangwa District 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 places respectively.

Tanzania Electricity Supply Company Limited (TANESCO) and Rural and Urban Water Supply and Sanitation Authority (RUWASA) are the other group of interested party. Currently, no houses which is supplied with neither water and electricity in the project area. Electric pole is traversing along the Ruangwa-Nanganga Road and nearby the project area. The Likunja and Kitandi villages are both supplied with water by RUWASA; through currently the project/command area is not. So TANESCO and RUWASA utilities infrastructure are not going to be affected by the project implementation, however they are required to ensure the project is supplied with enough water and power during the operation phase of the project.

5.1.4 Affected Parties

These are those stakeholders who can be directly or indirectly affected, whether positively or negatively by the project. The land acquisition from the farm's owners is considered to be directly and negatively impact of the project because farms land, trees and buildings are likely to be affected. Local individuals are currently crossing the project area to their residences beyond the demarcated project site. Now, there is no any auxiliary police who are protecting

the area, during the construction and operation phase of the project crossing the project area will be within the specific roads and this may annoy the locals since they are not 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 (DoE-VPO)	
4.	National Environment Management Council (NEMC)	
5.	Ruangwa District 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.	Rural and Urban Water Authority (RUWASA)	
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 and District Office, Ruangwa District Council, Ruangwa District, Likunja ward, Likunja and Kitandi villages in the project area.

5.3 Results of Stakeholder Consultations

5.3.1 Consultation with Stakeholder Representatives / Officials

The consultation with stakeholder officials started on 6th April 2023 and will continue during the detailed ESIA Report, whenever necessary. In general, the stakeholders do support the project because they believe it will be beneficial to the local community and the nation. However, they have raised some issues/concerns regarding its implementation and provided some recommendations or mitigation measures. The record of issues / concerns raised during consultation with stakeholder representatives and local government officials is as provided in **Table 5.3-1**,

Table 5.3-1 Issues/Concerns raised during stakeholder consultations.

Date	Stakeholder Name	Raised Concern
06/04/2023	District Director - Ruangwa District Council (RDC)	<ul style="list-style-type: none"> • The District Council is aware with the proposed project at Likunja area, • The local residents in the project area have been participated at every stage of the project so far, and there is no any conflict, • The project is supplied with electricity and currently RUWASA is implementing the water supply project from Nyangawa to the project area, • The proposed project will increase population in the project area, this will lead to increase of the per capital income of the individual • The higher education service from the reputable university will avail close • The proposed project area has been surveyed and about 3000 plots will be produced for sale • The proposed project has minimum negative impacts compare to positive impacts
06/04/2023	Department of land - Ruangwa District Council	<ul style="list-style-type: none"> • The proposed project has been surveyed and about 200 PAPs has been identified • The proposed project site is about 400 acres • The project area is dominated with farms • Three location was proposed for the project such as; Ruangwa Secondary School, Chigombele ngoma and Likunja area preferred to be used since the area is suitable for the project • The surveyed area of flanking project environment has produced 3000 plots that are expected to be sold by the Ruangwa District Council soon • The project is expected to increase population in the project area and Ruangwa District as whole • The proposed project will also increase the per capital income of the individuals
06/04/2023	District Environmental Management Office - DEMO	<ul style="list-style-type: none"> • The district environmental office participated throughout the project establishment in Likunja area • The project has no endangers species, since it is the agricultural area • the expected solid waste to be generated throughout the project duration should be transported to the authorized dumpsite
06/04/2023	District Health Officer - DHO	<ul style="list-style-type: none"> • The wastewater infrastructure should be similar with the expected population in the project area • The design lecture rooms should follow the health policy • The proposed infrastructure should consider the people with disability • The design should consider location of hand washing area to combat the pandemic diseases • During the construction stage, engagement of the health and safety personnel is of more important • Design should consider presence of the solid waste collection points within the campus area • Design should consider presence of burning chambers for sanitary ped
07/04/2023	District Community Development Officer	<ul style="list-style-type: none"> • The sensitization meetings have been conducted in the project area to in the project area

		<ul style="list-style-type: none"> • The proposed project will also increase the per capital income of the individuals • The infrastructure in the project area will be improved • The project will increase population in Ruangwa District Council • The local people will be shifted in flanking environment of the project area, if they decide to sell their plots • The employment opportunity will be available through the project implementation •
06/04/2023	District Fire Officer- Ruangwa District	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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 accidents incidence throughout the project duration
08/04/2023	The ward and Street/Mtaa development committee (Likunja Ward)	<ul style="list-style-type: none"> • The UDSM in collaboration with Lindi municipal council has done conclusive community engagement • 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

		<ul style="list-style-type: none"> • 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
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5.3.2 Consultation with Local Community Members

The consultation meeting with local community members was conducted on 4th April 2023.

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.	<p>Presentation of the Project and its implementation schedule</p> <p>Present potential environmental and social impacts reports and its enhancement and mitigation plan.</p>	<p>Organized public meetings /Consultations based on Stakeholders needs and circumstances (FGD, one on one meetings etc.)</p> <p>Disclosure on UDSM Website</p>
			<p>Describe Grievance Redress Mechanism</p> <p>Present a list of identified stakeholders and describe an approach of their engagement.</p>	<p>Emailing to respective stakeholders.</p> <p>Email copies of the instruments to Non-State Actors and other institutions.</p> <p>Sharing of executive summaries in hard copy during meetings.</p>
				<p>For stakeholders who are illiterate, information will be presented verbally during meetings in local language.</p> <p>Disclosure of Project documentation in appropriate and accessible manner.</p> <p>The instruments will be disclosed in Swahili language in project offices and hard copies will be accessible to stakeholders</p>
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	<p>Face to Face Meetings</p> <p>Community Meetings</p> <p>Site Visits based on stakeholders needs and circumstances.</p> <p>Disclosure on UDSM Website.</p> <p>FGD</p> <p>Disclosure of Project documentation in appropriate and accessible manner.</p> <p>The instruments will be disclosed in Swahili language at the</p>

S/n	Project Phase	Objective	Messages	Means of Communication
				University, Ruangwa City 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 Likunja Village
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 Likunja Village
6.	Throughout the Project Implementation Period.	Information dissemination	General information on Linkuja Centre project implementation	Posting on bulletin boards; Information leaflets, banners Outreach activities with Likunja communities where presentations, workshops and public meetings will be conducted. Sharing on UDSM social media and website Information accessible at Ruangwa.
7.	Throughout the Project Implementation Period.	Contact with the Project Coordination team	Maintain website with contact box, email, social media accounts and phone number for people to submit questions, comments and concerns.	UDSM's Websites UDSM's phone number for HEET activities and concerns will be shared to project sites and all stakeholders. UDSM's phone number for HEET activities and concerns will also be found at Ruangwa Town 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 Engagement 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 Institutions and Agencies (TANESCO, MUWASA, FIRE, OSHA)	Inclusion in the decision-making processes and implementation role of the project	Kiswahili	Correspondence by phone/email meetings Roundtable discussions
2.	Communities and local government authorities of Kianda village	Sensitization as to the project, its benefits and their role. 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 Likunja Centre.	Sensitization as to the project, its benefits and their role. Information on the Project and approach to	Kiswahili	Meetings Roundtable discussions Community meetings Group discussions Outreach activities

S/n	Stakeholder Group	Specific Needs	Language	Communication Means
		managing environmental and social issues. Consideration of their decision-making processes		Flyers Banners
4	Vulnerable Groups (women, youth, elders and the disabled) at project site surrounding areas	Sensitization as to the project, its benefits and their role. 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, MUWASA, FIRE, OSHA)	Inclusion in the decision-making processes and implementation role of the project	Kiswahili	Correspondence by phone/email meetings Roundtable discussions
6	Communities and local government authorities of Kianda village	Sensitization as to the project, its benefits and their role. Information on the Project and approach to managing environmental and social issues.	Kiswahili	Community meetings Outreach activities 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, RUWASA, OSHA); Local NSAs; Community groups representatives from Likunja 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, RUWASA, OSHA); Local NSAs; Community groups representatives from Likunja 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, RUWASA, OSHA); Local NSAs; Community groups representatives from Likunja area,.	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
Representatives of implementing institutions and agencies (TANESCO,	Inform stakeholders of any new activities, unexpected impacts etc.	Inform public about any emerging issues Information and	Public Meetings Focus Groups Discussions.	At least once per each stage of the project or	UDSM Monitoring and evaluation team, E&S Coordinators

Target Stakeholders	Objective	Messages/ Agenda	Means of Communication	Schedule/frequency	Responsible person/ group
RUWASA, OSHA); Local NSAs; Community groups representatives from Likunja area, Students and Student organisation, UDSM staff, service providers and private sector surrounding project site	during construction. Provide updates on project progress	education on the risks and impacts, GRM, workers code of conduct etc. Updates on project progress etc.	Face to Face Meetings	once when there is changes or revision	
Community groups representatives from Likunja area, 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 Ruangwa council and police station
Representatives of implementing institutions and agencies (TANESCO, RUWASA, FIRE, OSHA); Community groups representatives from Likunja area, Students and Student organization, 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
Throughout the Project Implementation Period (All Components)					

Target Stakeholders	Objective	Messages/ Agenda	Means of Communication	Schedule/frequency	Responsible person/ group
Representatives of implementing institutions and agencies (TANESCO, RUWASA, OSHA); Community groups representatives from Likunja area, 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	
Representatives of implementing institutions and agencies (TANESCO, RUWASA, OSHA); Local NSAs; Community groups representatives from Likunja area, 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 IDENTIFICATION AND ASSESSMENT OF IMPACTS

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)³⁹. 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) ⁴⁰. 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 ⁴¹	-	-	-	-
Cultural and Historical Heritage Resources	-	-	-	-

³⁹ Valued Environmental Components can be physical, biological, social, economic, or cultural

⁴⁰ Valued Environmental Components can be physical, biological, social, economic, or cultural

⁴¹ 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 Matrix⁴² provided in **APPENDIX 2**, 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** for 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 commencement of construction works. This requires removal of vegetation cover/trees from the construction site. The vegetation cover /trees provide some ecological functions and improve 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/tress is likely to result into loss of ecological functions and landscape quality of the surrounding environment.

6.3.2 Construction Phase

6.3.2.1 Air pollution due to dust and exhaust emissions

The project will interact with Atmospheric Environment during construction phase through excavation and stockpiling of excavated soil materials 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.

⁴²Environmental Impact Assessment Using the Rapid Impact Assessment Matrix (RIAM). Ed. Kurt Jensen. Published by Olsen & Olsen, 1998.

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. Hence, if it occurs, its effects on human health will be reversible.

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**; and is expected to be **short-term** and **temporary** as it occurs only during construction phase. However, its effects on human health will be **reversible** if it occurs.

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 accumulation of other construction solid wastes. The accumulation of excavated soil materials and other construction solid wastes is likely to result into landscape degradation and loss of aesthetic value of the surrounding environment.

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.

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 **short-term** and **temporary** as it occurs largely during the construction phase. However, its effects on human health are Irreversible because there is not yet any known treatment for HIV, apart from Ant-retrovirus (ARV) drugs, which help to increase resistance against HIV.

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**; and is expected to be **short-term** and **temporary** as it occurs only during construction phase. Its effects on human health will be reversible considered to be **non-cumulative** because it will occur only within the boundaries of the construction site.

6.4.1.3 Construction related risk of accidents.

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

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 construction phase. However, its effects on the human health may be **Irreversible** because the impact may result into fatal injury (death) or non-fatal injury which results into loss of an organ (E.g., legs, arms, etc.). The impact is considered to be **non-Cumulative** because it will occur only within the boundaries of the construction site.

6.4.1.4 Increased risk of traffic accidents

The project will involve movement of heavy trucks to and from the construction site during transportation of construction materials to the construction site 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 into risk of traffic accidents at the junction between the access roads to the construction site and 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 **short-term** and temporary as it occurs during the construction phase. The impact is considered to be non-**Cumulative** because it will occur during construction.

6.4.1.6 Creation of temporary employment for local people

The project 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 dependent families. For example, if the project employs 50 people and if each individual has an average of 5 dependents, 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

Differences in gender and socio-economic status among the project employees are likely to result into emergence of Gender Based Violence (GBV), Sexual Exploitation and Abuse (SEA), and Sexual Harassment (SH). For example, some corrupt senior project staff may demand sexual favours from female job seekers or demand sex from female employees. The impact has been assessed to be **indirectly negative with Low Significance, and is expected to be short-term and temporary as it occurs only during the** construction phase. However, if it occurs, can have long-term effects on the socio-psychological conditions of the affected people.

6.4.2 Demobilization Phase

6.4.2.1 Loss of temporary 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 **long-term** and **permanent** as it will continue to occur after closure or completion of the project. The loss of temporary employment may have some long-term effects on the socio-economic conditions of the retrenched workers.

6.4.3 Operation Phase

6.4.3.1 Increased revenue for infrastructure/utility service providers.

The project will interact with Community Public Infrastructure/Utilities during operation phase through increased demand for water and electricity power supply. 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, RUWASA, 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 Likunja Centre.

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 by the UDSM.

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
Creation of air pollution due to dust emission and exhaust from construction activities.	Low	-	✓	-	-
Creation of noise nuisance and vibration effects due to construction activities.	Medium	-	✓	-	-
Creation of landscape degradation and loss of aesthetic value of the surrounding environment.	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	-	✓	-	-

Impacts	Significance	MP	CP	DP	OP
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		

6.5.1 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.

6.5.1.1 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.

The study on climate projections indicates in present century (2011–2040) Dar Es Salaam is projected to feature decreased minimum temperature in the range of -0.1°C to 0°C ; and increased rainfall in the range of 0.25 to 0.5 mm/day⁴³.

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 maneuver 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 6.5-2** provides the general mitigation measures against climate change effects. **Table 6.5-3** outlines the specific mitigation measures against the potential effects/impacts of climate change on the construction of new academic buildings at Likunja Centre.

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

⁴³ Climate Change Projections for Tanzania Based on High-Resolution Regional Climate Models from the Coordinated Regional Climate Downscaling Experiment (CORDEX)-Africa. Philbert Modest Luhunga, Agnes L. Kijazi, Ladislaus Chang'a, Afredy Kondowe, Hashim Ng'ongolo and Habiba Mtongori. <https://www.frontiersin.org/articles/10.3389/fenvs.2018.00122/full>

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 6.5-2: 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 fractures.	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 6.5-3: 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. In the long run sedimentation will result into reduced water retention capacity of the	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-

	marshland, hence increased flood risk around the building structures	off and overloading of the marshland area.
(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.

6.5.1.2 Impacts of Seismic Activity on the Project

The construction site is not located within an area with high seismic hazard⁴⁴ 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.

6.5.1.3 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, firefighting 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.

6.6 Analysis of Alternatives

The purpose of the project is to undertake construction of Classroom cum office Building, Hostel Building, and Min-cafeteria Building. The justification for the project has been prompted by the need for 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.

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.

⁴⁴ ⁴⁴Map 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.

6.6.1 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 Likunja Centre

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 6.6-1**.

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 6.6-1: No Project Alternative VS Project Alternative.

Evaluation Criteria	Project Alternative		Project Alternative	
	No Alternative	Low	High	Low
Techno-economic				

Evaluation Criteria	Project		Project Alternative	
	No Alternative	Low	High	Low
Investment Costs	-	-	-1	-
Students' enrolment level	-	-2	+2	-
Revenue collection for fees	-	-2	+2	-
Productivity	-	-2	+2	
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.				

6.6.2 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 6.6-2**.

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 6.6-2: Labour-Intensive VS Machine-Intensive Methods.

Evaluation Criteria	Labour-intensive method		Machine-intensive method	
	High	Low	High	Low
Techno-economic				
Cost of hiring equipment / machinery	-	+1	-1	-
Employment creation	+1	-	-	-1
Efficiency and time saving	-	-1	+1	
Work productivity	-	-1	+1	-
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	
<p>KEY: +1 = Positive Impact -1 = Negative Impact</p>				
<p>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.</p>				

6.6.3 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 Ruangwa District 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.

6.6.4 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.

6.6.5 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:

- Proper selection of site with adequate distance from human settlements/college buildings and consideration of wind direction.
- Planting of trees around the WSP to act as a wind break and minimize odour nuisance to the nearby receptors.
- 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 wetland at Likunja Site may not be economical due to absence of suitable area, which can be harnessed for establishment of Constructed Wetland

Conclusion: It is therefore recommended that the use of WSP should be preferable to the use of Constructed Wetland at Likunja Site.

CHAPTER SEVEN

7.0 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 Likunja Centre. The employment opportunities can be increased by emphasizing 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 Creation of temporary employment opportunities for local people

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 Likunja Centre 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 iron 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 foundations⁴⁵.

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 goggles, safety boots, etc.
- Avoid prolonged use of hand-held equipment by workers beyond the prescribed 8 hours in accordance with Tanzania Standards⁴⁶.

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

⁴⁵ This effect has already been noted during the site investigation at CoET Site.

⁴⁶The United Republic of Tanzania. The Environmental Management (Standards for Control of Noise and Vibration Pollution) Regulations (2010). THIRD SCHEDULE (Made Under Regulation 15(1)).

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 of 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.
- 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 UDSM Likunja Centre 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 reputation⁴⁷. 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.

⁴⁷ 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	<ul style="list-style-type: none"> ▪ 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	<ul style="list-style-type: none"> ▪ 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. ▪ To 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	<ul style="list-style-type: none"> ▪ 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
		<ul style="list-style-type: none"> ▪ 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	<ul style="list-style-type: none"> ▪ 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. ▪ 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	<ul style="list-style-type: none"> ▪ Comply with the relevant requirements of the plan and other health and safety documentation.

S/n	Key Personnel	Responsibilities
		<ul style="list-style-type: none"> ▪ 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 advise the Project Manager, Site Manager and Site Foremen.

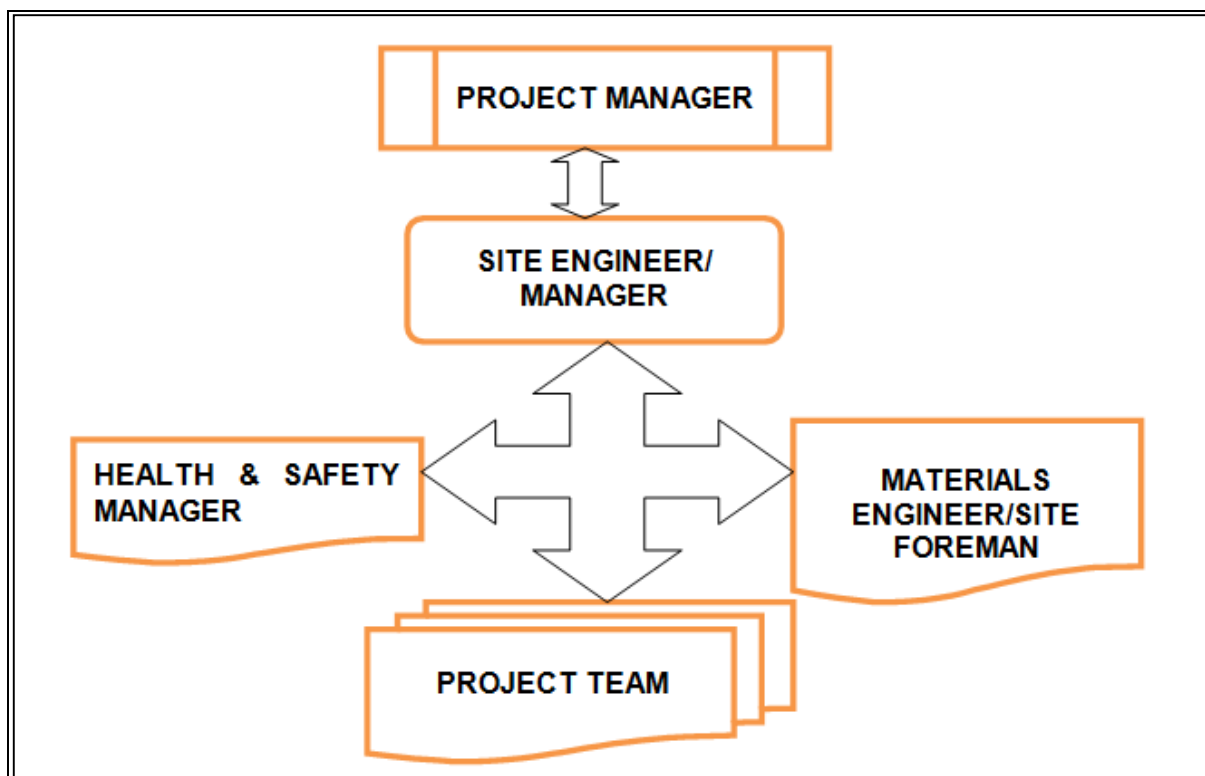


Figure 8.3-1: Organizational Structure for the EH&S Management Plan.

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 Reporting 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 injuries⁴⁸; over 3 day injuries⁴⁹; work related disease; and dangerous occurrences⁵⁰. 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.

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 monthly safety performance report must provide the following information:

- Total personnel at site
- Total man hour worked

⁴⁸ It could be worker injuries or public member injuries.

⁴⁹ Employee fails to perform normal duties work for 3 consecutive days.

⁵⁰ These are near-miss happenings that are reportable.

- 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 **Figure 8.4-2**.

Table 8.4-2: Risk Rating Matrix.

Consequences (C)	Likelihood (L)				
	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.

Impact	H	Yellow	Red	Red
	M	Green	Yellow	Red
	L	Green	Green	Yellow
		L	M	H
Probability				

(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 analysed 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 organization of the project; and
- Communicate environmental and social expectations and requirements to various stakeholders and relevant institutions, and regulatory agencies.

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

The measures and procedures outlined in this ESMP are commitments made by project proponent and therefore remain responsible for their implementation. It is recognized 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.

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 ESIA's ESMP will be used by the Contractor for preparation of Contractors' specified 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.

9.2 Institutional Roles and Responsibilities

The important stakeholders / agencies identified in this ESMP include the University of Dar Es Salaam (UDSM); World Bank; Ruangwa District 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 organizational 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.

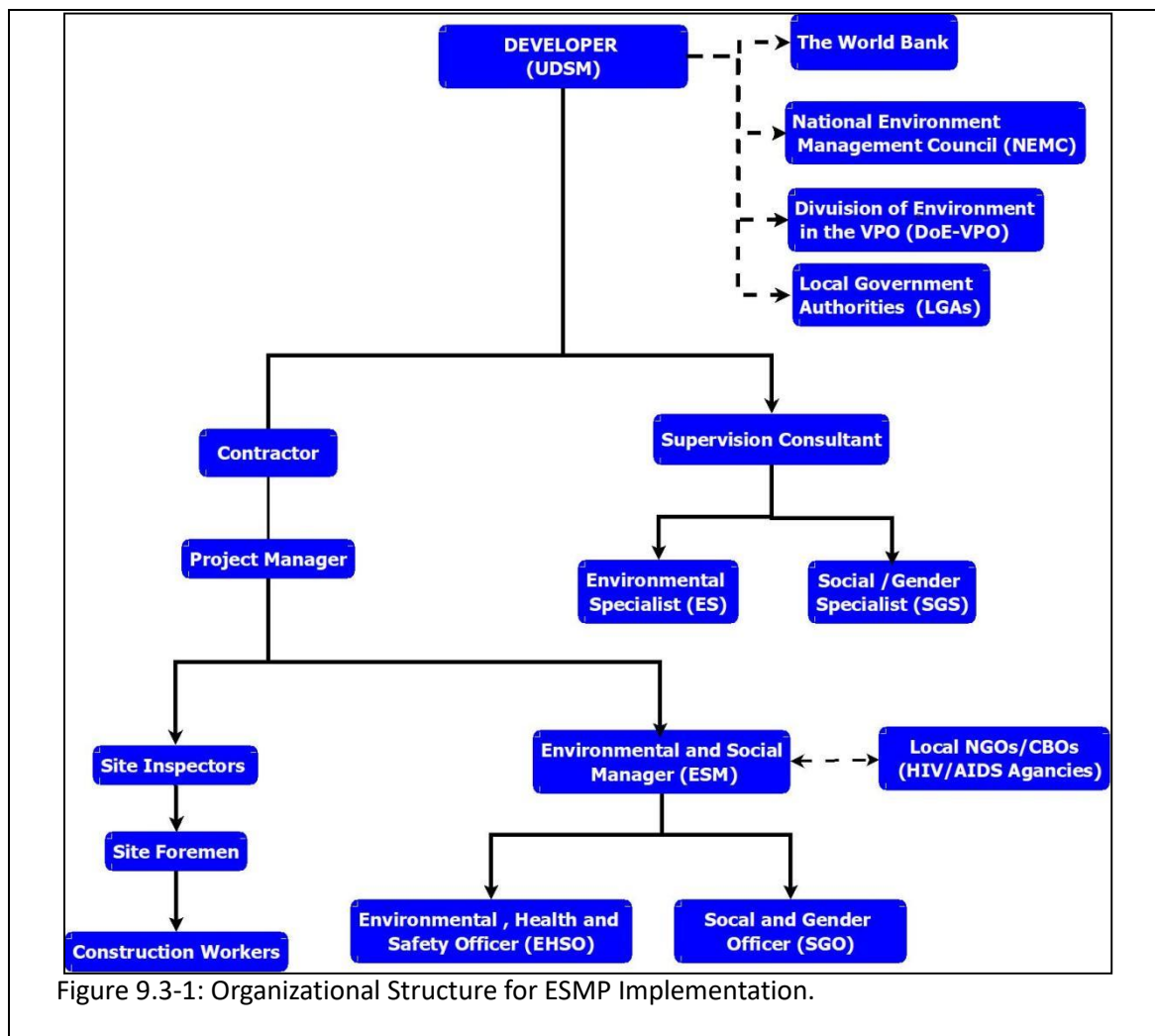


Figure 9.3-1: Organizational Structure for ESMP Implementation.

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 Likunja 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, 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 Officer (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 Likunja University Campus is located within the jurisdictional boundaries of Ruangwa District Council, Likunja ward, Likunja and Kitandi Villages Governments. Ruangwa District Council and the respective Ward and Village Governments are considered as the Local Government Authorities (LGAs).

The involvement of 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 Ruangwa District Council as an LGA should be involved in the implementation of this ESMP.

In order to make the LGA to be well informed on the contents of the ESIA Report, one copy of this report will be submitted to Ruangwa District Council. This is to ensure that the LGA through its Environmental Management Officer (EMO) is 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 Contractor 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 Construction 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.

9.3.11 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.

9.3.11.1 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:

- Environmental and Social Safeguard (ESS) Team.
- Supervision Consultant's Environmental Specialist and Social/Gender Specialist
- Contractor's Human Resource Officer (HRO), EHSO, and SGO.
- Ruangwa District Council Environmental Management Officer (EMO) and Community Development Officer (CDO).

- Likunja Ward Executive Officer (WEO).
- Likunja and Kitandi Village Executive Officers (VEOs).
- Local NGO and CBO dealing with ESHS Issues.

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.

9.3.11.2 Role and Responsibility of Grievances Redress Committee

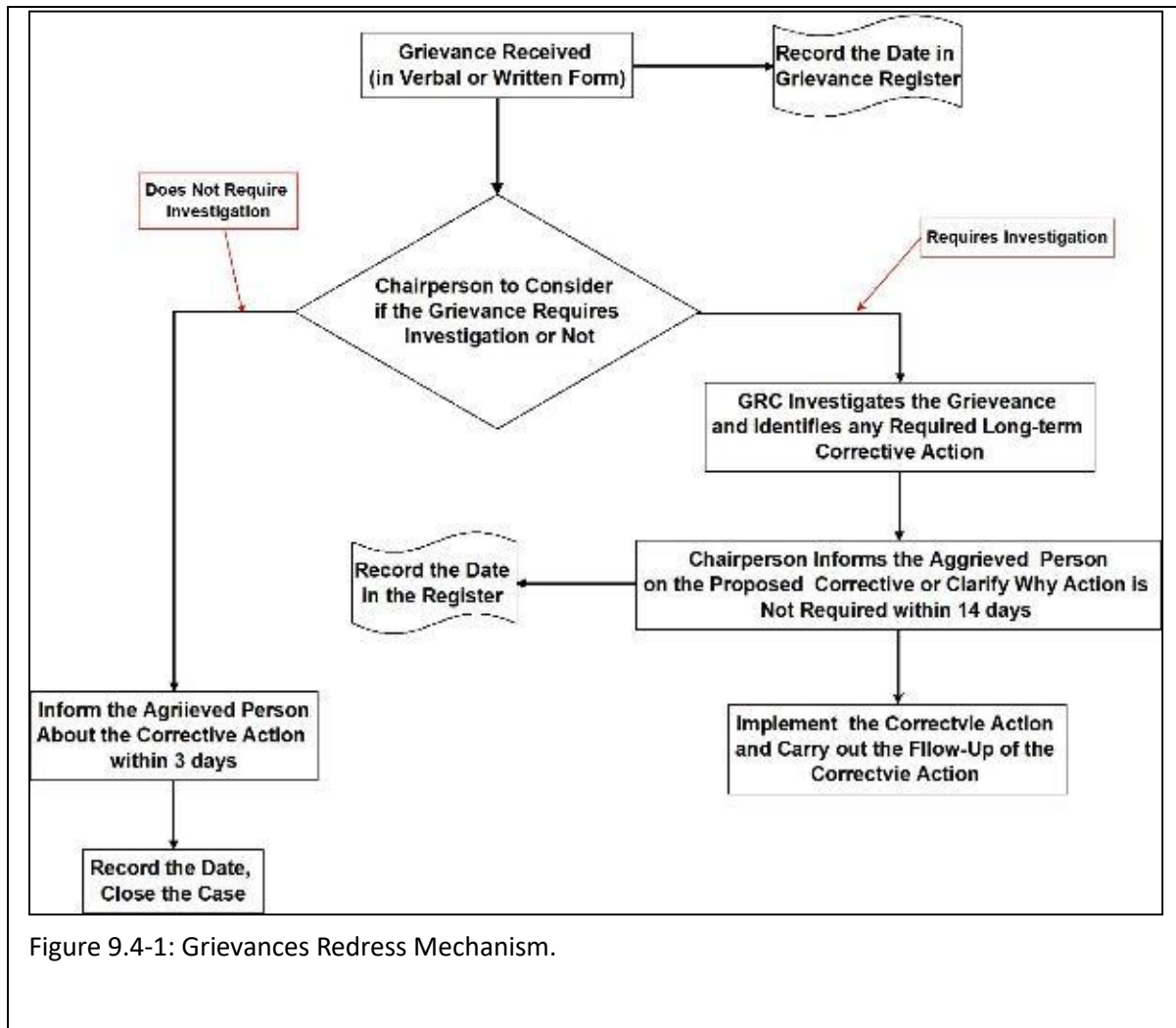
The Gender Redress Committee (GRC) will be chaired by PIU's Gender Expert, who shall be responsible for receiving and registering grievances. The Supervision Consultant's Social/Gender Specialist shall be the Secretary of the GRC and shall be responsible for assisting the Chairperson in documenting, 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 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., District Council Office, Ward Government Officer and Village Government Officer).

9.3.11.3 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.



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:

- documented in a written Grievance Form and recorded in a logbook;
- assessed on its level of urgency/severity; and
- 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 provided in **APPENDIX 4**.

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.

9.4 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's ESS Officers.

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 ESHS and GBV/SEA, and thereafter regularly (monthly) throughout the project implementation period. The samples of Contractor's Code of Ethical Conduct and Code of Conduct on ESH&S and GBV/SEA are provided in **APPENDIX 6**.

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 PIU for review and approval.

9.5 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 UDSM Likunja Centre 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 the 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.

9.5.1 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.

9.5.2 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 construction workers, and to ensure proper construction practice during the construction period in order to avoid some construction behaviors, that have adverse impacts on the environment.

The training will help the responsible project personnel to understand their obligations in environmental protection and possible consequences of the environmental damage. The construction workers will have a better understanding of the protection level and methods for environmentally sensitive areas. Based on the actual situation of the project, the training period for construction workers will not be more than one week.

9.6 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.

9.7 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 9.7-1**, 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.	<ul style="list-style-type: none"> • 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 foundations⁵¹. 	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.	<ul style="list-style-type: none"> ▪ 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).	<ul style="list-style-type: none"> • Limiting noisy construction activities only to day time hours. • Fencing of the construction site with corrugated iron sheets to minimize transmission of noise to the sensitive receptors. 	Contractor monitored by Supervision Consultant's Environmental Expert	2,000,000.00

⁵¹ This effect has already been noted during the site investigation at CoET Site.

Effects/Impacts	Mitigation/Enhancement Measures	Responsibility	Cost Estimates (TZS)
Landscape degradation and loss of aesthetic value of the surrounding environment due to accumulation of construction / demolition solid wastes.	<ul style="list-style-type: none"> • 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. 	Contractor monitored by Supervision Consultant's Environmental Expert	10,000,000.00
Increased transmission of HIV/AIDS and STIs	<ul style="list-style-type: none"> ▪ 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.	<ul style="list-style-type: none"> ▪ 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	<ul style="list-style-type: none"> ▪ 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. 	Contractor monitored by Supervision Consultant's Environmental Expert	2,000,000.00

Effects/Impacts	Mitigation/Enhancement Measures	Responsibility	Cost Estimates (TZS)
	<ul style="list-style-type: none"> ▪ 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. 		
Creation of occupational health and safety risks.	<ul style="list-style-type: none"> ▪ 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 Standards⁵². 	Contractor monitored by Supervision Consultant's Environmental Expert	50,000,000.00
Increased employment opportunities for local people due to recruitment of construction workers.	<ul style="list-style-type: none"> ▪ 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 	Contractor monitored by Supervision Consultant's Environmental Expert	Not Applicable

⁵²The 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)
	<p>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)</p>		
<p>Risk of emergence of GBV/SEA and SH due to interpersonal relationships and social interactions.</p>	<ul style="list-style-type: none"> ▪ The Contractor will ensure there are codes of conduct on prevention of Gender-Based 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. 	<p>Contractor monitored by Supervision Consultant's Environmental Expert</p>	<p>15,000,000.00</p>

Effects/Impacts	Mitigation/Enhancement Measures	Responsibility	Cost Estimates (TZS)
Increased income generation opportunities for local people due to increased demand for food from construction workers.	<ul style="list-style-type: none"> 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.	<ul style="list-style-type: none"> 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.	<ul style="list-style-type: none"> Give 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. 	Contractor monitored by Supervision Consultant's Environmental Expert and Social/Gender Expert	To be provided in the BOQ for Other Items
D. Operation Phase			
Increased enrolment of students and revenue for the institute.	<ul style="list-style-type: none"> The UDSM-Likunja Centre will promote marketing of the institute at national and international levels. 	The Management of UDSM-Likunja Centre.	NA
Increased revenue for infrastructure/ utility service providers.	<ul style="list-style-type: none"> UDSM will make consultation with infrastructure/utility service providers. 	UDSM-Likunja Centre 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 councilor 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 Councilor 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.

10.2.3 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.

10.2.4 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.

10.3 ESMP Monitoring Schedule

The ESMP monitoring schedule as summarized in **Table 10.3-1**, 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 10.3-1: 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) HIV/AIDS program is in place and	Independent Environmental and Social Consultant (IESC) in collaboration

Monitoring Parameters	Monitoring Objective	Monitoring Indicators	Monitoring Locations	Monitoring Methods	Monitoring Frequency	Performance Standards	Monitoring Responsibility
		Number of participants by gender.				being implemented on a regular basis.	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. Presence of written warning signboard in	Construction sites.	Visual inspection.	Continuous.	Number of reported constructions related accidents.	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
		Kiswahili and English. Presence of trained mobile equipment /machine operators.					
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.
B11. Workers Welfare ⁵³ and Child labour.	To ensure compliance with labour laws.	Monthly Salary Slips;	Based on submission of Monthly	Monthly ESH&S	Monthly	Number of reported complaints	Independent Environmental and Social

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
		NSSF Monthly Payment Receipts. WCF Monthly Payment Receipts	Compliance Reports.	Compliance Reports		regarding minimum wages. Reported cases of non-payment of Monthly NSSF and WCF contributions.	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							
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.

Monitoring Parameters	Monitoring Objective	Monitoring Indicators	Monitoring Locations	Monitoring Methods	Monitoring Frequency	Performance Standards	Monitoring Responsibility
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 building is estimated to be Tanzania Shillings (TZS), 1,019,375,000.00.

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.

11.1.2.1 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 diseases like cholera and diarrhea to the construction workers.

11.1.2.2 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 11-1** is considered to be the environmental⁵⁴ cost to be incurred due to implementation of mitigation measures for this project, which is estimated to be TZS 103,400,000.00.

Table 11-1: Direct Environmental Cost Estimates.

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

⁵⁴The term "environmental" in this report also means "social" and "cultural", unless otherwise specified.

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 the total project costs is estimated to be TZS 1,122,775,000, after including the environmental costs.

When compared with total project costs (TZS 1,122,775,000), the overall environmental cost is about 9.209% 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. 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 3, 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 demobilization plan:

- Workers Welfare Management
- Camp Sites and Office Facilities; Solid Waste Management; Soil Erosion and Sedimentation Control; Groundwater and Dewatering Control.
- Workshops/Garages, Vehicle Washing and Refueling 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 Lecture Rooms, Offices, Hostel, and Mini-Cafeteria at the UDSM Likunja Centre in Ruangwa District, Lindi Region. 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 Likunja Centre is one of the selected locations where the HEET Project will be implemented.

For UDSM Likunja Centre, the HEET Project involves construction of Lecture Rooms and Offices, Hostel, and Mini-Cafeteria Buildings. 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) 437,500.00 or Tanzania Shillings (TZS) 1,019,375,000.00 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) indicates that ESS 1, ESS 2, ESS 3, ESS 4, and ESS 10 will be applicable. The review of national policies, legalizations 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 characterized 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 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"), as well as tricycles ("Bajaj") plying along the local roads. These include the Likunja-Kitandi Road and Likunja-Makanjiro Road. The nearest sensitive receptor is the existing Likunja Secondary School, about 1.21 km to the south-east of 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 precautions 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. Air quality measurements indicate concentration of gaseous emission (CO, SO₂, O₃, NO, CH₄, H₂S) were below detectable limits.

The existing infrastructure includes three (3) electricity power poles; sewer manholes; and 14 Staff Houses. During the site investigation it was noted that the sewer manholes are directed towards the

marshland or wetland vegetation. 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, health, and safety risks than “Machine Intensive Method”.

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 Likunja Centre. The employment opportunities can be increased by emphasizing on labour-intensive construction methods. The labor-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 shorelines. 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.

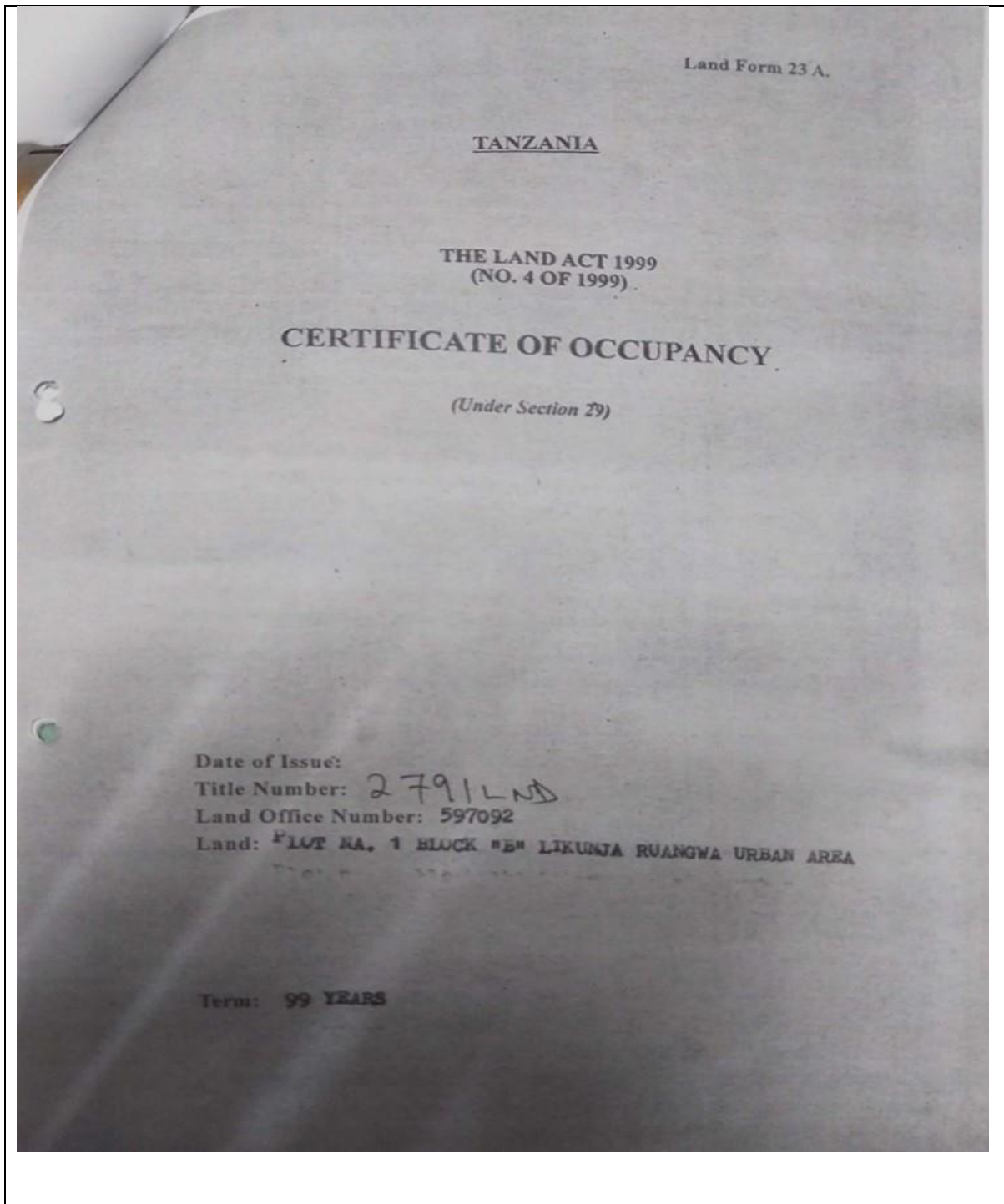
It is therefore recommended that some of the trees should be retained by carefully selecting the location of lecture theatre and laboratory building. Trees and grass should be planted around the building to prevent soil erosion and sedimentation of storm water drainages. However, trees species to be planted must be carefully selected to avoid trees species which may damage building foundation.

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APPENDICES

APPENDIX 1: TITLE DEED FOR LIKUNJA SITE.



APPENDIX 2: BASELINE DATA ON AIR QUALITY, NOISE AND VIBRATIONS**Appendix 2a: Ambient Particulate Matter measured at Likunja Campus project site.**

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	-10.14398	38.896991	0.031	0.023	0.010
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: Average values of measured ambient pollutant gases

Station Code	LOCATION		Ambient Pollutant Gases				
	GPS Readings		CO	NO ₂	SO ₂	H ₂ S	VOCs
	Latitudes	Longitudes	mg/m ³	mg/m ³	mg/m ³	mg/m ³	mg/m ³
AQMS1	-10.14398	38.896991	1.47	0.101	0.32	0.024	5.3
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: Average ambient Noise Levels measured at established station.

Station Code	Location		Noise Levels in dBA	
	GPS Readings		Daytime	Night-time
	Latitudes	Longitudes	dBA	dBA
AQMS1	-10.14398	38.896991	45.8	42.5
TBS Limits			<52	<42
WHO/IFC/WB Guidelines			<55	<45

Source: Field Measurements on February 2024.

Appendix 2d: Average vibrations levels at the measured station.

Station Code	Location		Vibration Levels (mm/s PPV)
	GPS Readings		
	Latitudes	Longitudes	
AQMS1	-10.14398	38.896991	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)	Permanence (B1)	Reversibility (B2)	Cumulative (B3)	$\alpha1 \times \alpha2 = \delta T$	$\beta1 + \beta2 + \beta3 = \sigma T$	$\delta T \times \sigma T = ES$	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 existing 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 employees 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/utility 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